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Information Resources on the Care and Welfare of Rabbits

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[Updates: Housing, Husbandry, and Welfare of Rabbits, 1994](#)



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[Web Policies and Important Links](#)

Contents

- [Acknowledgments](#)
- [How to Use this Document](#)
- [Request Library Materials](#)
- [Animal Welfare Concerns for Companion and Laboratory Rabbits](#)
by Anna Meredith
- [Animal Welfare Issues for Commercial Rabbit Producers](#)
by James McNitt, Ph.D. and Janice Swanson, Ph.D.
- **Bibliography**

These sections should be of interest to researchers, graduate students, extension specialists, and veterinarians. Citations were selected from scientific journals, texts, and proceedings from the years 1994-2005.

- [Anesthesia and Analgesia](#)
- [Animal Models](#)
- [Behavior](#)
- [Breeding](#)
- [Environmental Enrichment](#)
- [Feeding](#)
- [General Information](#)
- [Health](#)
- [Housing](#)
- [Laboratory and Clinical Techniques](#)
- [Production](#)
- [Reproduction](#)

- [Web Site Resources](#)
-

Acknowledgments

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Special thanks to D'Anna Jensen for the cover design, final editing, formatting, and printing of this publication. Her role in guiding this publication to completion is greatly appreciated.

About this Document

This publication is divided into three major sections: Introduction, Bibliography, and Web Site Resources. A section containing National Agricultural Library Document Delivery Information for U.S. and foreign patrons follows these sections.

Introduction

Two articles written by world experts outlining current issues regarding the care and welfare of companion rabbits, laboratory rabbits, and rabbits raised for commercial purposes are presented.

Bibliography

An extensive bibliography categorized into twelve subject subsections covering all aspects of rabbit care, husbandry, health, and welfare comprise this section of the publication. Citations were selected from searches conducted using a variety of agricultural, medical, and life science databases. Within a subject category citations are arranged alphabetically according to the last name of the primary author. Each citation is listed with a set of keywords that describe useful information about the entry. If a citation is listed from a publication available through the National Agricultural Library (NAL) the NAL call number has been included. Entries were included with publication dates ranging from 1994-2005.

Web Site Resources

Over thirty annotated web site resources relating to the care, welfare, and housing of rabbits are listed. It should be noted that the recommendations on the proper care of rabbits vary widely depending on many factors including what breed, type of housing, and for what purpose the rabbits are kept. The sites include rabbit care and welfare information for companion, commercial, and laboratory rabbits. Resources selected cover: breeds, breeding, housing, health, nutrition, general husbandry and more. All resources are accessible through the internet and are current as of August 2006. Readers are cautioned as to the dynamic nature of the internet and the fact that addresses and content are subject to change.

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The Animal Welfare Information Center, <http://awic.nal.usda.gov/contact-us>

<http://awic.nal.usda.gov/pubs/Rabbits/rabbits.htm>

August 30, 2006

Animal Welfare Concerns for Companion and Laboratory Rabbits

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The relationship between rabbits and man goes back over 3,000 years and they are used for food, fur, sport, research and as companion animals. Rabbits are increasing in popularity as pets, and in the UK are the third most popular mammalian pet after cats and dogs (Pet Food Manufacturer's Association 2002). Although traditionally a children's pet, rabbits are now more commonly kept by adults as a true companion animal in the home, taking the place of cats and dogs. There is a plethora of information sources for owners about companion rabbits, on the internet and in publications, and understanding of basic husbandry requirements has increased in recent years. Expectations for high quality veterinary care and the availability of pet insurance for rabbits in the UK, has led to great improvements in medical and surgical care of many animals. However, there are still many welfare issues present, especially regarding diet and its effect on dental and gastrointestinal health, housing and behavioral problems. The number of unwanted companion rabbits rescued by welfare organisations is still high, with owners purchasing young animals on impulse, especially at Easter time, with scant regard to their requirements and the cost of veterinary care, or the behavioral changes that can occur at puberty if animals are not neutered.

The use of laboratory rabbits is generally decreasing and is low compared to the use of rodents. In 2002 the Home Office in the UK recorded 30,280 scientific procedures on rabbits, compared to over 2.2 million procedures on rats and mice (Home Office 2003). Strict legislation controls the welfare of laboratory rabbits in the UK and many other countries. The main welfare issues are that of housing and social requirements, the refinement of laboratory techniques such as anaesthesia and antibody production, and the assessment and alleviation of pain.

The update of this bibliography on *Housing, Husbandry and Welfare of Rabbits* reflects the enormous advances that have been made over the past decade in our knowledge and understanding of rabbit physiology and behavior, and will be an invaluable tool to veterinarians, researchers, animal technicians and all who work with this fascinating species. This introduction will largely reflect the author's opinion and experience of both companion and laboratory rabbits in the UK.

Housing

Rabbits are highly social animals with complex social behavior based largely on scent. Comparative studies of domesticated rabbits living in groups in large enclosures have shown they retain the full behavioral repertoire of their wild counterparts (Bell 1984). Housing for laboratory rabbits has generally improved greatly over the last decade, with group housing and environmental enrichment now the norm rather than the exception in many laboratories, and several guidelines on best practice for housing are available (Hubrecht 1999, 2000; Stauffacher 2000; Second Report of the BVA/WF/FRAME/RSPCA/UFAW Joint Working Group on Refinement). It is generally accepted that housing rabbits in pairs or groups, preferably in floor pens, can significantly improve their physical and psychological welfare. The

welfare issues for singly housed rabbits are well known, and manifest mainly as stereotypic behavior, such as:

- rhythmic biting of water bottles
- biting, chewing or licking of bars food hoppers, walls and floor
- pawing or digging in the corner
- excessive fur pulling
- rapid circling
- head swaying/weaving and vertical sliding of nose between bars.

Permanently caged animals are also prone to osteoporosis due to inactivity (Claes and Burri 1979), and obesity. Rabbits housed in social groups benefit from both social interactions and exercise, and abnormal behaviors are greatly reduced (Love 1994; Batchelor 1995; Krohn 1999). Rabbits are commonly used for antisera production in laboratories and concerns that stress effects on both high and low-ranking group-housed rabbits may affect immune function have not been proven (Turner et al. 1997), leading to little justification for single housing for this purpose. In addition, health problems such as rhinitis and sinusitis (Asnuffles@) may be reduced, due to better ventilation and reduction in exposure to high ammonia concentrations (Love and Hammond 1991). Group housing can lead to problems such as aggression and stress if the group is unstable, and great care must be taken to ensure that groups are compatible. Intact males in particular are prone to fighting and there are differing opinions on the justification of using surgical neutering to manage this. However, from all the research to date, the benefits of group housing in terms of animal welfare far outweigh any disadvantages and should be used wherever possible. Furthermore, the improvements in physiological and psychological health should result in more physiologically normal experimental models, which may lead to a reduction in the numbers needed in research.

The sense of smell is very important to rabbits and complex information concerning social interactions relating to sex, hierarchy, and mother/infant relationships is communicated via this route (Bell 1986). For this reason the use of strong smelling substrates such as wood shavings should be avoided and partial rather than total cleaning out is preferable to retain a sense of security. Experiments have shown that rabbits choose straw or shredded paper as a substrate in preference to wood shavings (Turner et al. 1992), and the strong smell of the latter may influence this preference.

Studies have also shown that environmental enrichment has great psychological benefits, especially for singly housed animals (Lidfors 1997). The provision of shelves or boxes to give an area of raised height seems to be particularly beneficial (Hansen 2000; Gerson 2000). The provision of hay has both behavioral (Berthelsen 1999) and health benefits (see below).

For companion rabbits, few guidelines exist, and inappropriate housing can still cause welfare issues, often due simply to owner ignorance or misinformation. The hutches sold in the majority of pet shops are far too small for rabbits to fulfil even basic behavioral requirements such as standing erect on the hind legs and the ability to hop. Rabbits should be kept with a companion wherever possible and allowed regular access to an exercise area. The ability to graze in an outdoor pen has benefits both in terms of exercise and dietary health. House rabbits generally benefit from more interaction with the owner than those kept in hutches, and are usually allowed to roam free in the house. However, chewing of household objects can lead to problems such as electrical burns from cables and gastrointestinal obstruction from ingestion of materials such as carpet. Therefore rabbits should not be left unsupervised and have a safe cage area for confinement when necessary.

Feeding

Feeding an appropriate diet to a companion rabbit is probably the single most important factor in maintaining its health. There is a great deal of literature relating to the nutrient requirements of production and laboratory rabbits, but relatively little relating specifically to the companion rabbit. Companion rabbits have the potential for a much longer life span than the short-lived production or experimental rabbit. Many of the diseases commonly seen in pet rabbits can be directly attributed to, or associated with, the feeding of an inappropriate diet and could be largely preventable.

Rabbits are adapted in terms of their teeth and digestive system to eat an herbaceous diet that is high in fiber, low in fat,

and low in starchy carbohydrates. However, rabbits are commonly fed low fiber and high carbohydrate diets, which are linked to:

Dental disease

Rabbit teeth grow constantly throughout life. Rabbits on a high carbohydrate and low fiber diet have reduced tooth wear and therefore elongation of the tooth both above and below the gum. This results in irregular wear, distortion and the formation of sharp painful spikes. Severe elongation of the cheek teeth can prevent the mouth from closing fully, which ultimately prevents the incisors meeting properly, causing them to also overgrow. Overgrown distorted teeth are predisposed to infection and the development of facial abscesses. High carbohydrate diets and reduced wear also predispose to caries (cavities).

Opinions vary on the significance of dietary calcium levels on dental disease. Many rabbits are selective eaters of coarse mix, favouring items low in calcium and fiber. This may make them prone to osteoporosis and poor tooth and bone quality. Bone growth, development and maintenance are also dependent on the mechanical stresses to which it is subjected. Rabbits, which do not spend prolonged periods grinding fibrous food, can also show poor jawbone quality.

Not all dental disease is due to diet, and genetic factors are also important. A congenital malocclusion of the teeth, particularly in extreme dwarf and lop breeds, can also be a significant factor. This can have major welfare implications, as affected animals will need incisor trimming at regular intervals. The use of clippers to cut teeth is painful and can result in microfractures of the enamel, loosening of the teeth, exposure of pulp and dental infection (Meredith and Crossley 2000). Burring of the teeth or complete removal of maloccluded incisors is therefore recommended.

Gastrointestinal disease

Fiber is critical to the rabbit for gastrointestinal health because it stimulates and maintains normal motility of the gut. Low fiber diets predispose to gut stasis and the formation of hairballs. High starch diets can be incompletely digested due to the rapid gut transit times, and cause a rapid overgrowth in caecal bacteria. This can lead to enterotoxaemia and fatal diarrhoea. This is seen mainly in young, recently weaned rabbits when also fed minimal hay, and combined with the stress of a change of diet and a recent move, for example from a breeder to a pet-shop (Brown 1997; Bennegadi 2001).

Behavioral problems

Rabbits in the wild spend many hours a day eating. Low fiber concentrate diets are rapidly eaten and rabbits can develop vices related to boredom, such as increased aggression or repetitive bar biting. Lack of fiber can also lead to fur chewing and barbering.

Obesity

The feeding of ad libitum concentrate diets in both laboratory and companion rabbits is a common cause of obesity. This can predispose to serious health problems including arthritis, osteoporosis, faecal retention around the perineum, urine scalding, flystrike and metabolic disease.

The best diet for rabbits is one that mimics as closely as possible their natural grass-based diet in the wild. The bulk of the diet of the pet rabbit should consist of grass (fresh or freeze-dried) and/or good quality meadow/Timothy hay, and this should be available at all times. Education of rabbit owners and laboratory staff is the crucial to improve rabbit welfare by means of dietary improvement. Pet shops and veterinarians, welfare organisations and the media can play a key role in achieving this relatively simple measure, that will have a major influence on rabbit health.

Neutering

Surgical neutering of laboratory rabbits is generally not undertaken, although it is used in some long-term situations to prevent aggression in group housed males. In companion rabbits, neutering is generally recommended. Unbred does are

particularly prone to developing uterine adenocarcinoma, and the use of neutering as prevention is recommended. Neutering of both sexes will also prevent many behavioral problems such as territorial aggression and urine spraying that can result in animals becoming unwanted or sent to rescue organisations. The ethical arguments for and against the use of surgical intervention to prevent these problems divides opinion, but the welfare implications of an animal being neglected or abandoned must be borne in mind. It is generally recognised that a neutered female and a neutered male make the most stable social combination for companion rabbits.

Behavioral Problems

In both companion and laboratory rabbits individual housing, a barren environment and a concentrated, low fiber diet can lead to behavioral problems such as stereotypic behavior and aggression. Normal territorial behavior, especially in does on reaching sexual maturity, can manifest as cage guarding and biting when approached. Aggression can also be a learned behavior and a common cause is incorrect handling--the rabbit that is picked up in an insecure manner rapidly learns that if it bites the handler it will be put down. Pain is another important cause of aggression, especially in a previously tractable animal. Many behaviors seen as problems by the owner are in fact normal, such as digging, chewing and territorial marking with urine. Advice for behavioral problems is increasingly sought by rabbit owners from both veterinary surgeons and animal behavior counselors (McBride and Wickens 1997; Scott 2001).

Veterinary Care and Preventive Medicine

Many rabbit diseases are preventable (see Diet above) and a routine preventive medicine programme should be instituted to include dietary and husbandry advice, routine veterinary examination (Antinoff 1999) and, where appropriate, neutering and vaccination against Myxomatosis and Viral Haemorrhagic Disease. Outdoor rabbits are particularly prone to myiasis (flystrike) in summer months and should be checked regularly.

Anesthesia and Analgesia

Rabbits are particularly prone to stress on handling, and sedation or anaesthesia is frequently required for both minor and major veterinary or experimental procedures. Anaesthesia in rabbits is still judged as a relatively high risk procedure, with figures of up to 30% mortality reported (Kramer 1998). Provision of sedation or anaesthesia is an important welfare issue, but can in itself be a source of stress. In particular the use of volatile agents such as isoflurane, sevoflurane and desflurane for induction has been shown to be aversive and result in struggling and apnoea (Flecknell et al. 1999, Hedenqvist et al. 2001). Significant improvements in anaesthetic techniques have been made in the past decade or so, particularly the use of balanced anaesthetic regimes using a combination of agents in order to minimise unwanted side effects, such as medetomidine or xylazine, ketamine and butorphanol with supplementary oxygen (Borkowski and Zaras 1999; Meredith and Crossley 2000). Better peri-operative care, such as maintenance of body temperature, analgesia, fluid therapy, and gastrointestinal support plays a major role in decreasing anaesthetic complications and mortality.

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[Return to Top](#)

[Return to Contents](#)

Animal Welfare Issues for Commercial Rabbit Producers

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Commercial rabbit production includes the production of meat, pelts, and wool and the production of live animals for breeding and laboratory stock and for pets.

In the United States, a large number of people involved with rabbits are fanciers-- people who raise rabbits for show purposes. Although this group may not directly seek advice from an Extension agent, they may serve as a source of information and assistance. The American Rabbit Breeders Association, Inc., is one group that deals with many aspects of rabbit production. They set standards of perfection for judging and sponsor a variety of events for rabbit enthusiasts. The Professional Rabbit Meat Association is comprised of rabbit growers producing rabbits for meat and sponsor a newsletter and computer network to provide mutual assistance.

The "Easter Bunny Syndrome" makes commercial rabbit producers particularly vulnerable to criticism. Rabbits are naturally "cute" and possess physical attributes that attract the affection of most people. The production of rabbits as a source of fur has been addressed by animal protection groups (People for the Ethical Treatment of Animals and other groups).

As animal protection actions and concerns continue to rise with regard to the acceptability of standard husbandry practices, people involved in the production and use of rabbits need to be aware of potential problem areas. Several commercial production practices may be targeted as welfare concerns:

- confinement rearing
- post-partum breeding
- wool harvesting methods
- fur production
- transport
- slaughter
- sales

Confinement Rearing

Controversy over the confinement rearing of social species of livestock (calves, poultry, swine) has been a primary welfare issue. Although little attention has been focused on rabbits, it is reasonable to assume that the same complaints of space restriction and social deprivation are tenable. Rabbits are usually caged in groups before sexual maturity and individually as adults. Most fryers (young rabbits harvested for meat), are group-raised littermates. Fryers are marketed at a target age of 56 days but may not attain market weight until 70 days. Commercial rabbit producers house rabbits in caging systems with cage sizes adjusted for breed of rabbit, management system, and intended purpose (e.g., breeding adults vs. laboratory stock). Because of the ventilation problems inherent in multi-deck caging systems, most large rabbitries have a single deck of cages. In the U.S., water is usually provided by an automatic watering system, and food is hand-distributed to each cage (Cheeke, 1987; McNitt, et al., 2000).

Possible welfare concerns may include social deprivation (in the case of singly housed adult breeders), cage sizes and floor types, and stocking densities of group-raised market animals. Adult rabbits generally are not housed in groups. Because of the rabbit's territorial nature, each cage is regarded as an individual's own territory by both sexes. Scent marking occurs, and if other rabbits are introduced, fighting is prevalent (Harkness, 1988; Lukefahr, et al., 2004). Studies have been undertaken in Europe to develop housing systems for breeding groups (Stauffacher, 1986; Dal Bosco, et al., 2004). A 3-year study in Canada indicated that rabbits could be successfully group housed on the floor in a facility with smooth concrete floors and epoxy-treated block walls. The rabbits were grouped at 8 to 9 weeks of age. Grouping older rabbits required the use of tranquilizers or castration to avoid fighting (Love and Hammond, 1991). A New Zealand study reported that group-housed does have a significantly lower proportion of young alive at 21 days postpartum than does individually housed in boxes (Muller and Brummer, 1991). However, further study is needed to assess whether well-being is compromised for certain group members and the overall impact on production.

Work has been carried out to determine the effects of environmental enrichment on rabbit performance. This generally has been positive and enrichment objects introduced into the cages have caused stimulation and increased activity (Huls, et al., 1991; Brooks, et al., 1993; Lopez, et al., 2004; Verga, et al., 2004) but enrichment has not been shown to affect performance (Maertens, et al., 2004; Verga, et al., 2004) although enrichment objects may increase mortality (Mirabito, et al., 2000). Enrichment objects have included wooden dowels, wooden rings, a brass wire ball, hay or straw and empty aluminum beverage cans. Huls, et al. (1991) and Brooks, et al. (1993) provided PVC "tunnels" between two cages so the adult female rabbits could be apart or together. Given such a choice, the rabbits spent 90% of their time together. Finzi, et al. (2000) housed rabbits in units that provided the choice of an exposed cage, an underground cage, or the tube connecting the two. There were no differences in preference among areas and the behavior was not affected by season or reproductive status. Orova, et al. (2004) found that growing rabbits preferred wire net floors rather than deep litter at normal temperatures (16-18EC). A two tier cage provides spatial enrichment without increasing floor space requirement (Finzi, et al., 1996). Margait and Finzi (2000) reported that most of the feeding and drinking occurred on the lower level but there was no statistically significant difference because of the large variation among does.

Studies have also shown that environmental enrichment has great psychological benefits, especially for singly housed animals (Lidfors, 1997). The provision of shelves or boxes to give an area of raised height seems to be particularly beneficial (Hansen, 2000; Gerson, 2000). The provision of hay has both behavioral (Berthelsen, 1999) and health benefits (see below).

In market rabbits, stocking densities have been studied to determine the effect of rabbit density on growth and consumption parameters. High stocking densities may result in rabbits reaching slaughter weights 3 to 5 days later than rabbits housed at lower densities (Maertens and DeGroot, 1984). Singly housed control animals reached slaughter weight an average of 1 week earlier than group-raised rabbits. Fur-plucking and ear-biting were behavioral manifestations attributed to overcrowding. Several studies showed no consistent difference in rate of gain, feed efficiency, and mortality when rabbits were stocked at densities of 930, 465, and 310 cm² per rabbit in either conventional or large pens (Lukefahr, et al., 1980; Harris, et al., 1981; Prawirodigdo, et al., 1985). Hamilton and Lukefahr (1993) found no significant mean differences in feed intake, feed efficiency, survival rate and uniformity of final weight for rabbits housed at 929, 465 or 310 cm² per rabbit although the rabbits in the first group had better numerical means for all four traits.

European studies have produced similar results. One study found that 500 cm² per animal gave the best overall performance results (Ferriera, 1984), while another reported that densities of 583 and 700 cm² per animal were detrimental (Petersen, et al., 1988). Studies in France have indicated that there are reduced social interactions and locomotory activities with less than about 650 cm² per animal. It was reported however that even at high densities aggressive encounters were uncommon and mixed sex housing did not result in major problems (Morisse and Maurice, 1996). Similarly, Bell and Bray (1984) found that the sex composition of rearing groups had little effect on weight gain, feed intake or mortality from 30-93 days of age. The incidence of injuries in male rabbits 60 to 80 days of age increased significantly as the size of the group increased from 15 or less to 16-30 or over 40 animals (Bigler and Ester, 1996).

Matics, et al. (2004b) reported that younger rabbits prefer a higher density and, given a choice, will select a more densely occupied area. This has led to the suggestion that younger rabbits (21-42 d) should be housed at a high density and then at a lower density for the finishing period (Matics, et al., 2004a). This housing method reduced mortality among the rabbits (Rashwan, et al., 2004).

In recent years, advocacy of "free-range" systems as an alternative to confinement rearing has become a popular topic in the animal welfare and sustainable agriculture arenas. Some concern has also been raised that wire floors are not a suitable substrate for rabbits and may result in increased incidence of ulcerative pododermatitis (sore hocks) (Drescher, 1992; Drescher and Schlender-Bobbis, 1996). Rommers and Meijerhof (1996) compared several alternative floors for cages. These included slats and several configurations of synthetic meshes. Most resulted in less footpad injuries than wire floors but did not influence the production of the does. Trocino, et al. (2004) found that there was no difference in production rates of rabbits on slatted or wire net floors. Because of the increased expense of the alternative floors, production costs were increased and profits reduced. A study that compared cage-reared to floor-reared meat rabbits found that production performance of rabbits was similar between the two housing systems up to 70 days of age. After 70 days, stocking density became an important factor (Crimella, et al., 1988). Lambertini, et al. (2001) and Metzger, et al. (2003) found that mortality was higher for rabbits reared on litter and that the caged rabbits had higher weight gain, feed efficiency, carcass weight and dressing percentage. A concern is the spread of coccidiosis in floor-reared rabbits.

Finishing fryer rabbits in pens on grass that were moved to a new site each day resulted in slower growth rates and lower carcass and kidney fat weights and required more labor than rabbits finished in cages. This system might be profitable in those cases where the consumer is willing to pay extra for a grass finished product (McNitt, et al., 2003).

Future research that focuses on different production philosophies and their companion systems can help to elucidate the benefits of each system to both humans and animals (Harkness, 1988; Lukefahr, et al., 2004).

Post-Partum Breeding

Post-partum breeding is a common practice among rabbit producers in Europe (Camps, 1983). After kindling, does are re-bred within 48 hours. This practice has been condemned by animal protection groups despite the fact that wild rabbits re-breed in the same manner (Lockley, 1954; Harkness, 1988). One British publication does not recommend re-breeding until 3 to 7 days post-partum on welfare grounds (King, 1988). In the United States the majority of producers re-breed at 14 or 35 days post-partum. There is no direct advantage in re-breeding at 1 day versus 14 days post-partum in terms of the total number of kits weaned (Harris, et al., 1982).

Wool Harvesting

Wool harvesting practices also have the potential to become an issue. Angora rabbits grow a low-density fine fiber that produces light-weight warm garments. Wool harvesting can be accomplished by shearing or plucking (Schlolut, 1987; Kilfoyle and Samson, 1988). Some countries have banned the plucking of wool on the grounds of cruelty. Plucking, when done properly, involves the testing and removal of loose hair, preferably during molt. However, some types of Angora rabbits (e.g., German Angora) do not molt readily and should not be plucked (McNitt, et al., 2000). Theoretically, plucking removes only the longest fibers and leaves the undercoat to protect the rabbit. It does, however, damage the follicles and change the composition of the coat, thereby reducing the lifetime wool yield (Schlolut, 1987;

Kilfoyle and Samson, 1988).

Shearing is more widely practiced in the United States. Proper handling and methods of restraint should be utilized to ensure protection from nicks and cuts during the process. Other welfare considerations include protection from temperature extremes. Rabbits should have from 1/4 to 1/2 inch of wool left on the body and should not be sheared or plucked during particularly cold months. When temperatures drop to 35°F or less, rabbits should be provided with warm quarters and a nest box until the wool has reached at least 1 inch in length (Vermorel, 1988; Vernet, 1988).

Fur Production

The fur industry has been under attack by animal activists for several years, with a dramatic escalation in the past 5 years. Ethical and welfare arguments have been advanced with regard to the necessity for fur garments and the methods used to capture wild fur-bearing animals or to produce and euthanize ranched species (Nilsson, et al., 1980; Commission of the European Communities, 1991). In the United States, few rabbits are commercially grown specifically for their pelts. Most rabbits raised for pelts are of the Rex breed (McNitt, 1988). In the Rex pelt, the guard hairs and underfur are of the same approximate length. This provides a dense, even pelt useful for garment manufacture. The monetary value, however, is not sufficiently high and is generally not a profitable enterprise (McNitt, et al., 2000). Unlike other species of ranched fur-bearers where the pelt is the only product produced, the rabbit carcass can be used for meat. Although this is of little comfort to activists, the general public may be more accepting of the use of the entire animal, rather than killing for just the hide.

Transport

The transport of rabbits to processing facilities can pose welfare questions similar to those raised for other livestock species. Separation, caging, crating and handling practices, mixing, food and water deprivation, noise, temperature, humidity, and other environmental changes are all variables that affect the physical and psychological welfare of animals. Transport has been shown to affect meat in rabbits by increasing the rate of muscle glycogen depletion, which causes dark, firm, dry meat; increasing plasma glucose; increasing liver glycogen (during long hauls); and decreasing liver weights (Jolley, 1990). Having water available reduces live weight and carcass losses associated with antemortem handling (Coppings, et al., 1989). Factors that may affect the transport stress include the type of housing with penned rabbits coping better than caged rabbits (Canali, et al., 2000), sex with females suffering more shrink than males (Trocino, et al., 2003), and transport distance. Longer distances resulted in higher muscle pH, redder carcasses, higher muscle moisture and drip loss, higher water holding capacity and higher shear force (Dal Bosco, et al., 1997). More research is needed to elucidate transport stressors and to recommend improvements. In the meantime, humane handling and hauling practices should be encouraged and practiced.

Slaughter

Humane slaughter has been and will continue to be a concern of both animal user and animal protection groups. Unlike other farm livestock, rabbits are not covered by the Humane Slaughter Act (Anon., 1906); however, interest is high in securing more humane methods for stunning (Anon., 1992). Rabbits that are processed in commercial facilities undergo electrical stunning, which renders the animal unconscious, and then are decapitated. To achieve a suitable level of stunning, a minimum stunning current of 140 mA at 100 V should be used (Anil, et al., 1996). In smaller processing facilities or on-site slaughter, however, manual methods are used. Two methods have been recommended for manual stunning (Arrington and Kelly, 1976; Sandford, 1986; McNitt, et al., 2000). The first method is cervical dislocation. When performed by a competent person, cervical dislocation renders the rabbit unconscious immediately. The second method involves the use of a blunt stick to strike the rabbit behind the ears at the base of the skull. Generally, cervical dislocation is the preferred method for manual stunning. Welfare problems arise when inexperienced personnel attempt to perform the stunning. Care should be taken to properly train personnel before they attempt to manually stun a rabbit. Trainees should learn the proper way to handle the rabbit to reduce excitability and stress; observe the technique being

performed by a competent individual; and perform the technique under supervision until competence is attained.

Sales

There is a real possibility for problems for producers who rear rabbits for sale to laboratories for use in consumer product testing. Consumer product testing procedures that specifically use rabbits, such as the Draize eye irritancy test, have been major animal welfare and rights issues for a number of years. Another important consideration for producers who sell stock for purposes other than food or fiber is compliance with U.S. Department of Agriculture (USDA) regulations under the Animal Welfare Act. Rabbit producers who sell to buyers other than processors or individuals purchasing the rabbits for their own use must be licensed by USDA if their gross sales exceed \$500 per year (USDA, 1990). USDA sets facility standards, specifies the management practices that must be followed, and inspects facilities to assure compliance. Public complaints about producers are directed to USDA for consideration. Pet stores, carnivals, and other animal sellers or exhibitors often purchase stock from unlicensed producers because of lower prices. This practice should be discouraged, because it discriminates against licensed producers and leaves the industry open to criticism for non-compliance with the Animal Welfare Act.

Conclusion

Ultimately, it is up to rabbit producers to ensure that they provide for the needs of their rabbits. Proper housing, appropriate and adequate feed, ventilation, clean water, health management, and environments designed to decrease stress are all important contributors to rabbit well-being. Research is needed to further determine factors that contribute to both physiological and psychological well-being of domestic rabbits.

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Additional information may be obtained from:

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[Return to Top](#)

[Return to Contents](#)

Anesthesia and Analgesia

Alderton, B. (1998). **Anaesthesia in ferrets, rabbits, and guineapigs.** In: *Internal Medicine: Small Companion Animals. The T G Hungerford Course for Veterinarians. Proceedings 306, Stephen Roberts Lecture Theatre, University of Sydney, Australia, June 15 -19, 1998*, Bryden, D. (Ed.), pp. 241-268, University of Sydney, Post Graduate Foundation in Veterinary Science: Sydney, Australia. ISBN: 1-875582-69-X.

NAL Call Number: SF604.R37 no. 306

Keywords: ferrets, guineapigs, rabbits, anesthesia, preanesthetic medication, neuroleptics, anesthetics, injectable anesthetics, inhaled anesthetics, dosage.

Baturaite, Z.; Ruksenas, O. (2002). **Influence of 1,2,4 triazol based compound CA 10 on the cardiovascular and respiratory systems of the rabbit.** *Baltic Journal of Laboratory Animal Science* 12 (3): 177-183, ISSN: 1407-0944.

NAL Call Number: SF405.5.L32

Keywords: 1,2,4 triazol, antiinflammatory drug, immunologic drug, hypnorm, anesthetic drug, laboratory equipment, electrocardiography, clinical techniques, diagnostic techniques, heart rate.

Borkowski R; Karas A.Z. (1999). **Sedation and anesthesia of pet rabbits.** *Clinical Techniques in Small Animal Practice* 14 (1): 44-9, ISSN: 1096-2867.

NAL Call Number: SF911 S45

Abstract: Pet rabbits frequently become stressed when handled and may require sedation or chemical immobilization for procedures such as blood collection, IV catheter placement, radiography, deep ear cleaning, and dentistry. Common surgical procedures requiring general anesthesia include spay, castration, gastrotomy, cystotomy, and orthopedic procedures. Rabbits may be difficult to safely sedate or anesthetize. Individual rabbits may have varying sensitivity to the depressant effects of anesthetics. The apparent sensitivity of the rabbit's respiratory center to anesthetic drugs and the narrow range between anesthetic and toxic doses in this species add to the unpredictable character of rabbit anesthesia. Furthermore, mortality following anesthesia and surgery in sick rabbits is common. Strategically, safe anesthesia of rabbits must include the planning of procedures so that anesthetic time is minimized. Clinicians must be on guard for individual variation in response to drugs. Minimizing the use of cardiovascular depressant agents, use of agents with a high therapeutic index, and careful titration of doses to effect, along with thorough cardiorespiratory monitoring, will permit attainment of appropriate anesthetic depth with the widest margin of safety. This article presents several injectable and inhalant anesthetic protocols that may assist in effective management of many types of rabbit patient.

Keywords: review, anesthesia, methods, anesthetics, hypnotics and sedatives, administration and dosage, adverse effects, pharmacology, animal welfare, physiology, stress, psychological.

Cantwell, S.L. (2001). **Ferret, rabbit, and rodent anesthesia.** *The Veterinary Clinics of North America. Exotic Animal Practice* 4 (1): 169-91, ISSN: 1094-9194.

NAL Call Number: SF997.5.E95E97

Abstracts: Ferrets, rabbits, and rodents are increasingly being presented to veterinarians for evaluation and treatment. The owners of these animals expect high-level medical and surgical care. Consequently, veterinarians are more often required to provide intensive anesthetic management of these animals. The variability of anesthetic agents used and patient responses are addressed. The consequences of size for anesthetic management are discussed. Successful small mammal anesthesia requires following general anesthetic

principles, awareness of limitations, and maintenance of high standards of care.

Keywords: review, rabbits, ferrets, rodents, anesthesia, physiology, monitoring, postoperative care, preoperative care.

Difilippo, S.M.; Norberg, P.J.; Suson, U.D.; Savino, A.M.; Reim, D.A. (2004). **A comparison of xylazine and medetomidine in an anesthetic combination in New Zealand White rabbits.** *Contemporary Topics in Laboratory Animal Science* 43 (1): 32-34, ISSN: 1060-0558.

NAL Call Number: SF405.5 A23

Abstract: A comparison was made of two anesthetic protocols for cardiothoracic surgery in rabbits. Eight male New Zealand White rabbits (2.8 to 3.2 kg) were used in a double crossover study. Each rabbit received intramuscular ketamine (35 mg/kg), xylazine (5 mg/kg), and buprenorphine (0.03 mg/kg) or ketamine (35 mg/kg), medetomidine (0.5 mg/kg), and buprenorphine (0.03 mg/kg) on alternate weeks. After intramuscular injection, each rabbit was intubated and placed on 0.75% isoflurane in 1 L O₂/min. Palpebral, pedal, and righting reflexes and cardiopulmonary parameters were measured every minute for the first 10 min and every 5 min thereafter. Rabbits were monitored for 20 min of spontaneous ventilation followed by 60 min of intermittent positive pressure ventilation. Intermittent positive pressure ventilation and isoflurane then were discontinued and recovery monitored. Systolic, mean, and diastolic blood pressures were higher in the medetomidine-treated rabbits. Return of the palpebral, pedal, and righting reflexes was prolonged in the medetomidine-treated rabbits. There were no differences in heart rate, respiratory rate, return to spontaneous breathing, and time to extubation between the two groups. These results indicate medetomidine can be safely used in rabbit anesthesia, provides acceptable cardiovascular parameters, and induces a longer anesthetic period than that of xylazine.

Keywords: male, breed, New Zealand White, anesthetic protocols, cardiothoracic surgery, intramuscular ketamine, xylazine, buprenorphine, ketamine, medetomidine, buprenorphine, intramuscular injection.

Flecknell, P.A.; Roughan, J.V.; Hedenqvist, P. (1999). **Induction of anaesthesia with sevoflurane and isoflurane in the rabbit.** *Laboratory Animals* 33 (1): 41-6, ISSN: 0023-6772.

NAL Call Number: QL55 A1L3

Abstract: The effects of induction of anaesthesia with sevoflurane and isoflurane were studied in rabbits. All rabbits had periods of apnoea (ranging from 30-180 s) during induction which resulted in moderate hypercapnia and acidosis. Arterial pCO₂ rose from 4.1 +/- 0.3 kPa to a peak of 7.6 +/- 0.4 kPa (mean +/- SD) (both agents). All animals showed a significant reduction in heart rate (P < 0.05). Heart rate (HR) fell from 226 +/- 33 to a minimum during induction of 57 +/- 32 (sevoflurane) and 199 +/- 41 to 45 +/- 11 (isoflurane). Most animals struggled violently during induction. Use of sevoflurane did not prevent the breath-holding response seen during induction of anaesthesia with other volatile anaesthetics in this species, and the severe apnoea which occurs may represent a significant hazard. The behaviour of the animals indicated that both sevoflurane and isoflurane are aversive, suggesting that this technique should be avoided whenever possible

Keywords: anesthesia, sevoflurane, isoflurane induction, apnoea, hypercapnia, acidosis, behavior, adverse, struggling.

Flecknell, P. (1998). **Assessment and alleviation of post-operative pain.** *Animal Welfare Information Center Newsletter* 8 (3/4): 8-14, ISSN: 1050-561X.

Online: <http://www.nal.usda.gov/awic/newsletters/v8n3/8n3fleck.htm>

NAL Call Number: aHV4701.A952

Keywords: mice, rats, guineapigs, rabbits, ferrets, primates, pigs, sheep, dogs, cats surgery, pain, laboratory animals, animal welfare, analgesics.

Foley, P.L.; Henderson, A.L.; Bissonette, E.A.; Wimer, G.R.; Feldman, S.H. (2001). **Evaluation of fentanyl transdermal patches in rabbits: blood concentrations and physiologic response.** *Comparative Medicine* 51 (3): 239-244, ISSN: 0023-6764.

NAL Call Number: SF77.C65

Keywords: breed, New Zealand White, laboratory animals, rabbits, adverse effects, analgesics, animal welfare, blood chemistry, cutaneous application, fentanyl transdermal patches, potency, respiration, weight loss.

Gil Alfredo, G.; Illera Juan, C.; Silvan, G.; Lorenzo Pedro, L.; Illera, M.(2002). **Changes in hepatic and renal enzyme concentrations and heart and respiratory rates in New Zealand White rabbits after anesthetic treatments.** *Contemporary Topics in Laboratory Animal Science* 41 (6): 30-32, ISSN: 1060-0558.

NAL Call Number: SF405.5 A23

Keywords: breed, New Zealand White, hepatic and renal biochemical parameters, heart rate, respiratory rate, anesthesia, alanine aminotransferase, alkaline phosphatase, aspartate aminotransferase, blood urea nitrogen, creatinine, diazepam, ketamine, xylazine, autonomic drug, general anesthetic drug, sedative/hypnotic drug, gamma glutamyltransferase, laboratory animal care, laboratory techniques.

Hedenqvist, P.; Orr, H.E.; Roughan, J.V.; Antunes, L.; Flecknell, P.A. (2002). **Anaesthesia with ketamine/medetomidine in the rabbit: influence of route of injection and the effect of combination with butorphanol.** *Veterinary Anaesthesia and Analgesia* 29 (1): 14-19. ISSN: 1467-2987.

NAL Call Number: SF914.V47

Keywords: breed, New Zealand White, female, anesthesia, blood gases, depth, drug combinations, drug delivery systems, subcutaneous, intramuscular routes duration, ketamine, medetomidine, butorphanol, pH, toe pinch, ear pinch, reflexes, respiration, hypoxemia.

Hedenqvist, P.; Roughan, J.V.; Antunes, L.; Orr, H.; Flecknell, P.A. (2001). **Induction of anaesthesia with desflurane and isoflurane in the rabbit.** (2001). *Laboratory Animals* 35 (2): 172-9, ISSN: 0023-6772.

NAL Call Number: QL55.A1L3

Abstract: The characteristics of two techniques of face-mask induction of desflurane anaesthesia (rapid or slow) were compared with the effects of slow isoflurane induction in five New Zealand White (NZW) rabbits. Slow induction used stepwise increments in vapour setting of 2% for desflurane and 0.5% for isoflurane at 30 s intervals. All animals were anaesthetized using each technique according to a randomized block design with one week between treatments. Observations were made of the quality of induction (any struggling or periods of apnoea) and the latency to, and the duration of loss of the righting and toe pinch reflexes recorded. Changes in respiratory rate, arterial blood gas and cardiovascular parameters were also recorded. Induction and recovery times were shorter with rapid desflurane induction in comparison to isoflurane (loss of righting reflex: 139+/-27 s cf. 205+/-48 s), but both techniques were associated with struggling and long periods of apnoea (> 1 min) during the first 4 min after administration. During this period a significant degree of bradycardia, hypercapnia and hypoxaemia occurred with both techniques, but these and the subsequent effects of rapid desflurane administration were less severe than with isoflurane. Slow induction with desflurane was tolerated best, with little or no deleterious behavioural or physiological effects, however excessively prolonged induction times (loss of righting reflex 337+/-160 s) limits the application of this method. Desflurane, administered rapidly, appears to be a more suitable agent than isoflurane. However, as with isoflurane, anaesthesia should only be induced following oxygen supplementation.

Keywords: breed, New Zealand White, anesthesia, isoflurane, respiratory rate, arterial blood gas, cardiovascular parameters, bradycardia, hypercapnia, hypoxemia, oxygen supplementation.

Hellebrekers, L.J.; de Boer, E.J.; van Zuylen, M.A.; Vosmeer, H. (1997). **A comparison between medetomidine-ketamine and medetomidine-propofol anaesthesia in rabbits.** *Laboratory Animals* 31 (1): 58-69, ISSN: 0023-6772.

NAL Call Number: QL55.A1L3

Abstract: We investigated the effects of combinations of the alpha 2-agonist medetomidine with either ketamine or propofol for their overall quality of anaesthesia, including the possible concomitant changes in respiratory and circulatory function in New Zealand White rabbits. Medetomidine was administered at 0.35 mg/kg, intramuscularly. Following sedation, ketamine (5 mg/kg) or propofol (2 and 3 mg/kg) were administered intravenously via the ear vein. Data on reflexes (palpebral, corneal, ear-pinch and toe-pinch), jaw muscle tone and physiologic parameters (heart rate, blood pressure, respiration rate, body temperature) were recorded before and after administration of drugs. Intermittent arterial blood sampling was performed at predetermined intervals before and after anaesthesia. The results show that the ear-pinch and toe-pinch reflexes and the jaw muscle tone are reliable indices to determine surgical anaesthetic depth. A surgical level of anaesthesia could be obtained reliably with the combination medetomidine-ketamine and medetomidine-propofol (3 mg/kg) with a duration of 19 min (variation 10 to 40 min, n = 6) and 11 min (variation 5 to 15 min, n = 6), respectively. Propofol

administered at 2 mg/kg did not produce an adequate anaesthetic level. The data from this study demonstrate a high degree of predictability in achieving a fast induction and adequate anaesthetic depth together with a low incidence of untoward side-effects and a zero mortality with the combinations investigated. The data from the medetomidine-ketamine group show that, although adequate anaesthetic depth of medium duration is achieved, the arterial oxygen tension is reduced to hypoxemic levels. With the use of this combination, the supplemental administration of oxygen is advised. With the combination of medetomidine-propofol (3 mg/kg) a short duration anaesthesia of adequate depth was achieved, whereby physiological variables all remained within acceptable ranges. The use of medetomidine-propofol, in combination with the alpha 2-antagonist atipamezole to shorten recovery time, will provide reliable and very versatile anaesthesia in rabbits.

Keywords: breed, New Zealand White, alpha 2-agonist medetomidine, intramuscularly, ketamine, propofol, intravenously, anesthesia, respiratory function, circulatory function, palpebral reflex, corneal reflex, ear-pinch reflex, toe-pinch reflex, anesthetic depth.

Henry, V.A.; Parsons, D.M. (1997). **Hypnotic sedation: an alternative to chemical sedation during minor diagnostic procedures for rabbits and guinea pigs.** *Contemporary Topics in Laboratory Animal Science* 36 (4): 55, ISSN: 1060-0558.

NAL Call Number: SF405.5.A23

Keywords: rabbits, guineapigs, surgery, laboratory animals, handling, animal welfare, restraint of animals, sedation, hypnosis.

Kramer, S. (1998). **Care of rabbits and rodents during and after anaesthesia. [Perioperatives Narkosemanagement bei Kleinsäufern.]** *Tierärztliche Praxis* 26 (2): 129-135, ISSN: 0303-6286.

NAL Call Number: SF603.V4

Abstract: In anaesthesiology rabbits and rodents are considered being high risk patients as about 30% of the anaesthetized patients die intra- or postoperatively. Due to the anatomic structures many anaesthetic techniques and patient monitoring are very difficult or even impossible to perform in these animals. For this reason anaesthesia of rabbits and rodents confronts the veterinarian with great problems. The main complications during anaesthesia are discussed and principles of the perioperative anaesthetic management, of anaesthetic techniques as well as patient monitoring are presented.

Keywords: laboratory animals, rabbits, rodents, complications, injectable anesthetics, anesthesia, intraoperative care, German language.

Neiger-Aeschbacher, G. (2002). **Anästhesie und Analgesie bei Heimsäufern. Teil 1. Vorbereitung, Prämedikation und Allgemein-anästhesie. [Anaesthesia and analgesia in small mammals. Part 1. Preparation, premedication and general anaesthesia.]** *Schweizer Archiv für Tierheilkunde* 144 (11): 586-595, ISSN: 0036-7281.

NAL Call Number: 41.8 SCH9

Keywords: rabbits, rodents, pets, anesthesia, analgesics, animal welfare, postoperative care, surgery, German language.

Neiger, A.G. (2002). **Anaesthesie und Analgesie bei Heimsäufern. Teil 2. Intra und postoperative Betreuung. [Anaesthesia and analgesia in small mammals. Part 2. Peri and postoperative care.]** *Schweizer Archiv fuer Tierheilkunde* 144 (11): 597-604, ISSN: 0036-7281.

NAL Call Number: 41.8 SCH9

Keywords: pets, rabbits, rodents, analgesics, anesthetics, administration, emergencies, veterinary care, intraoperative care, postoperative care, monitoring, complications, fluid therapy, analgesia, physiology, perioperative care, postoperative care, fluid therapy, German language.

Park, W. (1999). **Effects of inhalation anaesthetics on mucus secretion by goblet cells in the lower respiratory tract of rabbits.** *Korean Journal of Veterinary Clinical Medicine* 16 (2): 339-351, ISSN: 1225-4800.

Keywords: inhaled anaesthetics, mucus, respiratory system, bronchi, cilia, ethyl ether, glycolipids, glycoproteins, halothane, isoflurane, mucopolysaccharides, mucoproteins, polysaccharides, postoperative care, adverse effects, trachea.

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NAL Call Number: SF997.5.R2P48 1997
Keywords: anesthesia, anesthetics, German language.
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NAL Call Number: QL55.A1L3
Keywords: breed, New Zealand White, ethics, pain, laboratory animals, opioids, analgesics, buprenorphine, animal welfare, survival time, weight change, virulence, experiments, viral diseases, myxoma virus.
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Keywords: pets, anaesthesia, mice, rats, hamsters, chinchillas, rabbits, birds, Turkish language.
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NAL Call Number: QL55 A1L3
Keywords: laboratory mammals, endoscopy, endoscopes, trachea.
- Weinstein, C.H.; Fujimoto, Jennifer, L.; Wishner, R.E. **Anesthesia of six-week-old White rabbits for thoracotomy.** *Contemporary Topics in Laboratory Animal Science* 39 (3): 19-22, ISSN: 1060-0558.
NAL Call Number: SF405.5 A23
Keywords: laboratory animals, spine, skeletal system, isoflurane, general anesthetic drug, 5 French polypropylene catheterization, complications, surgical method, direct laryngoscopy, intubation method, surgical anesthesia, anesthesia method, thoracotomy, surgical method, cough reflex.
- Worthley, S.G. (2000). **Rapid oral endotracheal intubation with a fibre-optic scope in rabbits: a simple and reliable technique.** *Laboratory Animals* 34 (2): 199-201. ISSN: 0023-6772.
NAL Call Number: QL55.A1L3
Keywords: animal welfare, anesthesia, inhaled anesthetics.
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Keywords: breed, anaesthesiology, pharmacology, bronchoalveolar lavage fluid, respiratory system, lung, respiratory system, plasma blood and lymphatics, intensive care medicine, low volume PEEP effect, low volume-ZEEP effect, low volume sigh effect.

[Return to Top](#)

[Return to Contents](#)

Animal Models

Ahmed, A.; Jafri, H.; Lutsar, I.; McCoig, C.C.; Trujillo, M.; Wubbel, L.; Shelton, S.; McCracken, G.H. Jr. (1999). **Pharmacodynamics of vancomycin for the treatment of experimental penicillin- and cephalosporin-resistant pneumococcal meningitis.** *Antimicrobial Agents and Chemotherapy* 43 (4): 876-81, ISSN: 0066-4804.

NAL Call Number: RM265.A5132

Abstract: With the emergence of beta-lactam antibiotic resistance among strains of *Streptococcus pneumoniae*, vancomycin has assumed an important role in the treatment of bacterial meningitis. Using the rabbit meningitis model, we evaluated the pharmacokinetics and pharmacodynamics of vancomycin in this setting. Animals were given 80 mg/kg of body weight daily in two or four divided doses to determine the penetration and activity of vancomycin in cerebrospinal fluid (CSF); each regimen was administered with and without dexamethasone. Mean peak (2 h) concentrations in CSF that were four- to eightfold higher than the minimum bactericidal concentration (MBC; 0.5 microgram/ml) for the pathogen were adequate for bacterial clearance. In both groups concentrations in CSF remained higher than the MBC for greater than 80% of the respective dosing intervals, and the penetration of vancomycin into CSF was 20%. Mean concentrations in CSF at 24 to 36 h of therapy were lower than those achieved during the first 12 h, consistent with a decline in the level of antibiotic entry into CSF as inflammation wanes. Rates of bacterial clearance were similar for the two regimens, and for all animals cultures of CSF were sterile by 36 h. The coadministration of dexamethasone significantly reduced the penetration of vancomycin into CSF by 29% and significantly lowered the rate of bacterial clearance during the first 6 h in animals receiving 20-mg/kg doses of vancomycin. For animals receiving 40-mg/kg doses, therapeutic peak concentrations in CSF were obtained even with steroid use, suggesting that the effect of steroids may be circumvented by the use of larger daily doses of vancomycin.

Keywords: animal model, rabbit, anti-inflammatory agents, therapeutic use, antibiotics, glycopeptide, cerebrospinal fluid, pharmacokinetics, cephalosporin resistance, dexamethasone, combination meningitis, pneumococcal, microbiology, outcome assessment, *Streptococcus pneumoniae*, drug effects.

Akita, M.; Ishii, K.; Kuwahara, M.; Tsubone, H. (2002). **The daily pattern of cardiovascular parameters in Kurosawa and Kusanagi-Hypercholesterolemic (KHC) rabbits.** *Experimental Animals Tokyo* 51 (4): 353-360, ISSN: 1341-1357.

NAL Call Number: RM265.A5132

Keywords: breed, Japanese White, Kurosawa, Kusanagi Hypercholesterolemic, animal model, hypercholesterolemia, etiology, radiotelemetry, monitoring method, physiological method, conscious, unrestrained, blood pressure, daily pattern, body temperature, cardiovascular parameters, circadian rhythm, heart rate, locomotor activity.

Akman, A.; Bilezikci, B.; Kucukerdonmez, C.; Demirhan, B.; Aydin, P. (2003). **Suramin modulates wound healing of rabbit conjunctiva after trabeculectomy: comparison with mitomycin C.** *Current Eye Research* 26 (1): 37-43, ISSN: 0271-3683.

Abstract: To investigate and compare the effects of suramin and mitomycin C on conjunctival wound healing after trabeculectomy in a rabbit model. **MATERIALS AND METHODS:** Thirty New Zealand White rabbits were divided into three groups, and trabeculectomy was performed on the left eyes under general anesthesia. During the surgery, suramin (250 mg/ml) and mitomycin C (0.4 mg/ml) were applied to the scleral flap site for 2 minutes in groups 1 and 2, respectively. The control animals (group 3) received no pharmacological treatment

during trabeculectomy. Intraocular pressure (IOP) measurements were recorded before surgery and every 3 days after the operation, starting from postoperative day 1. Three animals from each group were sacrificed on days 15, 20, and 25, yielding a total of 27 eyes for histopathological study. Each specimen was histochemically and immunohistochemically (CD3, CD20, CD68, and collagen III) evaluated, and graded. **RESULTS:** Bleb failure time was significantly longer in both the suramin (15.0 +/- 4.7 days) and mitomycin C (16.7 +/- 5.1 days) groups than in the controls (10.3 +/- 4.2 days) ($p < 0.05$). Starting from postoperative day 9, the IOP in the suramin and mitomycin C groups was significantly lower than that in the control group ($p < 0.05$). This difference continued to be significant until day 18 for the suramin group, and until day 24 in the mitomycin C group. Histopathological evaluation showed lower degrees of cellularity, fibrosis, collagen III deposition, and CD3 density in the suramin- and mitomycin C-treated eyes compared to control eyes at all time points ($p < 0.05$). There was also no significant difference between the suramin and mitomycin C groups concerning these histopathological findings and CD3 density ($p > 0.05$). Although there were trends towards reduced mean elastic fiber deposition and lower CD20 and CD68 density in both groups of treated eyes, the differences between the treated and control groups were not significant ($p > 0.05$). **CONCLUSIONS:** The results of the current study suggest that suramin has beneficial effects on wound healing in glaucoma surgery, and effectively prolongs bleb survival in rabbits. Suramin may be a promising alternative to anti-metabolite therapy in glaucoma surgery.

Keywords: New Zealand White, animal model, rabbits, antimetabolites, pharmacology, comparative study, conjunctiva, pathology, conjunctiva, physiopathology, growth substances, metabolism, intraocular pressure, drug effects, intraoperative care, mitomycin, administration and dosage, suramin, trabeculectomy, wound healing.

Akyol, N.; Demir, T.; Kukner, A.; Colakoglu, N. (2001). **Effects of systemic octreotide, local mytomycine-C and local corticosteroids on wound-healing reaction after glaucoma surgery.** *International Ophthalmology* 24 (5): 235-41, ISSN: 0165-5701.

Abstract: To determine and compare the effectiveness of octreotide, mitomycine-C and corticosteroids on wound-healing reaction after glaucoma surgery. **METHODS:** A full thickness scleral trephination was carried out by the same surgeon on four groups of six rabbits. A sponge soaked in mytomycine-C was applied subconjunctivally in group 1 before trephination. Group 2 received corticosteroid drops tid topically for 14 days. Group 3 received subcutaneous octreotide injections tid for 14 days. The control group (group 4) was not given any drug that may interfere with wound healing. All groups received gentamycin drops tid for seven days. The rabbits were sacrificed on the fourteenth day and the trephination area with overlying conjunctiva was excised. The samples were prefixed with glutaraldehyde, dehydrated and embedded in Araldite Cy 212. Ten semithin sections stained with toluidin blue were analysed for each group. Fibroblast and macrophage counts were performed on the surgical site and subconjunctival area. **RESULTS:** Intensive fibroblastic activity, increased number of vessels and active macrophages were observed only in group 4. The fibroblast and macrophage densities in this group were significantly higher than the other three groups in which wound healing was modulated ($p > 0.001$). Mean number of fibroblasts in group 1 was also significantly less than the ones of groups 2 and 3 ($p < 0.01$). Macrophage densities were similar in groups 1, 2 and 3. No statistical significance was found between groups 2 and 3 by means of fibroblast and macrophage densities. **CONCLUSION:** Octreotide reduced wound-healing reaction in a similar fashion to corticosteroids or mitomycine-C. These initial results seem promising.

Keywords: animal model, rabbits, male, adrenal cortex hormones, administration and dosage, ciliary body, pathology, comparative study, conjunctiva, pathology, fibroblasts, pathology, filtering surgery, glaucoma, surgery, hormones, administration and dosage, subcutaneous injections, intraoperative care, macrophages, pathology, mitomycin, nucleic acid synthesis, octreotide, postoperative care, wound healing, drug effects.

Amthor, F.R.; Tootle, J.S.; Yildirim, A. (2003). **A new transparent multi-unit recording array system fabricated by in-house laboratory technology.** *Journal of Neuroscience Methods* 126 (2): 209-19, ISSN: 0165-0270.

Abstract: A new recording array system has been developed to record multi-unit activity in rabbit retina. The array consists of individually laid down layers of carbon fiber or tungsten microelectrodes whose center-center spacing can be made less than 100 microm. The array and associated electronics can be constructed by technology typically found in most electrophysiology laboratories. The array is mostly transparent, so that

visual stimuli and microscopic examination can take place through it. The array can be manipulated much like a single electrode, and thus can be used to record from multiple tissue sites. Arrays as large as 32 elements have been used, with success rates of about 50% per electrode, with some electrodes picking up more than one cell. Stable recordings have been held for up to 6 h from groups of ganglion cells in an isolated eyecup preparation. These multi-electrode arrays have been used repeatedly in experiments for several months without any obvious degradation in recording quality. Although the arrays are hand-made, their layered method of assembly allows as many as 32 elements to be assembled.

Keywords: carbon, electric impedance, electrophysiology, instrumentation, microelectrodes, retinal ganglion cells, physiology.

Arens, S.; Kraft, C.; Schlegel, U.; Printzen, G.; Perren, S.M.; Hansis, M. (1998). [**Does surgical approach have an effect on the development of local infection? Animal experiment comparison of conventional open vs. minimally invasive bone plate osteosynthesis (MIPO).**] *Langenbecks Archiv fur Chirurgie. Supplement. Kongressband. Deutsche Gesellschaft fur Chirurgie. Kongress.* 115 (Suppl. I): 193-6, ISSN: 0942-2854.

Abstract: With a standardised model we investigated the influence of two different surgical approaches to the rabbit tibia for plate osteosynthesis on resistance to local infection after postoperative inoculation of graduated concentrations of staphylococcus aureus at the implant. The infection rate for the minimally invasive plate osteosynthesis with insertion of the implant in closed, soft tissue tunneling technique was 25% (3/12 animals; ID50 = 6.2 x 10(6) CFU) and for the conventional open approach 38% (5/13 animals; ID50 = 2 x 10(6) CFU). This difference is statistically not significant (with P > 0.05).

Keywords: animal model, rabbits, bone plates, comparative study, fracture fixation, surgical wound infection, microbiology staphylococcal infections, microbial colony count, *Staphylococcus aureus*, growth and development, surgical procedures, tibia surgery, minimally invasive methods, German language.

Asbell, P.A. (2000). **Valacyclovir for the prevention of recurrent herpes simplex virus eye disease after excimer laser photokeratectomy.** *Transactions of the American Ophthalmological Society* 98: 285-303, ISSN: 0065-9533.

Abstract: A variety of factors have been reported as inducing the reactivation of latent herpes simplex virus (HSV), among them stress, trauma, and UV radiation. Excimer laser photorefractive keratectomy (PRK) is a surgical procedure utilizing a 193 nm ultraviolet light to alter the curvature of the cornea and hence correct vision. Reactivation of ocular herpes simplex keratitis following such excimer laser PRK has been reported. All published cases of HSV reactivation following excimer laser treatment in humans are reviewed. The present study evaluates whether stress, trauma of the corneal de-epithelialization prior to the laser, or the excimer laser treatment itself to the stromal bed induces this ocular reactivation of the latent HSV, and whether a systemic antiviral agent, valacyclovir, would prevent such laser PRK-induced reactivation of the HSV. **METHODS:** Forty-three normal 1.5- to 2.5-kg New Zealand white rabbits were infected on the surface of the cornea with HSV-1, strain RE. The animals were monitored until resolution, and then all animals were divided into 5 treatment groups: (1) de-epithelialization only, intraperitoneal (i.p.) saline for 14 days; (2) de-epithelialization plus laser, i.p. saline for 14 days; (3) de-epithelialization plus laser, valacyclovir 50 mg/kg per day i.p. for 14 days; (4) de-epithelialization plus laser, valacyclovir 100 mg/kg per day i.p. for 14 days; (5) de-epithelialization plus laser, valacyclovir 150 mg/kg per day i.p. for 14 days. Animals were evaluated in a masked fashion by clinical examination biweekly and viral cultures biweekly through day 28. **RESULTS:** The reactivation rates were as follows: group 1, 0%; group 2, 67%; group 3, 50%; group 4, 17%; and group 5, 0%. Viral titers were negative in animals that had no reactivation but persistently positive in those that had reactivation (day 6 through day 28). **CONCLUSIONS:** Excimer laser (193 nm) treatment can trigger reactivation of ocular herpes disease (67%) and viral shedding in the latently infected rabbit. De-epithelialization alone is not sufficient to cause reactivation or viral shedding. Prophylaxis with intraperitoneal valacyclovir decreases the recurrence rate in a dose-response fashion. At 150 mg/kg per day, there are no recurrences. The presence of persistent viral shedding in reactivated animals may correlate with cases of late HSV recurrence reported in humans undergoing excimer treatment. The data suggest that humans undergoing excimer laser procedures for correction of refractive errors or treatment of corneal scars with a history of herpetic keratitis are at increased risk for reactivation. Such patients, however, may appropriately be considered for prophylactic systemic antiviral medication at the time of the laser procedure in order to decrease the possibility of recurrence.

Keywords: acyclovir, analogs and derivatives, therapeutic use, antiviral agents, keratectomy, photorefractive,

excimer laser, herpetic keratitis, prevention and control, surgery, virology, postoperative care, recurrence, prevention and control, simplexvirus, isolation and purification.

Askar, I.; Sabuncuoglu, B.T.; Yormuk, E.; Saray, A. (2001). **Nuclear magnetic resonance spectroscopy and imaging in animal research.** *Journal of Reconstructive Microsurgery* 17 (5): 347-55; discussion 355-6, ISSN: 0743-684X.

Abstract: In nerve injuries, if it is not possible to reinnervate muscle by using neurorrhaphy and nerve grafting technique, reinnervation should be provided by the use of neuroization--directly implanting motor nerve into muscle. A comparative study of three techniques of neurotization is presented in rabbits. In this experimental study, a total of 40 white New Zealand rabbits were used and divided into four groups, each including 10 rabbits. In the first group (control--Group 1), only surgical exposure of the gastrocnemius muscle, main muscle nerve (tibial nerve), and peroneal nerve was done, without any injury to the nerves. In the second group (direct neurotization group--Group 2), the tibial nerve was transected, and the peroneal nerve, which had already been divided into fascicles, was implanted into the lateral head of the gastrocnemius muscle aneural zone. In the third group (dual neurotization group--Group 3), the tibial nerve which had been transected and re-anastomosed, and the peroneal nerve were implanted into the lateral head of the gastrocnemius muscle. In the last experimental group (hyperneurotization group--Group 4), fascicles of the peroneal nerve were implanted into the lateral head of the gastrocnemius, preserving the tibial nerve. Six months later, changes in the histologic pattern and the functional recovery of the gastrocnemius muscle were investigated. It was found that functional recovery was achieved in all neurotization groups. Groups with the tibial nerve transected had less muscular weights than those of groups with the tibial nerve intact. EMG recordings showed that polyphasic and late potentials were frequently seen in groups with the tibial nerve transected. Degeneration and regeneration of myofibrils was observed in such groups as well. New motor end-plates, including vesicles, were formed in a scattered manner in all neurotization groups. As a result, the authors conclude that direct and dual neurotization techniques are useful in peripheral nerve injuries, if it is not possible to reinnervate muscle by using neurorrhaphy and nerve grafting, and that there is no suggested superiority among these techniques.

Keywords: comparative study, animal model, rabbits, microsurgery, muscle contraction physiology, muscle fiber pathology, skeletal injuries, skeletal muscle innervation, surgery, nerve transfer, peroneal nerve transplantation, reconstructive surgical procedures, recovery, tibial nerve transplantation.

Avila, M.; Ortiz, G.; Lozano, J.M.; Franco, P.; Patarroyo, M.E. (2001). **GGRGDSPCA peptide: a new antiscarring agent on glaucoma filtration surgery.** *Ophthalmic Surgery and Lasers* 32 (2): 134-9, ISSN: 1082-3069.

Abstract: GGRGDSPCA synthetic peptide competes for integrin receptor in scar formation after glaucoma filtering surgery in a rabbit model. The purpose of this study was to evaluate the use of this peptide and compare it with mitomycin on glaucoma filtering surgery. **MATERIALS AND METHODS:** Posterior sclerectomy was performed in both eyes of 17 rabbits. The right eye received GGRGDSPCA (p605) at 0, 4, 8, 12, and 16 days after. Nine left eyes received saline as a control; the remaining 8 eyes received mitomycin C at 0.5 mg/mL intraoperative. Intraocular pressures and biomicroscopy were evaluated as well as bleb function. **RESULTS:** Intraocular pressure decreased significantly in both the peptide and mitomycin treated eyes in comparison with the saline group ($P = 0.0003$). Pressure was similar in both groups. The blebs showed filtrating function in a functional analysis at day 21 and 41 in the mitomycin cases as well as in the peptide group. Histologic analysis performed in both peptide and mitomycin groups showed inhibitory effect in fibrocellular and collagen organization with bleb formation. **CONCLUSIONS:** The p605 peptide showed to be similar to mitomycin C in controlling and improving glaucoma filtering surgery in rabbits. This alternative may potentially be useful for similar purposes in humans for the control of glaucoma and improvement of filtering surgery.

Keywords: animal models, rabbits, female, glaucoma surgery, cicatrix, drug therapy, comparative study, filtering surgery, pathology, physiopathology, intraocular pressure mitomycin, adverse effects, therapeutic use, oligopeptides, chemical synthesis, postoperative care, GGRGDSPCA peptide.

Blasier, R.D.; White, R.J. (1998). **Duration of immobilization after percutaneous sliding heel-cord lengthening.** *Journal of Pediatric Orthopedics* 18 (3): 299-303, ISSN: 0271-6798.

Abstract: Heel-cord lengthening is commonly performed for contractures in neuromuscular disease. Immobilization after this procedure has ranged from 3 to 8 weeks. A three-part study was performed to determine adequate length of immobilization. Sixteen rabbits had surgical transection of the right gastrocnemius

tendon in phase 1. Healing was allowed for 1, 3, 5, or 7 weeks. Tendons were then studied by magnetic resonance imaging (MRI), mechanical testing, or histologic section. A marker for healing was determined by MRI. Seven children underwent percutaneous sliding heel-cord lengthening (PSHCL) in phase 2. Healing was studied by MRI. Based on the marker from phase 1, adequate healing occurred at 3 weeks. Thirty-one children underwent PSHCL for neuromuscular contracture in phase 3. Cast immobilization was maintained for 3 weeks (group 1) and for >3 weeks (group 2). There was no evidence of rupture or progressive lengthening after cast removal in either group.

Keywords: human, child, animal model, rabbits, achilles tendon, pathology, surgery, casts, cerebral palsy, complications, child equinus deformity, etiology, equinus deformity, magnetic resonance imaging, postoperative care, wound healing.

Boppart, S.A.; Bouma, B.E.; Pitris, C.; Tearney, G.J.; Southern, J.F.; Brezinski, M.E.; Fujimoto, J.G. (July 1998).

Intraoperative assessment of microsurgery with three-dimensional optical coherence tomography.

Radiology 208 (1): 81-6, ISSN: 0033-8419.

Abstract: To evaluate three-dimensional optical coherence tomography (OCT) for use in the assessment of the microsurgical anastomoses of vessels and nerves. **MATERIALS AND METHODS:** OCT is an optical analogue of ultrasonography and is capable of imaging nontransparent biologic tissue by detecting backscattered infrared light. Cross-sectional in vitro images of rabbit and human vessels and nerves were obtained in as little as 125 msec at 10-micron resolution by using a solid-state laser as a light source. A surgical microscope was integrated with OCT to perform simultaneous imaging with en face visualization. Cross-sectional images were assembled to produce three-dimensional reconstructions of microsurgical specimens. **RESULTS:** Three-dimensional OCT reconstructions depicted the structure within an arterial anastomosis and helped identify sites of luminal obstruction. The longitudinal spatial orientation of individual nerve fascicles was tracked in three dimensions to identify changes in position. In vitro human arteries and nerves embedded in highly scattering tissue and not visible at microscopy were located and imaged with OCT at eight frames per second. **CONCLUSION:** The three-dimensional, micrometer-scale, diagnostic imaging capabilities of OCT permit rapid feedback for assessment of microsurgical procedures. OCT technology can be readily integrated with surgical microscopes and has potential for intraoperative monitoring to improve patient outcome.

Keywords: human, rabbits, anastomosis, surgical, anatomy, cross-sectional, arteries, human image processing, computer-assisted infrared rays, intraoperative care, lasers, microsurgery, intraoperative monitoring, neurosurgical procedures, optics, instrumentation, peripheral nerves, radiology.

Botham, P.A.; Hadfield, N.A.M. (1999). **Review of the long-term in-house use of an in vitro test battery for predicting severe ocular irritants.** *Human and Experimental Toxicology* 18 (8): 538.

Keywords: K562 cell line, rabbit, animal model, eye, sensory system, ocular irritants, in vitro test battery, assessment method, meeting.

Brooks, S.E.; Ribeiro, G.B.; Archer, S.M.; Elnor, V.M.; Del Monte, M.A. (Jan-Feb 1996). **Fat adherence syndrome treated with intraoperative mitomycin-C: a rabbit model.** *Journal of Pediatric Ophthalmology and Strabismus* 33 (1): 21-7, ISSN: 0191-3913.

Abstract: We used an animal model of restrictive strabismus analogous to the fat adherence syndrome in humans to test the efficacy of topical intraoperative mitomycin-C (MMC) in preventing the development of restrictive scar tissue. A cicatricial adhesion was created between the inferior rectus muscle and the inferior orbital rim of each eye in eight rabbits, and passive forced ductions were quantitatively measured with a spring scale. Eight eyes were treated intraoperatively with topical MMC 0.5 mg/mL, the other eight with sterile water. Passive forced ductions were again measured 4 weeks postoperatively and representative orbits were exenterated for histopathologic examination. Significant restriction of motility was produced in six of the eight control eyes. Though prophylactic treatment with MMC may have been beneficial in some cases, on average, the restriction developing in these eyes did not significantly differ from that in the control eyes. In addition, longer exposure times to MMC led to marked orbital inflammation and severe restriction of ocular motility. Finally, histopathologic evaluation of the orbits of the MMC-treated eyes revealed marked fibrosis of perimuscular connective tissues. Although MMC may have a role in the management of fat adherence syndrome, further study is needed to establish safe and efficacious methods of delivery.

Keywords: adhesions, complications, pathology, adipose tissue, cicatrix, disease models, intraoperative care,

mitomycin, therapeutic use, oculomotor muscles, physiopathology orbital diseases, complications, postoperative period, strabismus, drug therapy, etiology, surgery.

Butler, P.E.; Sims, C.D.; Randolph, M.A.; Van de Water, A.P.; Lee, W.P. (1998). **Prolonged survival in fetal rabbit surgery.** *Journal of Investigative Surgery: the Official Journal of the Academy of Surgical Research* 11 (1): 57-61, ISSN: 0894-1939.

Abstract: Timing and outcome of antenatal surgical intervention is being explored using fetal animal models. Models that are currently used range from larger animals with fewer offspring and higher cost to smaller animals with larger litters and lower cost. The rabbit is an ideal “small” animal model for experimentation in the third trimester, with a large litter, short gestation and a relatively large fetus. This paper reports methods by which prolonged survival (greater than 110 days) may be achieved in as many as 60% of operated fetuses following complex fetal surgery in the rabbit.

Keywords: animal model, rabbits, abnormalities, surgery, intraoperative care, postoperative care, pregnancy, preoperative care, survival rate, time factors.

Caliendo, F.J.; Halpern, V.J.; Marini, C.P.; Nathan, I.M.; Patel, D.; Faust, G.; Cohen, J.R. (1999). **Warfarin anticoagulation in the perioperative period: is it safe?** *Annals of Vascular Surgery* 13 (1): 11-6, ISSN: 0890-5096.

Abstract: This study was undertaken to determine if warfarin anticoagulation could be safely continued during surgery and in the perioperative period. An animal model was followed by a prospective human study of all patients on heparin or warfarin at the time of surgery. Twenty-four rabbits underwent laparotomy, during which a controlled liver injury was created and repaired. Group 1 (Warf) was anticoagulated with warfarin to raise the mean international normalization ratio (INR) to 2.5-3.0. Group 2 (Hep) was anticoagulated with heparin to raise the activated partial thromboplastin time to 1.5-2.0 times control. The heparin was then stopped 6 hr prior to surgery and resumed 6 hr postoperatively without a bolus. Group 3 (control) was not anticoagulated and received saline infusion. For the human study, data were collected on 40 patients undergoing 50 operations from October 1996 to January 1998. The results of this study reveal that (1) bleeding was less in the group anticoagulated with warfarin throughout surgery in the animal model, (2) bleeding complications were less in the patients continued on warfarin through surgery than those on heparin (3) older patients may have an increased risk of bleeding, and (4) an INR of >3 at the time of surgery may increase the risk of bleeding.

Keywords: human, rabbits, animal model, anticoagulants, warfarin, adverse effects, therapeutic use, blood loss, surgical, prevention and control, statistics and numerical data, comparative study, heparin, adverse effects, perioperative care, risk factors, time factors, adverse effects.

Chen, C.H.; Chen, W.J.; Shih, C.H. (May-June 2002). **Enveloping of periosteum on the hamstring tendon graft in anterior cruciate ligament reconstruction.** *Arthroscopy: the Journal of Arthroscopic and Related Surgery* 18 (5): 27E, ISSN: 0749-8063.

Abstract: Tendon-bone incorporation of a tendon graft within the bone tunnel is a major concern when using tendon graft for ligament reconstruction. Periosteum consists of multipotent mesodermal cells to form all varieties of connective tissue, including osteogenic and chondrogenic tissues. From our histologic and biomechanical studies in animals, a superior healing process and stronger healing strength can be achieved when periosteum is sutured onto the tendon inserted within a bone tunnel. We applied this idea to anterior cruciate ligament reconstruction to enhance tendon-bone healing. A quadruple-stranded hamstring tendon graft is used. A piece of periosteum, 3 x 3 cm, harvested from the anterior cortex of proximal tibia, is split into 2 rectangle flaps (1.5 x 3 cm each). The periosteum flaps are wrapped and sutured around the tendon graft at the portions near the femoral and tibial tunnel openings. The cambium layer is faced outside to the bone tunnel. Periosteum is easy to harvest from proximal tibia, where is a routine incision for harvesting hamstring tendons. Besides the potential for enhancement of tendon-bone healing, periosteum may be able to seal off the intra-articular opening in a very early period to avoid synovial fluid reflux into the tunnel.

Keywords: animal model, rabbit, anterior cruciate ligament, physiopathology, surgery, biomechanics, bone, nails, femur, surgery, knee joint, surgery, osteogenesis, periosteum transplantation, postoperative care, suture techniques, tendon transfer methods, rehabilitation, tibia surgery, wound healing.

Choi, M.Y.; Auh, S.J.; Choi, D.G.; Chang, B.L. (2001). **Effect of ADCON-L on adjustable strabismus surgery in**

rabbits. *The British Journal of Ophthalmology* 85 (1): 80-4, ISSN: 0007-1161.

Abstract: In search of a way to prevent postoperative adhesion after strabismus surgery, an animal study was performed to assess the effect of a gel consisting of a polyglycan ester in a gelatin matrix (ADCON-L).

METHODS: Bilateral recessions of superior rectus muscle (SR) were performed on 16 rabbits. ADCON-L was applied beneath and over the SR in the right eyes of all rabbits, while the operative fields in the left eyes were irrigated with a balanced salt solution (BSS). The adjustment was performed on each SR at 4 and 7 days postoperatively on the same eye. The length and force of the adjustment and the degree of adhesion were recorded. At 3 weeks postoperatively, disinsertional force was measured in several of the eyes, and the other eyes were enucleated. **RESULTS:** The length of the adjustment was longer and the force of the adjustment was less in the ADCON-L group than in the BSS treated group at 4 and 7 days postoperatively ($p=0.00$). A significant reduction ($p=0.00$) in the degree of adhesion was noted in eyes treated with ADCON-L. There was no significant difference in disinsertional force between the two groups. Histopathological evaluation of the muscle revealed decreased fibrosis of perimuscular connective tissue in eyes treated with ADCON-L at 3 weeks postoperatively. **CONCLUSION:** This study suggests that ADCON-L helps to prevent postoperative adhesion in rabbits and enables adjustment twice within 7 days postoperatively without complications.

Keywords: animal models, rabbit, strabismus surgery, adhesions, prevention and control, gels, therapeutic use, muscular diseases, oculomotor muscles, surgery, postoperative care, postoperative complications, prevention and control, suture techniques.

Cox, L. (2003). **Present angiogenesis research and its possible future implementation in wound care.** *Journal of Wound Care* 12 (6): 225-8, ISSN: 0969-0700.

Abstract: The process of new blood vessel formation is essential for wound healing. Nurses should be aware of the latest scientific findings on angiogenesis which will enhance their understanding of how it may affect clinical practice.

Keywords: review, human, animal models, rabbits, rats, swine, anoxia, physiopathology, cell physiology, extracellular matrix, physiology, growth substances, metabolism, neovascularization, research trends, wound healing.

Cruz, O.A.; Matkovich, L. (1995). **Effects of intraoperative topical mitomycin-C on strabismus surgery in the rabbit: a preliminary study.** *Ophthalmic Surgery* 26 (3): 237-40, ISSN: 0022-023X.

Abstract: The effect of intraoperative topical exposure of mitomycin-C (MMC) on muscle reattachment and scarring in strabismus surgery was prospectively investigated in the rabbit by performing bilateral recession surgery in which one eye was treated with topical MMC (0.2 mg/mL) and the other eye served as the control. One week postoperatively, in random, masked fashion, the severity of postoperative adhesions was rated lower in the MMC-treated eyes. Also, histology demonstrated decreased fibrosis in the muscle reattachment sites in the MMC-treated eyes. The muscle tension in the reattached muscles was greater than 100 g in all of the eyes. This preliminary study indicates that topical MMC exposure may inhibit scarring in strabismus surgery without inhibiting muscle reattachment or causing other obvious adverse effects.

Keywords: animal model, rabbit, adhesions, prevention and control, fibrosis, intraoperative care, mitomycin, administration and dosage, pharmacology, oculomotor muscles, drug effects, surgery, ophthalmic solutions, postoperative complications, prevention and control, strabismus surgery.

Demir, T.; Turgut, B.; Akyol, N.; Ozercan, I.; Ulas, F.; Celiker, U. (2002). **Effects of amniotic membrane transplantation and mitomycin C on wound healing in experimental glaucoma surgery.** *Ophthalmologica* 216 (6): 438-42.

Keywords: administration, topical amnion, pathology, amnion, transplantation, antibiotics, antineoplastic, pharmacology, therapeutic use comparative study fibroblasts, pathology glaucoma, drug therapy glaucoma, surgery, intraocular pressure, drug effects intraoperative care macrophages, pathology mitomycin, pharmacology, mitomycin, therapeutic use ophthalmologic surgical procedures, trabeculectomy transplantation, autologous wound healing, drug effects, wound healing, physiology, antineoplastic mitomycin.

Dinslage, S.; McLaren, J.; Brubaker, R. (Nov. 1998). **Intraocular pressure in rabbits by telemetry II: effects of animal handling and drugs.** *Investigative Ophthalmology and Visual Science* 39 (12): 2485-9, ISSN: 0146-0404.

Abstract: To measure under carefully controlled conditions the effects in the rabbit eye of commonly used therapeutic agents for glaucoma. **METHODS:** Rabbits were outfitted in one eye with an implantable telemetric pressure transducer and monitored for several months under controlled conditions of light/ dark and handling. Effects of tonometry, handling, water drinking, and instillation of topical ophthalmic medications on intraocular pressure were recorded during each 24-hour day/night cycle. **RESULTS:** Pneumatometry, animal handling, and water drinking all had an effect on intraocular pressure that in many instances was of the same magnitude as the effects of pharmacologic agents. Dorzolamide and timolol caused a sustained reduction of intraocular pressure during the nocturnal period. Epinephrine had a biphasic effect, causing an immediate pressure elevation followed by a prolonged depression. Apraclonidine, latanoprost, and pilocarpine had no measurable effect. **CONCLUSIONS:** Continuous telemetric measurement of intraocular pressure in rabbits permits the measurement of uncontrollable artifacts that occur with tonometric measurements and animal handling. If environmental conditions are rigidly controlled, this method is very sensitive for detecting therapeutic effects of candidates for ocular hypotensive drugs. When healthy animals are used, the method appears to be more sensitive for drugs that affect aqueous humor formation than for drugs that affect aqueous humor outflow resistance.

Keywords: husbandry, circadian rhythm, clonidine, pilocarpine, prostaglandins F, sulfonamides, thiophenes, epinephrine, analogs and derivatives, pharmacology, intraocular pressure, drug effects, ophthalmic solutions, telemetry methods, tonometry, ocular methods.

Eze, C.A.; Chah, F.K.; Ubah, S.A. (2002). **Clinical observations on antibacterial effect of honey as a surgical wound dressing agent.** *Journal of Natural Remedies* 2 (2): 150-154, ISSN: 0972-5547.

Keywords: animal model, rabbit, *Staphylococcus aureus*, wound contaminant, antibacterial agents, antibacterial properties, bacterial diseases, disease models, drug therapy, honey, human diseases, penicillins, postoperative care, streptomycin, wound dressings.

Farhat, F.; Loisanche, D.; Garnier, J.P.; Kirsch, M. (2001). **Norepinephrine release after acute brain death abolishes the cardioprotective effects of ischemic preconditioning in rabbit.** *European Journal of Cardio-Thoracic Surgery* 19 (3): 313-20, ISSN: 1010-7940.

Abstract: Brain death (BD) abolishes the infarct-limiting effect of ischemic preconditioning (IP) in rabbits. We wished to define the role of the norepinephrine storm in this observation. **METHODS:** Rabbits were randomized into six groups of ten animals each. In control group (CTRL), anaesthetized rabbits were subjected to 30 min left coronary marginal branch occlusion and 90 min reperfusion. In CTRL+IP group, anaesthetized rabbits were preconditioned with a 5-min ischemia and 5-min reperfusion sequence before coronary occlusion. In CTRL+NE+IP group, anaesthetized rabbits received a 10 microg/kg norepinephrine injection 90 min before IP. In BD group, rabbits were subjected to 90 min of BD before coronary occlusion. In BD+IP group, brain-dead rabbits were preconditioned before coronary occlusion. In BD+LA+IP group, rabbits received an intra-arterial bolus injection of an alpha and beta adrenoreceptor blocking agent (labetolol, 1 mg/kg) prior to brain death induction and subsequent preconditioning. BD was induced by rapid inflation of an intracranial balloon. At termination of the experiment, left ventricular volume (LVV), myocardial volume at risk (VAR) and infarct volume (IV) were determined with methylene blue and tetrazolium staining, and measured using planimetry. **RESULTS:** LVV was not significantly different among groups. Myocardial VAR/LVV was not significantly different between groups (CTRL, 22.5+/-6.9%; CTRL+IP, 23.3+/-2.2%; CTRL+NE+IP, 25.9+/-12.7%; BD, 19.9+/-4.8%; BD+IP, 21.7+/-3.1%; BD+LA+IP, 23.4+/-5.8%; P=NS). IV/VAR was significantly reduced in the CTRL+IP group as compared with CTRL and CTRL+NE+IP groups (12.2+/-1.2 vs. 49.7+/-1.7 and 49.3+/-4.7%; P<0.0001). There was no significant difference in IV/VAR between BD and BD+IP groups. In contrast, IV/VAR was reduced in BD+LA+IP compared to BD and BD+IP groups (13.9+/-5.4 vs. 50.0+/-1.4 and 49.6+/-1.5%; P<0.001). **CONCLUSION:** The loss of infarct-limiting effect of IP in brain-dead rabbits is related to the massive release of norepinephrine that occurs as a consequence of BD.

Keywords: animal models, rabbit, brain death, metabolism, comparative study, coronary disease, physiopathology, surgery, hemodynamic processes, physiology, ischemic preconditioning, myocardial methods, labetalol, pharmacology, myocardial infarction, prevention and control, myocardial reperfusion methods, norepinephrine pharmacology, norepinephrine secretion, preoperative care.

Fields, M.J.; Hoshijima, K.; Richardson, W.J.; Myers, B.S. (2000). **Clinical outcome scales for use in a rabbit model**

of cervical myelopathy. *Journal of Spinal Disorders* 13 (2): 124-30, ISSN: 0895-0385.

Abstract: This study determined the ability of an upper extremity Tarlov scale, a lower extremity Tarlov scale, and the Durham scale to predict the development of myelopathy and the likelihood of survival in a rabbit model of surgical treatments for cervical spondylotic myelopathy. Forty-eight rabbits were evaluated using the scales after cervical spinal surgery. Logistic regression analysis revealed that all three scales could predict the occurrence of myelopathy. However, only the Durham and lower extremity Tarlov scales also predicted the likelihood of survival. The Durham scale is offered as a useful predictor of myelopathy and survival in an animal model of surgical treatments for cervical spondylotic myelopathy. The lower extremity Tarlov scale is also a useful predictor of outcome; however, the upper extremity Tarlov scale is not recommended.

Keywords: animal models, rabbits, cervical spondylotic myelopathy, cervical vertebrae physiopathology, surgery, comparative study, prognosis, recovery of function, spinal cord compression, spinal osteophytosis.

Freud, E.; Eshet, R. (2001). **Insights from animal models for growing intestinal neomucosa with serosal patching: A still untapped technique for the treatment of short bowel syndrome.** *Laboratory Animals* 35 (2): 180-187, ISSN: 0023-6772.

NAL Call Number: QL55.A1L3

Keywords: animal model, rabbit, rat, laboratory animal science, laboratory animal welfare, intestinal neomucosa, digestive system, regeneration, epidermal growth factor, octreotide, pharmacodynamics, prostaglandin E-2, urogastrone, short bowel syndrome, digestive system disease, serosal patch technique, therapeutic method.

Gad, S.C. (2002). **Evaluating products for their potential to cause dermal and ocular irritation and corrosion.** *Journal of Toxicology Cutaneous and Ocular Toxicology* 21 (3): 213-244, ISSN: 0731-3829.

NAL Call Number: RL803.J67

Keywords: animal models, rabbit, dog, mouse, monkey, dermal irritants; dermal toxicants, ocular irritants, corrosion, dermal irritation, ocular irritation, ocular testing, product safety, toxicity testing methods, literature review.

Grover, P.; Kaiser, J. (2001). **Alternative methods for dermal and ocular animal safety testing of chemicals.** *Proceedings of the Indian National Science Academy. Part B, Reviews and Tracts: Biological Sciences* 67 (1/2): 1-20, ISSN: 0073-6000.

Keywords: laws, regulations, laboratory animal science, laboratory animals, rabbits, animal testing alternatives, animal welfare, eyes, methodology, reviews, toxicity, India.

Guzzardella, G.A.; Torricelli, P.; Nicoli-Aldini, N.; Giardino, R. (2003). **Osseointegration of endosseous ceramic implants after postoperative low-power laser stimulation: an in vivo comparative study.** *Clinical Oral Implants Research* 14 (2): 226-32, ISSN: 0905-7161.

Abstract: Stimulation with low-power laser (LPL) can enhance bone repair as reported in experimental studies on bone defects and fracture healing. Little data exist concerning the use of LPL postoperative stimulation to improve osseointegration of endosseous implants in orthopaedic and dental surgery. An in vivo model was used for the present study to evaluate whether Ga-Al-As (780 nm) LPL stimulation can improve biomaterial osseointegration. After drilling holes, cylindrical implants of hydroxyapatite (HA) were placed into both distal femurs of 12 rabbits. From postoperative day 1 and for 5 consecutive days, the left femurs of all rabbits were submitted to LPL treatment (LPL group) with the following parameters: 300 J/cm², 1 W, 300 Hz, pulsating emission, 10 min. The right femurs were sham-treated (control group). Three and 6 weeks after implantation, histomorphometric and microhardness measurements were taken. A higher affinity index was observed at the HA-bone interface in the LPL group at 3 (P<0.0005) and 6 weeks (P<0.001); a significant difference in bone microhardness was seen in the LPL group vs. the control group (P<0.01). These results suggest that LPL postoperative treatment enhances the bone-implant interface.

Keywords: animal model, rabbit, aluminum, analysis of variance, arsenic, bone density, radiation effects, ceramics, chemistry, comparative study, dental implants, dental prosthesis design, durapatite, femur pathology, radiation effects, femur surgery, gallium, laser therapy, osseointegration, postoperative care.

Harumal, P.; Morgan, M.; Walton, S.F.; Holt, D.C.; Rode, J.; Arlian, L.G.; Currie, B.J.; Kemp, D.J. (2003).

Identification of a homologue of a house dust mite allergen in a cDNA library from *Sarcoptes scabiei* var. *hominis* and evaluation of its vaccine potential in a rabbit/ *S. scabiei* var. *canis* model. *The American Journal of Tropical Medicine and Hygiene* 68 (1): 54-60, ISSN: 0002-9637.

NAL Call Number: 448.8 Am326

Abstract: Identification of a homologue of a house dust mite allergen in a cDNA library from *Sarcoptes scabiei* var. *hominis* and evaluation of its vaccine potential in a rabbit/*S. scabiei* var. *canis* model. Menzies School of Health Research, Darwin, Northern Territory, Australia. *Sarcoptes scabiei* ("itch mite") causes scabies, a disease of considerable human and veterinary significance. Little work has been done at the molecular level because of the difficulty of obtaining mites. We have used mites in skin from the bedding of crusted scabies patients for the construction of a library of 10(5) cDNAs from *S. scabiei* var. *hominis* cloned in the vector pGEX4T-2. We describe the isolation by immunoscreening of 2 clones, one of which (Ssagl) is homologous to and cross-reactive with the house dust mite *Euroglyphus maynei* allergen M-177, an apolipoprotein from hemolymph. Immunohistochemistry revealed that it is located around the internal organs and cuticle of the mite and in eggs. Although it was not found to be protective in a challenge trial, the rabbits did not exhibit typical crust characteristics. This work shows that it is now possible to conduct such challenge trials with cloned scabies antigens.

Keywords: animal model, rabbits, skin disease, *Sarcoptes scabiei*, chemistry, genetics, immunology, amino acid sequence, base sequence cloning, molecular DNA, animal gene library, human immune sera, vaccines.

Holmes, J.M.; Townshend, A.M. (1995). **Optimum timing of postoperative adjustment in a rabbit model of adjustable suture strabismus surgery.** *Ophthalmic Surgery* 26 (3): 241-3, ISSN: 0022-023X.

Abstract: Strabismus surgeons disagree on the optimum timing of the postoperative adjustment in adjustable suture surgery. We compared the peak force necessary for adjustment at various postoperative times using a rabbit model. Twenty-four eyes of 12 rabbits underwent a superior rectus recession of 5 mm using a standard adjustable suture technique. The eyes were randomized to adjustment at 15 minutes, and at 6, 24, and 48 hours postoperatively. The peak force required to advance the muscle 3 mm was measured using a strain gauge. During each adjustment, the peak force was noted to be that required for initial disinsertion of muscle from sclera. The mean peak force required was 14 +/- 5 g at 15 minutes, 37 +/- 10 g at 6 hours, 60 +/- 40 g at 24 hours, and 103 +/- 52 g at 48 hours. There was a significant relationship between the time of adjustment and the peak force required for adjustment ($F = 7.8$, $P = 0.001$). Post-hoc analysis showed that the peak force required at 48 hours was greater than that required at 24 hours ($P = 0.04$), 6 hours ($P = 0.003$), and at 15 minutes ($P = 0.0002$). The force required for adjustment at 24 hours and beyond was greater than the maximal force generated by an extraocular muscle. We therefore suggest that the postoperative adjustment should be performed within the first 24 hours.

Keywords: animal model, rabbit, muscle contraction, physiology, oculomotor muscles, surgery, postoperative care, strabismus surgery, suture techniques, time factors.

Holzheimer, R.G. (2001). **Antibiotic induced endotoxin release and clinical sepsis. A review.** *Journal of Chemotherapy* 13 (Special Issue 1): 159-172, ISSN: 1120-009X.

Keywords: literature review, human, animal models, rabbit, rat, antibiotics, cefotaxime, antibacterial drug, anti-infective drug, ceftazidime, ciprofloxacin, cytokines, endotoxin, antibiotic induced release, gentamicin, imipenem, meropenem, penicillin binding protein, tobramycin, bacteremia, bacterial disease, sepsis, intra abdominal infection, infectious disease, peritonitis, digestive system disease, intensive care, multi organ failure.

Hosemann, W.; Goede, U.; Sauer, M. (1999). **Wound healing of mucosal autografts for frontal cerebrospinal fluid leaks: Clinical and experimental investigations.** *Rhinology* 37 (3): 108-112, ISSN: 0300-0729.

Keywords: laboratory animals, methods and techniques, cerebrospinal fluid, leaks, nervous system, clinical investigations, experimental investigations, frontal leakage, nasal septum, respiratory system, skull skeletal system, wound healing, mucosal autografting, application procedures, fibrous transformation, postoperative care, surgical method, therapeutic method.

Ito, T.; Shiomi, M. (2001). **Cerebral atherosclerosis occurs spontaneously in homozygous WHHL rabbits.** *Atherosclerosis* 156 (1) :57-66, ISSN: 0021-9150.

Abstract: We demonstrated that selectively bred homozygous WHHL rabbits known to show

hypercholesterolemia and severe coronary atherosclerosis also spontaneously develop cerebral atherosclerosis beginning at 9 months of age. These intracranial lesions occurred in the absence of hypertension in 24 of 25 animals at various sites, mainly along arteries at the base of the brain. No lesions were observed in penetrating arteries. Lesions were rich in smooth muscle cells and fibrous tissue, showing only rare fragmentation or disappearance of the internal elastic lamina, and only limited lipid deposition. Few macrophages were observed in these lesions. No significant correlation was seen between severity of cerebral atherosclerosis and age, systolic blood pressure (BP), serum total cholesterol, or triglyceride concentration. Xanthomas of the pia mater were observed in all 25 rabbits. Arterial findings were similar to those in human cerebral atherosclerosis, indicating that the coronary atherosclerosis-prone homozygous WHHL rabbit represents the first animal model for spontaneous cerebral atherosclerosis.

Keywords: animal model, rabbits, male, aging, physiology, husbandry, aorta, thoracic, pathology, arteries, blood pressure, brain diseases, etiology, cerebral arteries, coronary vessels, female, homozygote, hyperlipidemia, genetics, intracranial arteriosclerosis, etiology, lipids, blood, pia mater, genetics, receptors, deficiency, severity of illness index.

Jones, P.A.; Budynsky, E.; Cooper, K.J.; Decker, D.; Griffiths, H.A.; Fentem, J.H. (2001). **Comparative evaluation of five in vitro tests for assessing the eye irritation potential of hair-care products.** *Alternatives to Laboratory Animals: ATLA* 29 (6): 669-692, ISSN: 0261-1929.

NAL Call Number: Z7994 L3A5

Abstract: This study compared five methods, the isolated rabbit eye (IRE), bovine corneal opacity and permeability (BCOP), EpiOcular, fluorescein leakage (FL) and neutral red release (NRR) assays, for predicting the eye irritation potential of hair-care formulations. Ten shampoo and seven conditioner formulations of known ocular irritation potential were tested. Each group included a market-acceptable formulation as a comparative benchmark. Predictions of ocular irritation were made by using classification models (IRE, BCOP and EpiOcular assays) or by direct comparison with benchmarks (IRE, EpiOcular, FL and NRR assays). The BCOP assay was less sensitive than the IRE test in discriminating between formulations of different irritation potentials, and did not perform as well as the other assays in identifying mild formulations. All of the assays appeared to be better at discriminating correctly between the shampoos than between the conditioners. The EpiOcular assay showed the closest concordance between the in vivo results and the in vitro data from cell-based assays (particularly for shampoos). The FL assay also showed a high concordance (particularly for conditioners). There was a tendency for these in vitro assays to over-predict eye irritation potential, but there was no under-prediction and they were particularly successful at identifying mild formulations. The NRR assay was less predictive with both shampoos and conditioners. The results from this comparative evaluation fully support the continued use of the IRE test as a suitable alternative to in vivo eye irritation testing in rabbits, although it also over-predicted the irritancies of several of the formulations.

Keywords: shampoos, hair, surfactants, testing, irritant properties, assays, in vitro, eyes, rabbits, cattle, cornea, fluorescein, laboratory tests, coagulation, prediction, accuracy, animal testing alternatives, eye irritation tests, fluorescein leakage assay, neutral red uptake assay, bovine corneal opacity, permeability assay, epiocular assay, animal use replacement.

Kaatz, G.W.; Seo, S.M.; Aeschlimann, J.R.; Houlihan, H.H.; Mercier, R.C.; Rybak, M.J. (1998). **Efficacy of trovafloxacin against experimental *Staphylococcus aureus* endocarditis.** *Antimicrobial Agents and Chemotherapy* 42 (2): 254-6, ISSN: 0066-4804.

Abstract: Trovafloxacin is a new fluoronaphthyridone chemically and functionally related to members of the fluoroquinolone class of antimicrobial agents. The in vivo efficacy of the drug was compared with that of vancomycin by using the rabbit model of left-sided endocarditis. Rabbits infected with either a nafcillin-susceptible or -resistant test strain were treated with trovafloxacin (13.3 mg/kg of body weight every 12 h) or vancomycin (25 mg/kg of body weight every 8 h) for 4 days. In comparison with untreated controls, both antimicrobial agents effectively cleared bacteremia and significantly reduced bacterial counts in vegetations and tissues of animals infected with either test strain. No resistance to trovafloxacin emerged in test strains during therapy. We conclude that in this model trovafloxacin is as efficacious as vancomycin is and may serve as a viable alternative to vancomycin for use in humans with similar infections.

Keywords: anti-infective agents, therapeutic use, drug resistance, drug therapy, endocarditis, fluoroquinolones, naphthyridines, trovafloxacin, staphylococcal infections.

Kallfass, E.; Kramling, H.J.; Schultz-Hector, S. (May 1996). **Early inflammatory reaction of the rabbit coeliac artery wall after combined intraoperative (IORT) and external (ERT) Irradiation.** *Radiotherapy and Oncology: Journal of the European Society for Therapeutic Radiology and Oncology* 39 (2): 167-78, ISSN: 0167-8140.

Abstract: The present immunohistochemical study of radiation-induced damage in major blood vessels is based on a multidisciplinary study (Schultz-Hector et al., *Radiother. Oncol.*, 38: 205-214, 1996) investigating the combined effect of IORT of the coeliac axis and upper abdominal ERT. The paper describes the sequential changes occurring in the coeliac artery after IORT with 30 Gy, i.e. during and after combined IORT and fractionated ERT (total dose 40 Gy). Within 24 h after IORT, the arterial wall was found to be invaded by TNF-alpha positive macrophages, which later on disappeared within 7-14 days. At 2 days post-IORT, the medial smooth muscle cells were strongly positive for TNF-alpha and remained positive throughout the observation period of 63 days. At 80 days, a comparison of different IORT dose groups showed that TNF-alpha expression after 20 and 30 Gy IORT plus 40 Gy ERT had subsided, while it was still strongly evident after 40 Gy IORT. Negative reactions in sham irradiated animals or animals treated with ERT alone indicate that TNF-alpha expression was caused by IORT. After > 30 days post-IORT, there was increased collagen type I deposition in the adventitia. In two animals receiving the full ERT course, intimal proliferations involving mainly smooth muscle cells were observed. Our findings indicate that some features typical of radiation induced arteriosclerosis such as periarterial fibrosis and intimal proliferations can occur as early as < 60 days postirradiation. Macrophage invasion as well as TNF-alpha expression in medial smooth muscle cells are known to be important steps in the development of spontaneous atherosclerotic lesions. Therefore, early TNF-alpha induction in the arterial wall by a high local dose of X-irradiation may be regarded as one initiating factor of chronic radiation-induced arteriosclerosis.

Keywords: arteriosclerosis, etiology, metabolism, pathology, celiac artery, pathology, radiation effects, cell division, radiation effects, collagen, comparative study, densitometry, female, immunohistochemistry intraoperative care, adverse effects, muscle, smooth, vascular, pathology, radiation effects, radiation injuries, tumor necrosis factor.

Kim, H.K.; Kerr, R.G.; Turley, C.B.; Evans, P.J.; Jay, V.; Salter, R.B. (1998). **The effects of postoperative continuous passive motion on peripheral nerve repair and regeneration. An experimental investigation in rabbits.** *Journal of Hand Surgery* 23 (5): 594-7, ISSN: 0266-7681.

Abstract: The effects of continuous passive motion (CPM) on nerve regeneration following nerve repair were investigated. In 26 rabbits, the medial popliteal nerve was transected and microsurgically repaired. Half of the animals were treated with cast immobilization and the rest with 70 degrees arc CPM. Both treatments were discontinued on day 14. After sacrifice on day 100, no animal showed separation at the suture line. Mean nerve conduction velocity was slightly slower in the CPM than in the immobilization group. Mean fibre density was also slightly less in the CPM group but the difference was not significant. Mean fibre diameters, fibre diameter distributions, and soleus-muscle wet weights were similar in the two groups.

Keywords: action potentials, physiology, analysis of variance, axons, pathology, casts, surgical, comparative study, computer-assisted image processing, immobilization, microsurgery, motion therapy, nerve fibers, postoperative care, tibial nerve surgery.

King, G.J.; Edwards, P.; Brant, R.F.; Shrive, N.G.; Frank, C.B. (1995). **Intraoperative graft tensioning alters viscoelastic but not failure behaviours of rabbit medial collateral ligament autografts.** *Journal of Orthopaedic Research* 13 (6): 915-22, ISSN: 0736-0266.

Abstract: The effects of three different degrees of intraoperative graft tensioning on measures of ex vivo laxity, viscoelastic behaviour, and structural and material failure of isolated healing medial collateral ligament autografts were investigated in a rabbit model. The grafts were orthotopically replaced at one of three different loads (too tight, anatomic, or too loose) and were mechanically evaluated after 0, 12, 24, and 48 weeks of healing. Laxity of the ligament was influenced by intraoperative graft tensioning at time zero. However, after 12 weeks of healing, values for laxity were indistinguishable among the experimental groups. Cyclic load relaxation, a measure of viscoelastic behaviour, was significantly influenced by intraoperative graft tensioning, and this effect persisted even after 48 weeks of healing. Grafts placed under excessive tension relaxed one-third less than grafts placed under abnormally low in situ tension. The relevance of these differences remains to be

determined. Intraoperative tensioning had no significant influence on characteristics of structural or material failure of the graft during the first year of healing. These results suggest that, in this model, control of graft tension at the time of placement and fixation does not improve the failure characteristics of the medial collateral ligament. The structural strength of the grafts collectively improved to nearly normal values after 48 weeks; however, material recovery was less complete. Failure loads averaged 89% of control values, whereas failure stress averaged only 52% after 48 weeks of healing.

Keywords: female, elasticity, hindlimb, intraoperative care, medial collateral ligament, physiology, transplantation, stress, tibia transplantation, autologous, methods, viscosity, weight-bearing, wound healing.

Kinoshita, A.; Braga, F.J.; Graeff, C.F.; Baffa, O. (2001). **ESR dosimetry of 89Sr and 153Sm in bone.** *Applied Radiation and Isotopes* 54 (2): 269-74, ISSN: 0969-8043.

Abstract: The radiation absorbed dose in the rabbit bone delivered by 153Sm-EDTMP (samarium ethylenediaminetetra methylene diphosphonic acid) and 89SrCl₂ (strontium chloride) was measured by means of electron spin resonance (ESR). These radioisotopes are used in systemic radiotherapy for palliation of painful bone metastases. The knowledge of the dose is important in order to avoid side effects to the bone marrow. The ESR radiation dose signal was calibrated by the additive dose method using cobalt-60 gamma rays. For 153Sm-EDTMP, the bone doses in three rabbits were (4 +/- 2), (5 +/- 1) and (5 +/- 2) cGy kg/MBq. For 89SrCl₂, a dose of (2 +/- 1) cGy kg/MBq was found in one rabbit.

Keywords: animal model, rabbit, bone marrow, radiation effects, bone neoplasms, radiotherapy, electron spin resonance, spectroscopy, methods, organometallic compounds, administration and dosage, therapeutic use, organophosphorus compounds, radioisotopes, radiometry, methods, radiopharmaceuticals, samarium, strontium.

Leenaars, P.P.A.M. (1998). **Assessment of side effects induced by injection of different adjuvant/antigen combinations in rabbits and mice.** *Laboratory Animals* 32 (4): 387-406. ISSN: 0023-6772.

NAL Call Number: QL55 A1L3

Keywords: rabbits, mice, adverse effects, adjuvants.

Marty, M.S.; Neepier-Bradley, T.L.; Neptun, D.A.; Carney, E.W. (1999). **Developmental toxicity of diethanolamine applied cutaneously to CD rats and New Zealand White rabbits.** *Regulatory Toxicology and Pharmacology* 30 (3): 169-181, ISSN: 0273-2300.

Keywords: laboratory animals, New Zealand White rabbit, CD rat, toxicity, diethanolamine, cutaneous administration, developmental toxicity, skin lesions, reduced food consumption, personal care product, organogenesis.

Minguini, N.; Monteiro de Carvalho, K.M.; Akaishi, P.M.; De Luca, I.M. (2000). **Histologic effect of mitomycin C on strabismus surgery in the rabbit.** *Investigative Ophthalmology and Visual Science* 41 (11): 3399-401, ISSN: 0146-0404.

Abstract: To evaluate the efficiency of mitomycin C (MMC) in limiting the postoperative inflammatory response and scarring after strabismus surgery. **METHODS:** A prospective, two-stage, masked, controlled trial was conducted. In the first stage, the inflammatory response at the extraocular muscle reattachment site was increased after inferior rectus recession in eight rabbits. In the second stage, MMC (0.4 mg/ml) was applied during surgery to the eyes of 22 rabbits with inferior rectus recession. As a control, contralateral eyes were treated with saline solution. Seven weeks later, exenteration was performed, and the sites of muscle reattachment were processed for histologic examinations. The sums of the areas of the granulomas in the extraocular muscle reattachment sites of control and treated eyes were compared. **RESULTS:** There was no significant inhibitory effect of MMC on the inflammatory response of treated eyes compared with that of control eyes. **CONCLUSIONS:** The intraoperative use of MMC (0.4 mg/ml) was not effective in controlling the postoperative inflammatory response in rabbit eyes after extraocular muscle surgery. These data do not support the hypothesis that MMC reduces postoperative adhesions after strabismus surgery.

Keywords: antimetabolites, therapeutic use, cicatrix, pathology, prevention and control, granuloma, intraoperative care, mitomycin, oculomotor muscles, surgery, postoperative complications.

Moldenhauer, F. (2003). **Using in vitro prediction models instead of the rabbit eye irritation test to classify and label new chemicals: A post hoc data analysis of the international EC/HO validation study.** *Alternatives to*

Laboratory Animals: ATLA 31 (1): 31-46, ISSN: 0261-1929.

NAL Call Number: Z7994.L3A5

Keywords: Draize rabbit eye irritation test, international validation study, applied and field techniques, animal testing alternative evaluation, bovine opacity and permeability test, classification error estimation, linear discriminant analysis, mathematical and computer techniques, neutral red uptake test, new chemical evaluation, post hoc data analysis.

Nagasawa, K.; Nakanishi, H.; Yamamoto, R.; Kintsuji, S.; Fujimoto, S. (2002). **Decreased bioavailability of carbamazepine suppository after its intrarectal and intracolostomal administration to rectal-resected or colostoma-constructed rabbits.** *International Journal of Pharmaceutics* 241 (2): 375-384, ISSN: 0378-5173.
Keywords: animal model, rabbit, colon, rectum, carbamazepine, analgesic drug, bioavailability, suppository, carbamazepine 10,11 epoxide, rectal resection, therapeutic method, palliative care.

Nyce, J.W.; Metzger, W.J. (1997). **DNA antisense therapy for asthma in an animal model.** *Nature* 385 (6618): 721-725, ISSN: 0028-0836.

NAL Call Number: 472 N21

Keywords: animal model, rabbit, laboratory animals therapy, asthma, arthropod allergies, house dust mites, allergens, DNA, adenosine, respiratory diseases, nucleotides, allergies.

Ojeda, J.L.; Ventosa, J.A.; Piedra, S. (2001). **The three dimensional microanatomy of the rabbit and human cornea. A chemical and mechanical microdissection SEM approach.** *Journal of Anatomy* 199 (5): 567-576, ISSN: 0021-8782.

NAL Call Number: 447.8 J826

Keywords: eye, cornea, cellular and extracellular organization, new 3D aspects, morphologically, stromal neural plexus, comparative anatomy.

Orafidiya, L.O.; Agbani, E.O.; Abereoje, O.A.; Awe, T.; Abudu, A.; Fakoya, F.A. (2003). **An investigation into the wound-healing properties of essential oil of *Ocimum gratissimum* Linn.** *Journal of Wound Care* 12 (9): 331-4, ISSN: 0969-0700.

Abstract: To investigate the effects of *Ocimum* oil and two antibacterial preparations, Cicatrin (GlaxoWellcome) and Cetavlex (AstraZeneca), on the healing of full-thickness excisional and incisional wounds, created under anaesthesia, on the back of test and control groups of adult albino rabbits. **METHOD:** Treatment was by topical application of the test substances onto the wound surface for 15 days. Observation continued for a further six days. Quantitative parameters of wound healing were determined daily. Swabs were taken from wound sites that appeared not to be healing for identification of wound contaminants and sensitivity tests. **RESULTS:** There was a marked enhancement in the inflammatory and proliferative phases of wound healing in the rabbits treated with *Ocimum* oil, suggesting that the oil facilitated the healing process to a greater extent than the control and reference products. Wounds treated with Cetavlex showed no sign of healing for eight days but responded to *Ocimum* oil after a three-day wash-out period. **CONCLUSION:** The essential oil *Ocimum gratissimum* can promote wound healing. However, large studies will need to be carried out using domestic pigs, followed by clinical trials on human wounds.

Keywords: laboratory animals, albino rabbits, animal models, wound healing, Bacitracin, Cysteine, Neomycin, plant oils, Nigerio oils, African Traditional, volatile, pharmacology, cutaneous administration.

Osborne, R.; Carr, G.J.; Kohrman, K.A.; Stitzel, K.A. (1999). **Examination of the reversibility of corneal opacity using an historical eye irritation database.** *Journal of Toxicology Cutaneous and Ocular Toxicology* 18 (4): 349-358, ISSN: 0731-3829.

NAL Call Number: RL803.J67

Keywords: laboratory animal, cornea, sensory system, eye, sensory system, eye irritants, Draize eye test, toxicity testing method, low volume eye test, toxicity testing method, nonrinse procedure, laboratory method, rinse procedure, Good Laboratory Practice, regulations, animal welfare, corneal opacity, reversibility, historical eye irritation database, human safety assessments, regulatory classifications, training programs, visual clarity.

Pablo, L.E.; Ramirez, T.; Pueyo, M.; Larrosa, J.M.; Polo, V.; Honrubia, F.M. (1997). **Long-term effects of**

postoperative subconjunctival injections of mitomycin-C in the rabbit eye. *European Journal of Ophthalmology* 7 (4): 340-4, ISSN: 1120-6721.

Abstract: Single or multiple subconjunctival injections of mitomycin-C (MMC) may offer one way of establishing the total dosage of MMC more accurately. The method also allows re-applications later postoperatively. In this experimental, randomized prospective study we compared the effects of a single intraoperative application of MMC at the filtering site and a single postoperative subconjunctival injection of the drug. **METHODS:** The left eyes of 32 pigmented rabbits were divided into two groups. In the first group we applied MMC intraoperatively (IO) with a 4 x 1 mm surgical sponge soaked in a MMC solution (0.5 mg/ml). In the second group we injected 0.4 ml of the same solution subconjunctivally (SC) immediately after (conjunctival) suture. Post-operative evaluation was carried out every day during the first week, then every three days until day 58. Survival analyses were done for intraocular pressure (IOP) and bleb failure. Log-rank tests were used to compare survival differences between the groups. **RESULTS:** The IO group showed longer survival parameters than the SC group ($p < 0.05$), both in the control of IOP and as regards blebs. The histological persistence of fistulas was similar. The IO group, however, had a higher incidence of undesirable side effects. **CONCLUSIONS:** Our findings suggest IO application of MMC is more effective in reducing fibroblast ingrowth. However, subconjunctival application offers certain advantages such as the possibility of repeating the treatment postoperatively and, therefore, using a smaller initial dose.

Keywords: animal model, rabbit, antibiotics, antineoplastic, administration and dosage, conjunctiva, drug effects, fibroblasts pathology, follow-up studies, injections, intraocular pressure, intraoperative care, iris surgery, mitomycin, administration and dosage, postoperative complications, pathology, prevention and control, sclerostomy.

Park, M.J.; Lee, M.C.; Seong S.C. (2001). **A comparative study of the healing of tendon autograft and tendon-bone autograft using patellar tendon in rabbits.** *International Orthopaedics* 25 (1): 35-9, ISSN: 0341-2695.

Abstract: In order to compare the healing of tendon to bone and the healing of bone to bone in a rabbit model, the lateral 4 mm of patellar tendons were detached from their insertion into the tibia either subperiosteally (group I) or with a bone block (group II) and implanted into drill holes in the proximal articular surface of the tibia. The histological and biomechanical features of the graft incorporation were observed at 2, 4, 8 and 12 weeks. Histological patterns similar to normal tendon-bone attachment were seen at the tendon-bone interface in group I by 12 weeks, while direct bony union was seen in group II by 8 weeks. The maximum tensile load and stiffness were significantly greater in group II at 4 and 8 weeks while the difference between the two groups was not significant at 2 and 12 weeks. These findings show that more rapid incorporation of the graft occurs in group II although no significant difference in biomechanical parameters was noted once healing was complete.

Keywords: bone transplantation, adverse effects, rehabilitation, comparative study, disease models, elasticity osseointegration, patellar ligament transplantation, patellar ligament ultrastructure, postoperative care methods, tensile strength, tibia, surgery, time factors, autologous transplantation, adverse effects, rehabilitation, wound healing.

Potzl, W.; Witt, K.A.; Hackenberg, L.; Heusner, T.; Steinbeck J. (2003). **Influence of postoperative immobilization on tendon length after radiofrequency-induced shrinkage. An in vivo rabbit study.** *The American Journal of Sports Medicine* 31 (1): 36-40, ISSN: 0363-5465.

Abstract: Despite the widespread use of radiofrequency-induced shrinkage of collagenous tissues, there have been no animal studies on the effects of postoperative immobilization after such treatment. **PURPOSE:** To examine the effects of postoperative immobilization after radiofrequency energy treatment, with special emphasis on any tissue length increases. **STUDY DESIGN:** Controlled laboratory study. **METHODS:** The right patellar tendon of 60 New Zealand White rabbits was shrunk with a radiofrequency probe. Tendon length was measured intraoperatively before and after shrinkage and via radiographs immediately postoperatively and at 3, 6, and 9 weeks. Twenty rabbits were not immobilized, 20 were immobilized for 3 weeks, and 20 were immobilized for 6 weeks. **RESULTS:** In the nonimmobilized limbs, the tendon length increased 34.9% at 3 weeks and another 2.5% at 6 weeks, versus 11.2% at 3 weeks and 6.6% at 6 weeks in the immobilized limbs. Ten of the 20 rabbits that were immobilized for 6 weeks were sacrificed at 9 weeks and were found to have a further length increase of 10.8%. At 9 weeks, the tendons of this group were no longer significantly shorter than the tendons from rabbits that had not been immobilized. **CONCLUSIONS:** Careful postoperative rehabilitation is imperative after radiofrequency-induced shrinkage. Without protection, exposure to normal physiologic loads

places the shrunken tissue at risk of stretching out beyond the preshrinkage length. **CLINICAL RELEVANCE:** Shrunken tissue is at risk of stretching out after radiofrequency-induced shrinkage.

Keywords: animal model, rabbit, catheter ablation, methods, comparative study immobilization, physiology, patella, surgery, postoperative care methods, risk factors support, tendons, physiology, surgery, time factors.

Prata, J.A., Jr; Minckler, D.S.; Mermoud, A.; Baerveldt, G. (Feb. 1996). **Effects of intraoperative mitomycin-C on the function of Baerveldt glaucoma drainage implants in rabbits.** *Journal of Glaucoma* 5 (1): 29-38, ISSN: 1057-0829.

Abstract: The purpose of this study was to assess the effects of intraoperative mitomycin-C (MMC) on the function of Baerveldt glaucoma implants in rabbits. **METHODS:** Bilateral implantations of 200 mm² Baerveldt drainage devices were performed in 30 normal albino rabbits. One eye, randomly selected, received intraoperative application of MMC at the site of the implant plate for 5 min, via a 6 x 4 x 2 mm cellulose sponge saturated with 0.5 mg/ml of MMC. The opposite eye served as a control. MMC-treated and control eyes (five animals each group) were compared for intraocular pressure (IOP), resistance to flow, flow rates through the implant and histopathological findings at 2, 4, 6, 12, and 24 weeks postoperatively. Resistance to flow and flow rates through the implants were studied after opening the cornea and connecting the drain tube to a micromanometric system. **RESULTS:** Preoperative IOP did not differ between groups. MMC-treated eyes had lower levels of IOP than did controls at all postoperative times. The differences in IOP were statistically significant up to 8 weeks postoperatively. Resistance to flow was lower in MMC-treated eyes at all times studied, but the differences were statistically significant only at the time points of 2, 4, and 6 weeks. Flow rates through the implant bleb were always higher in MMC-treated eyes, and statistically significant differences were seen at 2, 4, 6, and 24 weeks. Histopathologically, MMC-treated eyes had thinner implant capsules with delayed maturation and less inflammatory infiltrate. **CONCLUSION:** MMC causes lower IOP and higher perfusion rates through the implant capsule at 2, 4, and 6 weeks postoperatively. Wound dehiscence, bleb leaks, and extraocular muscle injury were observed only in MMC-treated eyes.

Keywords: administration, topical animals aqueous humor, secretion comparative study drainage, instrumentation, filtering surgery, glaucoma, pathology glaucoma, physiopathology, glaucoma, surgery, intraocular pressure, drug effects intraoperative care mitomycin, pharmacology, nucleic acid synthesis inhibitors, pharmacology, oculomotor muscles, pathology prostheses and implants, rabbits random allocation sclera, ultrastructure.

Reuter, J.D.; Ovadia, S.; Howell, P.; Jaskwich, D.H. (2002). **Femoral fracture repair and postoperative management in New Zealand White rabbits.** *Contemporary Topics in Laboratory Animal Science* 41 (4): 49-52, ISSN: 1060-0558.

NAL Call Number: SF405.5 A23

Keywords: laboratory mammals, bone fractures, fracture fixation, experimental surgery, case reports, femur, postoperative care, postoperative complications.

Ross, R.G.; Selvasubramanian, S.; Jayasundar, S. (2003). **Effect of levamisole upon dexamethasone induced immunosuppression in rabbits.** *Indian Journal of Animal Sciences* 73 (1): 58-59, ISSN: 0367-8318.

NAL Call Number: 41.8 IN22

Keywords: breed, New Zealand, dexamethasone, immunologic drug, toxicity, levamisole, drug induced immunosuppression, immune system disease, toxicity, cell mediated immunity, humoral immunity, immune response, stress.

Sakai, H.; Fukui, N.; Kawakami, A.; Kurosawa, H. (2000). **Biological fixation of the graft within bone after anterior cruciate ligament reconstruction in rabbits: effects of the duration of postoperative immobilization.** *Journal of Orthopaedic Science* 5 (1): 43-51, ISSN: 0949-2658.

Abstract: To investigate the effects of the duration of postoperative immobilization on the biological fixation of the graft within bone after anterior cruciate ligament (ACL) reconstruction; we performed ACL reconstruction in 27 rabbits, which were divided into five groups - no immobilization and 1-, 2-, 4-, and 6-week immobilization. All animals were killed 6 weeks postoperatively, and the graft-bone tunnel interface was examined biomechanically and histologically. In the groups with immobilization, in tensile failure tests, most specimens failed through the intraarticular portion of the grafts. There was no significant difference in the

maximum load between these groups. In the no-immobilization group, all specimens failed through pulling of the grafts out of the femoral tunnel, with a lower maximum load than in the other groups. Histologically, new bone formation and occasional collagen fiber continuity were observed at the interface; which consisted of a fibrous tissue. In the no-immobilization group, the graft was partly separated from the fibrous tissue covering the bony wall. It is concluded that no immobilization delays the biological fixation process in the bone tunnel after ACL reconstruction, and that a certain period of immobilization is necessary for the fixation to proceed smoothly.

Keywords: animal model, rabbit, anterior cruciate ligament, pathology, physiology, transplantation, biomechanics femur, physiology, surgery, immobilization, male postoperative care, rabbits, tibia, pathology, wound healing.

Scherer, R.U. (1995). **Short-time rabbit model of endotoxin-induced hypercoagulability.** *Laboratory Animal Science* 45 (5): 538-546, ISSN: 0023-6764.

NAL Call Number: 410.9 P94

Keywords: animal models, disseminated intravascular coagulation, hemostasis.

Schneider, D.J.; Moulton, M.J.; Singapuri, K.; Chinchilli, V.; Deol, G.S.; Krenitsky, G.; Pellegrini, V.D. Jr. (1998). **The Frank Stinchfield Award. Inhibition of heterotopic ossification with radiation therapy in an animal model.** *Clinical Orthopaedics and Related Research* 355: 35-46, ISSN: 0009-921X.

Abstract: An animal model for the study of heterotopic ossification was developed and the effects of perioperative radiation were analyzed. In Phase I, New Zealand White rabbits (n = 18) underwent surgery either with or without muscle injury on each hip to establish the most reliable model in which to study heterotopic ossification. In Phase II, rabbits (n = 36) underwent either 400, 800, or 1200 cGy radiation to one hip 24 hours after bilateral hip surgery to establish a dose response relationship for postoperative radiation therapy. In Phase III, rabbits (n = 24) underwent preoperative radiation therapy (800 cGy) at 4, 16, or 24 hours preoperatively to investigate the mechanism of action and efficacy of preoperative radiation therapy. Monthly radiographs were graded by blinded observers for severity of heterotopic ossification. Mean grade, intraobserver and interobserver variability, and statistical significance were evaluated. In Phase II, 17 of 18 rabbits generated heterotopic ossification in both hips, and the mean grade of heterotopic ossification was always greater on the operative side with intentional muscle injury. Variability in the grading was considered excellent. Phase II revealed that 800 cGy was the minimal effective dose. Contrary to hypothesis, Phase III revealed an increasing grade of heterotopic ossification coinciding with a decreasing preoperative time interval, with the difference in heterotopic ossification grade with 24-hour versus 4-hour preoperative radiation being significant. The rabbit model is reliable and reproducible and closely resembles the human clinical situation after hip surgery. Preoperative and postoperative radiation effectively prevented heterotopic ossification formation. The results support the use of preoperative radiation and establish a need for additional investigation regarding the mechanism of action and timing of preoperative radiation therapy.

Keywords: animal model, disease model, rabbit, arthroplasty, hip replacement, adverse effects, methods, radiation, dose-response relationship, ossification, heterotopic, etiology, prevention and control, perioperative care, severity of illness index, single-blind method.

Schwartz, D.M.; Jethmalani, J.M.; Sandstedt, C.A.; Kornfield, J.A.; Grubbs, R.H. (2001). **Post, implantation adjustable intraocular lenses.** *Ophthalmology Clinics of North America* 14 (2): 339-45, ISSN: 0896-1549.

Abstract: To eliminate persistent refractive errors after cataract and phakic IOL surgery, photosensitive silicone IOLs have been developed. These IOL formulations enable precise laser adjustment of IOL power to correct spherical and toric errors post-operatively, after wound and IOL stabilization. Initial experience with these laser adjustable IOLs indicate excellent biocompatibility and adjustability of more than five diopters.

Keywords: human, animal model, rabbit, lens implantation, intraocular methods, postoperative care, methods, prosthesis design, refractive errors, surgery.

Shimada, K.; Yoshida, K.; Tadokoro, H.; Kitsukawa, S.; Takami, A.; Suzuki, K.; Tanada, S., Masuda, Y. (1998). **High-resolution cardiac PET in rabbits: imaging and quantitation of myocardial blood flow.** *Journal of Nuclear Medicine* 39 (12): 2022-7, ISSN: 0161-5505.

NAL Call Number: RM845.J78

Abstract: A high-resolution PET system for small animals was tested for its applicability to the investigation of regional myocardial blood flow (MBF) in rabbits. **METHODS:** Nineteen measurements were performed in 10 closed-chest anesthetized rabbits at baseline and during infusions of adenosine (0.2 mg/kg/min) and propranolol (0.20-1.20 mg slow infusion) to obtain a wide range of MBF. Myocardial blood flow was assessed both by dynamic ^{13}N -ammonia PET and by colored microspheres. Blood was withdrawn directly from the femoral artery, and arterial ^{13}N activity was measured by coincidence type gamma detection system for the input function. Nitrogen-13 myocardial uptake was calculated by dividing the myocardial ^{13}N activity by the integral value of the input function. **RESULTS:** Three or four contiguous cross-sectional myocardial images were obtained after ^{13}N -ammonia injection. The left ventricular wall and cardiac cavity were clearly visualized. Moreover, initial passage of the tracer through the heart was obtained with serial 10-sec PET images. Nitrogen-13 myocardial uptake correlated well with flow measured with microspheres ($r = 0.88$). **CONCLUSION:** Our cardiac PET system can be used for in vivo imaging and quantitation of MBF in small animals and may play an important role in the future study of animal models of cardiovascular diseases.

Keywords: animal models, rabbits, male, adenosine, propranolol, ammonia, pharmacology, diagnostic use, heart, physiology, myocardium, metabolism, nitrogen radioisotopes, tomography.

Simunovic, Z.; Ivankovich, A.D.; Depolo, A. (2000). **Wound healing of animal and human body sport and traffic accident injuries using low-level laser therapy treatment: a randomized clinical study of seventy-four patients with control group.** *Journal of Clinical Laser Medicine and Surgery* 18 (2): 67-73, ISSN: 1044-5471.

Abstract: The main objective of current animal and clinical studies was to assess the efficacy of low level laser therapy (LLLT) on wound healing in rabbits and humans. **STUDY DESIGN/MATERIALS AND METHODS:** In the initial part of our research we conducted a randomized controlled animal study, where we evaluated the effects of laser irradiation on the healing of surgical wounds on rabbits. The manner of the application of LLLT on the human body are analogous to those of similar physiologic structure in animal tissue, therefore, this study was continued on humans. Clinical study was performed on 74 patients with injuries to the following anatomic locations: ankle and knee, bilaterally, Achilles tendon; epicondylus; shoulder; wrist; interphalangeal joints of hands, unilaterally. All patients had had surgical procedure prior to LLLT. Two types of laser devices were used: infrared diode laser (GaAlAs) 830 nm continuous wave for treatment of trigger points (TPs) and HeNe 632.8 nm combined with diode laser 904-nm pulsed wave for scanning procedure. Both were applied as monotherapy during current clinical study. The results were observed and measured according to the following clinical parameters: redness, heat, pain, swelling and loss of function, and finally postponed to statistical analysis via chi2 test. **RESULTS:** After comparing the healing process between two groups of patients, we obtained the following results: wound healing was significantly accelerated (25%-35%) in the group of patients treated with LLLT. Pain relief and functional recovery of patients treated with LLLT were significantly improved comparing to untreated patients. **CONCLUSION:** In addition to accelerated wound healing, the main advantages of LLLT for postoperative sport and traffic related injuries include prevention of side effects of drugs, significantly accelerated functional recovery, earlier return to work, training and sport competition compared to the control group of patients, and cost benefit.

Keywords: accidents, traffic, human, animal model, rabbit, athletic injuries, radiotherapy, disease models, laser therapy, low-level, postoperative care, wound healing, radiation effects, radiotherapy.

Sitges-Serra, A.; Hernandez, R.; Maestro, S.; Fernandez, N.; Girvent, M.; Sancho, J.J. (2001). **Influence of parenteral nutrition on postoperative recovery in an experimental model of peritonitis.** *Clinical Nutrition* 20 (5): 439-443, ISSN: 0261-5614.

NAL Call Number: RM216.M342

Abstract: There seems to be no clear-cut indications for routine TPN support after major elective surgery. The present study was designed to investigate whether TPN could improve the results of standard surgical care for acute peritonitis (laparotomy plus antibiotics). **ANIMALS AND METHODS:** Peritonitis was induced in 48 New Zealand rabbits (day -2). On day 0, appendectomy and peritoneal lavage were performed, ceftriaxone (250 mg, i.m./24 h.) was started and animals were randomly assigned to receive regular fluids (RF), glucose-based TPN (G-TPN) or isocaloric fat-based TPN (F-TPN) for 6 days. **MAIN OUTCOME MEASURES:** Balance studies (days 1-3), s-albumin, thyroid hormones and urinary catecholamines were determined at various points of the experiment. At postmortem, wound infection, residual intra-abdominal infection and laparotomy wound breaking strength were recorded. **RESULTS:** Peritonitis produced a fall in weight, s-albumin and T3. At day 6,

weight-loss was more pronounced in RF than in G-TPN or F-TPN (-7 vs 1.5 vs -1.2%; $P=0.0001$) but s-albumin and T3 concentrations were similar. Diuresis (377 vs 268 vs 269 mL/3 days; $P=0.01$) was higher and water balance lower (373 vs 511 vs 480 mL/3 days; $P=0.01$) in Group RF. Although the differences were not statistically significant ($P<0.2$), persistent infection and wound breaking strength were slightly worse in the pooled TPN groups compared with the RF group (19 vs 6% and 542 vs 701 g, respectively). **CONCLUSIONS:** TPN failed to improve relevant biochemical markers and clinical outcome after laparotomy for peritonitis. **Keywords:** acute disease, appendectomy, animal models, disease, liver function tests, nutritional status, total parenteral nutrition, adverse effects, peritonitis, chemically induced, mortality, therapy, postoperative care, postoperative complications, prevention and control, random allocation, serum albumin analysis, thyroid hormones, blood, treatment outcome, wound healing.

Tichias, K. (1998). **Progress in toxicological testing: reduction and refinement issues.** *Alternatives to Laboratory Animals: ATLA* 26 (5): 619-627.

NAL Call Number: Z7994.L3A5

Keywords: passive cutaneous anaphylaxis test, screening, guinea pigs.

Unur, E. (2002). **Morphological investigation of carotid body and its arteries in rabbits.** *Anatomia Histologia Embryologia* 31 (5): 266-268, ISSN: 0340-2096.

NAL Call Number: SF761.Z4

Keywords: *Oryctolagus cuniculus*, morphology, chemoreception, carotid body, arteries, carotid artery, anatomy, sensory reception, circulatory system, blood vessels.

Upman, P.J.; Anderson, J.; Tasse, L. (2003). **An analysis of ISO intracutaneous reactivity test results to justify a reduction in animal requirements.** *Lab Animal* 32 (3): 26-7, ISSN: 0093-7355.

NAL Call Number: QL55 A1L33

Abstract: The ISO intracutaneous reactivity test is the standard protocol for determining a medical device's potential for causing irritation. The authors present data indicating that the number of animals required per test can be reduced from three rabbits to two.

Keywords: welfare, drug evaluation, preclinical, intradermal injections, international cooperation, intradermal tests, irritants, administration and dosage, toxicity, skin, drug effects.

Worth, A.P.; Cronin, M.T.D. (2000). **Structure-permeability relationships for transcorneal penetration.** *Alternatives to Laboratory Animals: ATLA* 28 (3): 403-413, ISSN: 0261-1929.

NAL Call Number: Z7994.L3A5

Keywords: laboratory animals, rabbits, cornea, penetration, animal welfare, drug development.

Xu, Y.; Yang, G.H.; Jin, W.M.; Chen, K.Q.; Li, J.X. (1997). **Effect of topical aclacinomycin on glaucoma filtration surgery in rabbits.** *Journal of Ocular Pharmacology and Therapeutics: the Official Journal of the Association for Ocular Pharmacology and Therapeutics* 13 (6): 507-15, ISSN: 1080-7683.

Abstract: A prospective, randomized, double-masked and placebo-controlled study was performed to compare the effects of a single 5-minute intraoperative exposure to aclacinomycin (AMC) 0.4 mg/ml or 0.8 mg/ml with control eyes treated with saline solution on the success of glaucoma filtration surgery in 26 rabbits. Intraocular pressure (IOP), bleb survival, fistula patency and complications were evaluated. The results showed that IOP in the eyes treated with AMC was significantly lower than that in the control eyes from days 5-40 in the 0.4 mg/ml group and from days 5-20 in the 0.8 mg/ml group. The bleb survival lasted significantly longer in the two treated groups than in the control group and in the AMC 0.4 mg/ml group than in the AMC 0.8 mg/ml group. At 40 days, the rate of sclera fistula occlusion was 0% in the AMC 0.4 mg/ml eyes, 43.8% in the AMC 0.8 mg/ml eyes, and 100% in the control eyes. Significant complications, such as anterior chamber inflammation, hyphema, moderate and severe corneal haze, dense corneal neovascularization and mild cataract occurred only in the eyes treated with AMC 0.8 mg/ml. The results indicated that intraocular treatment with AMC at a dose of 0.4 mg/ml had a markedly beneficial effect on IOP, bleb appearance and fistula patency after experimental filtration surgery in rabbits.

Keywords: comparative study, aclarubicin, analogs and derivatives, therapeutic use, drug effects, pathology, filtering surgery, glaucoma surgery, intraocular pressure, intraoperative care, antibiotics, antineoplastic.

- Yamasaki, M. (1996). **Comparative anatomical studies on the thyroid and thymic arteries. 4. Rabbit (*Oryctolagus cuniculus*).** *Journal of Anatomy* 188 (3): 557-564, ISSN: 0021-8782.
NAL Call Number: 447.8 J826
Keywords: thyroid and thymic arteries anatomy, comparative study, thymus gland, thymic arteries, morphological variation.
- Yanabe, M.; Shibuya, M.; Gonda, T.; Asai, H.; Tanaka, T.; Narita, T.; Sudo, K.; Itoh, K. (1999). **Establishment of specific pathogen-free rabbit colonies with limited-flora rabbits associated with conventional rabbit flora, and monitoring of their cecal flora.** *Experimental Animals* 48 (2): 101-106, ISSN: 1341-1357.
NAL Call Number: QL55.J55.
Keywords: laboratory animals, specific pathogen free, cecal flora, fertility, rabbit colony establishment, weaning rates.
- Yanabe, M.; Shibuya, M.; Gonda, T.; Asai, H.; Tanaka, T.; Narita, T.; Sudo, K.; Matsui, T.; Itoh, K. (1999). **Production of ex-germfree rabbits for establishment of specific pathogen-free (SPF) colonies.** *Experimental Animals* 48 (2): 79-86, ISSN: 1341-1357.
NAL Call Number: QL55.J55
Keywords: diarrhea, cecal flora, mortality, specific pathogen-free, colony establishment.
- Yuan, C.; Zhao, X.Q.; Hatsukami, T.S. (2002). **Quantitative evaluation of carotid atherosclerotic plaques by magnetic resonance imaging.** *Current Atherosclerosis Reports* 4 (5): 351-7, ISSN: 1523-3804.
Abstract: In order to study human atherosclerotic plaque burden and composition in vivo, an imaging technique is needed that can directly measure volume and characterize the cross-sectional morphologic components of the atherosclerotic arterial wall. High-resolution magnetic resonance imaging (MRI), which is noninvasive and nonirradiative, has been described as one promising modality to achieve these purposes. MRI allows direct visualization of the diseased vessel wall and is capable of characterizing the morphology of individual atherosclerotic carotid plaques.
Keywords: review, animal model, disease, rabbits, arteriosclerosis, diagnosis, carotid stenosis, pathology, radiography, surgery, endarterectomy, methods, magnetic resonance angiography, contrast media, postoperative period, preoperative care, severity of illness index.
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Abstract: In an in vitro study, rabbit subconjunctival fibroblasts were cultured and the effects of an antineoplastic drug, hydroxyurea (HU), on fibroblast proliferation and fibroblast attachment was investigated. The effects of HU were compared with those of mitomycin C (MMC). Different concentrations of HU and MMC were added to culture medium. The HU doses which led to 50% of inhibition (ID(50)) and the dose which led to about 90% of inhibition (subtoxic high dose, STHD) were determined to be 8 and 1,000 microg/ml, respectively. ID(50) of MMC and its STHD which led to about 100% inhibition were found to be 0.01 and 1 microg/ml, respectively. Reversibility studies revealed that inhibition disappeared depending on the dose and incubation period of both HU and MMC. In an in vivo study, glaucoma filtration surgery (GFS) was performed in rabbits which were treated with HU (treatment group) and distilled water (control group). Tissue samples were taken from the subconjunctival area treated at 1 h, 1 day, 5 days and 30 days postoperatively. The biopsy specimens were then placed in tissue culture media. Fibroblast outgrowth rates detected in the HU group were found to be significantly lower than those in the control group in the specimens taken at the end of the first hour. The difference was significant on culture days 9-15 in the biopsy specimens taken on day 1 while it was not significant in those taken on days 5 and 30.
Keywords: in vitro, in vivo, rabbits, animals cell adhesion, drug effects, dose response relationship, cultured cells, conjunctiva, cytology, fibroblasts, filtering surgery, glaucoma, surgery, hydroxyurea, mitomycin, administration and dosage, pharmacology, therapeutic use, nucleic acid synthesis inhibitors, postoperative care.
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Keywords: endothelium, corneal drug effects, epithelium, filtering surgery, interferon alfa-2b, administration and dosage, toxicity, postoperative care, sclera surgery.

[Return to Top](#)

[Return to Contents](#)

Behavior

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NAL Call Number: QL55 A1L3
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NAL Call Number: 41.8 B45

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NAL Call Number: QL1.D48 v. 31

Keywords: laboratory animals, rabbits, behavior, experiments, housing, husbandry, cages, stocking density.

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Keywords: avoidance behavior, response to novel objects, auditory stimulus, influencing factors, England.

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NAL Call Number: QH301.B56

Keywords: molecular genetics, population genetics, evolution, biochemical variation, dna analysis of population, social groups, social organization, distribution within habitat, England.

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NAL Call Number: SF1.A56

Keywords: breed, Pannon White, commercial species, doe, female, growing, kit, newborn, nursing, once a day nursing, twice a day nursing, milk, reproductive system, body weight, carcass composition, food intake, growth, live weight gain, nursing, suckling, weaning.

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NAL Call Number: QL55 A1L3

Abstract: Laboratory rabbits kept in barren "traditional" cages tend to develop stereotypic behaviours and bone deformities. We have used an alternative regime, housing adult does as groups of four or five in floor pens (2.5-3 m²) supplied with hiding places and bedding. High- and low-ranking members of each group were identified, and their immunological status compared in terms of blood leucocyte function (chemiluminescence and mitogen tests), complement activity, and antibody production to soluble and cellular antigens. We found no evidence of immunosuppression, either in groups of a "docile" breed (New Zealand White) or Dutch crosses. These results, together with the animals' general health and ease of handling, lead us to conclude that group-housed does are suitable for raising antisera and other purposes, provided that they are adequately monitored.

Keywords: antibody formation, immunology, animal behavior, physiology, complement activation, housing,

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NAL Call Number: 41.8 An78

Keywords: cattle, goats, horses, pigs, sheep, rabbits, dogs, reviews, livestock, assessment, variation, effects, productivity, poultry, breed differences, sex differences, fearfulness, fright, stress, behavior, animal welfare, adaptation, behavior, selection, French language.

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NAL Call Number: SF451.R5

Keywords: animal welfare, well-being, adaptation, housing, Italian language.

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NAL Call Number: SF1.K7

Keywords: abnormal behavior, vices, agonistic behavior, animal welfare, Polish language.

[Return to Top](#)

[Return to Contents](#)

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Keywords: meat animals, Chinchilla, breed, husbandry, native livestock, performance traits, reproductive performance.

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NAL Call Number: 41.8 IN22

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NAL Call Number: 41.8 IN22

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Keywords: meat animals, Gigante de Espaa, breed, husbandry, carcass composition, native livestock, conservation program, performance traits, Spain.
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Abstract: This review cover the effects of the following techniques for stimulating ovarian activity: managemental procedures designed to reduce stress, different techniques for separating dams from their litters, manipulation of the light regime, supplementary feeding (flushing), housing close to males.
NAL Call Number: SF451.R5
Keywords: husbandry, feeding, light regime, reproduction, estrus induction Italy, Italian language.
- Medellin, M.F.; Lukefahr, S.D. (1999). **Crossbreeding parameter estimates for growth and litter traits in commercial rabbits.** *Journal of Animal Science* 77 (Suppl. 1): 132-133.
NAL Call Number: 49 J82
Keywords: breed, Altex, New Zealand White, commercial, crossbreeding parameter estimates, growth traits, litter traits, meeting.
- Medellin, M.F.; Lukefahr, S.D. (2001). **Breed and heterotic effects on postweaning traits in Altex and New Zealand White straightbred and crossbred rabbits.** *Journal of Animal Science* 79 (5): 1173-1178, ISSN: 0021-8812.
NAL Call Number: 49 J82
Keywords: breed, Altex, Altex x New Zealand White, New Zealand White, fryer, average daily gain, breed effects, breeding efficiency, feed efficiency, feed intake, heterosis, litter size, litter survival rate, market weight, postweaning traits, total litter weaning weight, weaning weight.
- Moura, A.S.A.M.T.; Costa, A.R.C.; Polastre, R. (1999). **Estimates of genetic parameters and genetic trends for reproductive traits in Botucatu rabbits selected for litter and growth performance traits.** *Journal of Animal Science* 77 (Suppl. 1): 140-141, ISSN: 0021-8812.
NAL Call Number: 49 J82
Keywords: breed, Botucatu, genetic parameter estimation, growth performance, litter traits, reproductive traits, meeting.
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NAL Call Number: QP251.A1T5
Keywords: transgenic, gene construct, donor recipient, embryo transfer method, assisted reproduction method, breeding method, tissue transplantation, embryo transfer, embryonic survival rate, recipient age.

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NAL Call Number: 41.8 IN22
Keywords: breed, Angora, German, wool, integumentary system, elasticity, wool fiber diameter, textile industry, Turkey.
- Paula, M.G.; Ferraz, J.B.S.; Eler, J.P. (2000). **Genetic parameters for Californian rabbits raised in Brazil.** [Parametros geneticos para coelhos da raca.] *Arquivo Brasileiro de Medicina Veterinaria e Zootecnia* 52 (5): 544-548, ISSN: 0102-0935.
NAL Call Number: SF604 .A76
Keywords: breed, Californian, average daily gain, individual weaning weight, pedigree, ten week weight, trait heritability, Portuguese language.
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NAL Call Number: SF1.A53
Keywords: embryo, strain, California, New Zealand, blastocyst, embryonic structure, multiple generational cloning, reproductive method, nuclei transfer, reproductive method, meeting abstract.
- Ponce De Leon, R.; Guzman, G.; Quesada, M.E. (2002). **Growth and feed efficiency of four rabbit breeds.** *Cuban Journal of Agricultural Science* 36 (1): 7-14, ISSN: 0864-0408.
NAL Call Number: S1.R4
Keywords: breed, California, Chinchilla, New Zealand, Semi Giant, weaning, feed efficiency, maize soybean alfalfa feed, animal feed, molasses supplement, Cuba.
- Ponce De Leon, R.; Guzman, G.; Tamayo, J.; Pubillones, O. (2001). **The new synthetic rabbit breed Caoba. Environmental and genetic effects on growth traits.** *Cuban Journal of Agricultural Science* 35 (2): 107-113, ISSN: 0864-0408.
NAL Call Number: S1.R4
Keywords: breed, Caoba, growth traits, environmental effects, genetic effects, weight gain, Cuba.
- Ponce De Leon, R.; Guzman, G.; Pubillones, O.; Garcia, J.; Mora, M. (2002). **Performance of imported rabbit breeds. Evaluation of pre-weaning growth.** *Cuban Journal of Agricultural Science* 36 (4): 313-319, ISSN: 0864-0408.
NAL Call Number: S1.R4
Keywords: breed, California, Chinchilla, Flanders Giant, New Zealand White, imported breeds, performance, linear model, mathematical and computer techniques, breed-x-sex interactions, daily gain, environmental effects, final weight, global-productivity, kidding number, litter size at weaning, pre-weaning growth, evaluation, season influence, weight at weaning, weight per age until weaning, weight per post weaning, age, year influence, Canada.
- Poornima, K.; Gupta, B.R.; Rao, G.N.; Satyanarayana, A. (2002). **Genetic study on pre-weaning body weights and growth rates in Californian White rabbits.** *Indian Journal of Animal Sciences* 72 (7): 601-603, ISSN: 0367-8318.
NAL Call Number: 41.8 IN22.
Keywords: breed, Californian White, body weight, pre-weaning, growth rate, pre-weaning, litter weight.
- Poornima, K.; Gupta, B.R.; Rao, G.N.; Satyanarayana, A. (2003). **Evaluation of Californian White rabbits for carcass traits.** *Indian Journal of Animal Sciences* 73 (5): 564-566, ISSN: 0367-8318.
NAL Call Number: 41.8 IN22
Keywords: birth month, carcass traits, dressing percentage, genetic correlations, heritability, meat production, phenotypic correlations, meat product, slaughter.
- Prakash, M.G.; Reddy, C.E.; Rao, V.P.; Reddy, G.R.; Satyanarayana, A.; Gupta, B.R. (2002). **Prediction of dressed weight based on biometrical measurements in rabbits.** *Indian Journal of Animal Sciences* 72 (8): 721-723,

ISSN: 0367-8318.

NAL Call Number: 41.8 IN22

Keywords: breed, Grey Giant, New Zealand White, Soviet Chinchilla, White Giant, biometrical measurements, body height, body length, chest girth, paunch girth, body weight, breeding value, dressed weight, prediction, genetic group, litter size, rabbit meat, meat product.

Prayaga, K.C.; Eady, S.J. (2002). **Performance of purebred and crossbred rabbits in Australia: Doe reproductive and pre-weaning litter traits.** *Australian Journal of Agricultural Research* 53 (9): 993-1001, ISSN: 0004-9409.

NAL Call Number: 23 Au783

Keywords: breed, Californian, Flemish Giant, New Zealand White, doe, female, crossbreed performance, doe reproductive traits, parity effects, pre-weaning litter traits, purebred performance, phenotypic correlations.

Queney, G.; Vachot, A.M.; Brun, J.M.; Dennebouy, N.; Mulsant, P.; Monnerot, M. (2002). **Different levels of human intervention in domestic rabbits: effects on genetic diversity.** *The Journal of Heredity* 93 (3): 205-9, ISSN: 0022-1503.

NAL Call Number: 442.8 Am3

Abstract: The effects of human interaction on domestic rabbits were evaluated through the analysis of animals (up to 267) belonging to fancy breeds (22), a commercial breed (1), and selected strains (2). Microsatellite loci and mtDNA polymorphism revealed that the genetic pool of domestic rabbits studied only originated from that available in France. The good conservation of the original diversity was probably ensured through the multiplicity of samplings from wild populations. Selected strains, because of the breeding strategy, keep a fairly high level of diversity compared to other breeds.

Keywords: wild animals, husbandry, methods, genetics, DNA, Mitochondrial, genetics, variation, population.

Rastogi, R.K.; Lukefahr, S.D.; Lauckner, F.B. (2000). **Maternal heritability and repeatability for litter traits in rabbits in a humid tropical environment.** *Livestock Production Science* 67 (1-2): 23-128, ISSN: 0301-6226.

NAL Call Number: SF1.L5

Keywords: New Zealand White rabbit, buck, doe, female, male, humidity, litter production traits, litter size, litter weight, maternal heritability, tropical environment.

Rathor, Y.S.; Thakur, Y.P.; Manuja, N.K.; Katoch, S.; Gupta, K. (2000). **Performance of different meat rabbit breeds for litter traits.** *Indian Veterinary Journal* 77 (7): 592-594, ISSN: 0019-6479.

NAL Call Number: 41.8 IN2

Keywords: breed Gray Giant, New Zealand White, Soviet Chinchilla, White Giant, broiler, meat breeds, genetic group, kindling period, kindling season, litter size, litter weight, performance, weaning weight.

Reddy, S.S.; Reddy, C.E.; Gupta, B.R.; Satyanarayana, A. (2000). **Effect of inbreeding on pre-weaning litter weights of broiler rabbits.** *Indian Veterinary Journal* 77 (7): 597-599, ISSN: 0019-6479.

NAL Call Number: 41.8 IN2

Keywords: breed, Flemish Giant, Gray Giant, Soviet Chinchilla, broiler, inbreeding, litter size, pre weaning litter weight.

Redel, H.; Fritsche, J. (1995). **Fleischkaninchenhaltung. Auf richtiges Management und gute Qualität kommt es an. [Breeding of rabbits for meat depends on good management and quality.]** *Neue Landwirtschaft* 5: 54-58, ISSN: 0863-2847.

Keywords: housing, hygiene, nutrition, profitability, meat production, management, rabbit feeding, German, language, Germany.

Rudolph, N.S. (1999). **Biopharmaceutical production in transgenic livestock.** *Trends in Biotechnology* 17 (9): 367-374, ISSN: 0167-7799.

NAL Call Number: TP248.13.T72

Keywords: transgenic founder, cow, dairy, livestock, goat, dairy, sheep, rabbit, pig, transgenic bioreactor, biopharmaceutical production, synthetic method, recombinant human protein production, synthetic method,

production efficiency, literature review.

- Rychlik, I. (2001). **Doswiadczalna stacja hodowli malych zwierzat w kitzingen dawniej i dzis. [Small animal breeding station in Kitzingen in the past and today.]** *Biuletyn Informacyjny Instytut Zootechniki* 39 (2): 43-45, ISSN: 0209-2492.
NAL Call Number: SF1.K7
Keywords: poultry, rabbits, Angora rabbit production, housing, husbandry, animal welfare, feed supplements, performance testing, Germany, Polish language.
- Sandford, J.C.; Thebault, R.G. (1996). **Quelques notes sur l'histoire du lapin.. Le lapin Angora travers les sicles. [Some notes on the history of rabbits. Angora rabbits through the ages.]** *Cuniculture* 130: 171-174, ISSN: 0152-3058.
Keywords: breed, Angora, animal welfare, domestication, nutrition, fibres, history, wool production, growth, reproduction, genetic improvement, France, French language.
- Sen, A.R.; Bhagwan, P.S.K. (1999). **Appraisal of two genetic groups of rabbits for carcass and meat quality traits in males and females.** *Indian Journal of Animal Sciences* 69 (8): 631-633, ISSN: 0367-8318.
NAL Call Number: 41.8 IN22
Keywords: broiler, female, male, carcass, genetic groups, meat quality, meat.
- Shahin, K.A.; Hassan, N.S. (2000). **Sources of shared variability among body shape characters at marketing age in New Zealand White and Egyptian rabbit breeds.** *Annales de Zootechnie* 49 (5): 435-445, ISSN: 0003-424X.
NAL Call Number: 49 F84
Keywords: Egyptian breeds, Black Baladi, New Zealand White, Red Baladi, market age, body length, body shape characters, shared variability, chest width, shank length, thigh circumference.
- Shahin, K.A.; Hassan, N.S. (2002). **Changes in sources of shared variability of body size and shape in Egyptian local and New Zealand White breeds of rabbits during growth.** *Archiv fuer Tierzucht* 45 (3): 269-277, ISSN: 0003-9438.
Keywords: breed, Egyptian, Black Baladi, New Zealand White, Red Baladi, Egyptian breeds, body shape, body size, chest width, shank length, breed differences, growth.
- Shemeis, A.R.; Abdallah, O.Y. (2000). **Possibilities of developing favourable body fat partition via selection indexes: Application on rabbits.** *Archiv fuer Tierzucht* 43 (2): 193-201, ISSN: 0003-9438.
Keywords: breed, New Zealand White, buck, doe, body fat partition, genetic parameters, phenotypic parameters, body length, heart girth, loin width, marketing body weight, selection indexes, weaning body weight.
- Slipka, J.; Hola, S.; Kolarova, S. (2001). **Nektere aspekty uspesneho velkochovu kraliku. [Some aspects of successful large-scale breeding of rabbits.]** *Collection of Scientific Papers Faculty of Agriculture in Ceske Budejovice Series for Animal Sciences* 18 (1): 65-70, ISSN: 1212-558X.
NAL Call Number: SF1.S26
Keywords: broiler, large scale breeding, reproduction, number of sucklings, Czech language.
- Tinaeva, E.A.; Markovich, L.G.; Mashurov, A.M.; Tkhan, K.K.; Kulikova, I. (2000). **Populational genetic analysis of intra- and interherd differences in rabbits of the Kalifornium breed on the polymorphic systems of blood proteins.** *Sel'skokhozyaistvennaya Biologiya* 4: 49-55.
Keywords: population, genetics, blood proteins, polymorphic systems, interherd differences, population genetic analysis, intraherd differences, geographic zones, Tyumenskaya, Moskovskaya, Odesskaya regions, Kabardino-Balkarskaya republic, Russian language.
- Wegner, W. (May 1997). **[Problematic aspects of breeding dwarf rabbits.]** *DTW Deutsche Tierarztliche Wochenschrift* 104 (5): 181-3, ISSN: 0341-6593.
NAL Call Number: 41.8 D482
Abstract: Some aspects of relevance for animal protection in breeding dwarf (pet) rabbits are enumerated and discussed. The predisposition of these standard dwarfs (Dw/dw) for certain defects and diseases underlines the

partial dominance of Dw; mating of these heterozygous dwarfs is an open neglect of the German animal protection law (section 11b). For feasibility of control breeders (and especially so in commercial pet rabbitries) should be obliged to guarantee unambiguous identification of breeding animals and their progeny.

Keywords: female, pet rabbits, animal welfare, legislation, breeding, methods, dwarfism, physiopathology, Germany, German language.

[Return to Top](#)

[Return to Contents](#)

Environmental Enrichment

Batchelor, G.R. (1995). **Group housing on floor pens and environmental enrichment of Sandy lop rabbits (Ii): the 24 hour behavioural time budget of group housed rabbits.** *Animal Technology: Journal of the Institute Animal Technicians* 46 (3): 167-190, ISSN: 0264-4754.

NAL Call Number: QL55 I5

Keywords: breed, Sandy lop, housing, behavior, enrichment, group housing, floor pens.

Bayne, K.A. (2003). **Environmental enrichment of nonhuman primates, dogs and rabbits used in toxicology studies.** *Toxicologic Pathology* 31 (Suppl.): 132-7, ISSN: 0192-6233.

Abstract: The increasing emphasis on the provision of environmental enrichment to laboratory animals, vis-a-vis the USDA Animal Welfare Regulations, the Guide for the Care and Use of Laboratory Animals (NRC 1996), and a potential forthcoming policy from the USDA on the subject, can be difficult to accommodate in a toxicology research environment. A summary will be provided of current requirements and recommendations. Then, strategies for meeting regulatory requirements will be described for non-rodent animals used in toxicology research. These strategies will address methods of both social enrichment, such as pair or group housing, as well as non-social enrichment, such as cage furniture, food enrichments, and toys. In addition, the value of positive interactions with staff (e.g., through training paradigms or socialization programs) will also be discussed. Apparent in the discussion of these strategies will be an overarching recognition of the necessity to avoid introducing confounding variables into the research project and to avoid compromising animal health. The roles of the Institutional Animal Care and Use Committee (IACUC) and the attending veterinarian in helping scientists balance animal well-being, the scientific enterprise and the regulatory environment will be described.

Keywords: dogs, rabbits, husbandry, housing, legislation, jurisprudence, standards, social environment, toxicology methods, ethics.

Berthelsen, H. (1999). **The effect of hay on the behaviour of caged rabbits (*Oryctolagus cuniculus*).** *Animal Welfare* 8 (2): 149-157, ISSN: 0962-7286.

NAL Call Number: HV4701 A557

Keywords: cages, hay, enrichment.

Dean, S.W. (1999). **Environmental enrichment of laboratory animals used in regulatory toxicology studies.** *Laboratory Animals* 33 (4): 309-327, ISSN: 0023-6772.

NAL Call Number: QL55 A1L3

Keywords: laboratory mammals, social content, diet, pair housing, husbandry, environmental enrichment.

Gerson, P. (2000). **The modification of "traditional" caging for experimental laboratory rabbits and assessment by behavioural study.** *Animal Technology: Journal of the Institute of Animal* 51 (1): 13-36.

NAL Call Number: QL55 I5

Keywords: cages, enrichment.

Gunn, D.; Morton, D.B. (1995). **Rabbits.** In: *Environmental Enrichment Information Resources for Laboratory Animals: 1965 - 1995: Birds, Cats, Dogs, Farm Animals, Ferrets, Rabbits, and Rodents.* AWIC Resource Series No. 2. U.S. Department of Agriculture, Beltsville, MD and Universities Federation for Animal Welfare

(UFAW), Potters Bar, Herts, UK, pp. 127-143, ISBN: 0-900767-91-X.

Online: <http://www.nal.usda.gov/awic/pubs/enrich/rabbits.htm#intro>

NAL Call Number: aHV4701.A94 no. 2

Keywords: natural environment, wild rabbits, social groupings, warrens, behavior, laboratory rabbits, breeds, New Zealand Whites, Dutch, Lops, housing, husbandry, cage design, psychological well-being, behavioral abnormalities, stereotypies, discomfort, distress, pair housing, group housing.

Harris, L.D. (2001). **Evaluation of objects and food for environmental enrichment of NZW rabbits.** *Contemporary Topics in Laboratory Animal Science* 40 (1): 27-30.

NAL Call Number: SF405.5 A23

Keywords: enrichment, toys, Jingle Ball, Kong toy, Nylabone, food enrichment, Bunny Stix, Bunny Blocks, celery.

Jordan, D. (2002). **The influence of environment enrichment (gnawing stick) on some performance and carcass traits of male rabbits.** *Acta Agraria Kaposváriensis* 6 (2): 195-200. ISSN: 1418-1789.

Keywords: breed, New Zealand White, male, housing, animal welfare, carcass weight, digestive tract, environmental enrichment, gnawing wood, fattening performance, liveweight gain, seasonal variation, Spring, Summer.

Lidfors, L. (1997). **Behavioural effects of environmental enrichment for individually caged rabbits.** *Applied Animal Behaviour Science* 52 (1/2): 157-169, ISSN: 0168-1591.

NAL Call Number: QL750 A6

Keywords: enrichment, behavior patterns, animal welfare.

Potter, M.P. (1998). **Apparent psychogenic polydipsia and secondary polyuria in laboratory-housed New Zealand white rabbits.** *Contemporary Topics in Laboratory Animal Science* 37 (6): 87-89, ISSN: 1060-0558.

NAL Call Number: SF405.5 A23

Keywords: polydipsia, environment, enrichment.

Shomer, N.H. (2001). **Enrichment-toy trauma in a New Zealand white rabbit.** *Contemporary Topics in Laboratory Animal Science* 40 (1): 31-32.

NAL Call Number: SF405.5 A23

Keywords: laboratory mammals, enrichment, toys, behavior.

[Return to Top](#)

[Return to Contents](#)

Feeding

- Agwunobi, L.N.; Onifade, A.; Erondu, O. (1997). **Sweetpotato (*Ipomoea batatas* (L.) Lam.) tuber meal as a substitute formaize (*Zea mays* L.) grain in rabbit ration.** *Tropical Agriculture* 74 (2): 168-171, ISSN: 0041-3216.
NAL Call Number: SB111.A2T76
Keywords: commercial rabbit mash, diet, feed, performance, maize grain, sweetpotato tuber meal, tropical agriculture.
- Ahlawat, S.S.; Panda, P.C.; Sharma, D.P. (1999). **Utilisation of poultry viscera meal in broiler rabbit feed pellets as a protein source.** *Indian Journal of Poultry Science* 34 (2): 197-200, ISSN: 0019-5529.
NAL Call Number: SF481.I5
Keywords: breed, New Zealand White, broiler, feed conversion ratio, fish meal, feed, growth performance, poultry viscera meal.
- Anandan, S.; Dey, A. (1998). **Performance of gestating German Angora rabbit fed varying levels of protein.** *Indian Journal of Animal Nutrition* 15 (4): 298-300, ISSN: 0970-3209.
NAL Call Number: SF95.I47
Keywords: breed, Angora doe, female, protein, dietary, dry matter digestibility, gestation, grass, feed, litter size.
- Arruda, A.M.V.; Lopes, D.C.; Queiroz, A.C.; Ferreira, W.M.; Rostagno, H.S.; Albino, L.F.T.; Pereira, E.S.; Ferreira, A.S. (2002). **Performance and carcass characteristics of growing rabbits fed diets with different starch levels and sources of fiber.** *Journal of Dairy Science* 85 (Suppl. 1): 221-222, ISSN: 0022-0302.
NAL Call Number: 44.8 J822
Keywords: breed, New Zealand White, commercial species, fiber, dietary, protein, starch, alfalfa hay, carcass characteristics, corn grain, feed, diet, food conversion, nutrient utilization, soybean hulls.
- Arruda, A.M.V.; Lopes, D.C.; Ferreira, W.M.; Queiroz, A.C.; Rostagno, H.S.; Albino, L.F.T.; Pereira, E.S.; Ferreira, A.S. (2002). **Caecal microbial activity and caecotrophy nutritional contribution of growing rabbits fed diets with different starch levels and sources of fiber.** *Journal of Dairy Science* 85 (Suppl. 1): 222, ISSN: 0022-0302.
NAL Call Number: 44.8 J822
Keywords: breed, New Zealand White, growing, microbe, cecal flora, fiber, dietary, starch, dietary, total volatile fatty acids, alfalfa hay, feed, corn grain, diet, soybean hulls.
- Belenguer, A.; Balcells, J.; Fondevila, M.; Torre, C. (2002). **Caecotrophes intake in growing rabbits estimated either from urinary excretion of purine derivatives or from direct measurement using animals provided with a neck collar: Effect of type and level of dietary carbohydrate.** *Animal Science Penicuik* 74: 135-144.
NAL Call Number: SF1.A56
Keywords: breed, New Zealand, growing male, cecum, digestive system, feces, nitrogen, microbial recycling, structural carbohydrates, diet, urinary purine derivatives, excretion, alfalfa hay, feed, barley grain, caecotrophy, composition; digestibility, dry matter intake, growth, maize, grain, neck collar, sugar beet pulp.
- Bhatt, R.S.; Bratia, D.R.; Mahajan, A. (1999). **Effect of incorporating rice-phak in the diet of Angora rabbits.** *Indian*

Journal of Animal Nutrition 16 (2): 144-148, ISSN: 0970-3209.

NAL Call Number: SF95.I47

Keywords: breed, German Angora x Russian Angora, body weight; calcium balance, nitrogen balance, nutrient digestibility, phosphorus balance, rice phak, feed, dietary incorporation, nutritive value, wool yield.

Bhatt, R.S.; Sharma, S.R. (2001). **Nutrient utilisation and growth performance of broiler rabbits fed oat plant meal and tall fescue hay.** *Asian Australasian Journal of Animal Sciences* 14 (9): 1228-1232, ISSN: 1011-2367.

NAL Call Number: SF55.A78A7

Keywords: breed, Soviet Chinchilla, broiler, nutritive value, oat meal, tall fescue hay, body weight gain, growth performance, nutrient utilization, hay.

Bhatt, R.S.; Sharma, S.R. (2001). **Replacement of soyflakes with cottonseed meal in diets of Angora rabbits.** *Asian Australasian Journal of Animal Sciences* 14 (8): 1106-1109, ISSN: 1011-2367.

NAL Call Number: SF55.A78A7

Keywords: adult, breed, Angora, wool producing, cellulose, hemicellulose, lysine, methionine, integumentary system, acid detergent fiber, cellulose, crude fiber, ether extract, hemicellulose, lysine, dietary supplement, neutral detergent fiber, dry matter, gossypol containing cottonseed meal, feed, mortality, soyflakes, wool yield.

Bhatt, R.S.; Sharma, S.R.; Singh, U.; Bhasin, V. (2002). **Substitution of maize with rice bran and rice polish in the diet of Angora rabbits.** *Indian Journal of Animal Sciences* 72 (4): 337-340, ISSN: 0367-8318.

NAL Call Number: 41.8 IN22

Keywords: breed, German Angora, biological performance, digestibility, maize, feed, mortality, rice bran, maize substitute, rice polish, wool characteristics, wool yield.

Bhatt, R.S.; Sharma, S.R.; Singh, U.; Kumar, D.; Bhasin, V. (2002). **Effect of different seasons on the performance of Grey Giant rabbits under sub-temperate Himalayan conditions.** *Asian Australasian Journal of Animal Sciences* 15 (6): 812-820, ISSN: 1011-2367.

NAL Call Number: SF55.A78A7

Keywords: breed, Grey Giant, immature kit, acid detergent fiber, diet, cellulose, crude fiber, climate, dry matter digestibility, feed efficiency, growth performance, litter size, mortality, nutritive value, rainfall, relative humidity, seasonal effects, winter, summer, rainy, temperature, slaughter weight, dressing percentage, liver weight, Himalayas.

Bhatt, R.S. (2001). **Performance of Angora rabbits on various vegetable proteins incorporated diets.** *Indian Journal of Animal Sciences* 71 (10): 962-965, ISSN: 0367-8318.

NAL Call Number: 41.8 IN22

Keywords: breed, German Angora, lysine, dietary supplementation, methionine, dietary supplementation, dietary vegetable proteins, growth performance, wool yield, live weight gain, mustard cake, feed, protein source, soyaflakes, protein source, sunflower cake, protein source.

Bhatt, R.S.; Sawal, R.K.; Mahajan, A. (1999). **Effect of feed protein source on digestion and wool production in Angora rabbit.** *Asian Australasian Journal of Animal Sciences* 12 (7): 1075-1079, ISSN: 1011-2367.

NAL Call Number: SF55.A78A7

Keywords: breed, Angora, German x British x Russian, nutrition, digestion, groundnut cake, feed, protein source, soyflakes, sunflower cake, wool production.

Bilko, A.; Cheritah, L. (2001). **Sufficient and necessary conditions for rapid odour learning coupled with suckling in the newborn rabbit.** *Advances in Ethology* 36: 121, ISSN: 0931-4202.

NAL Call Number: 410 Z35B

Keywords: maternal care, nursing, milk intake, nipple grasp frequency, rapid odor learning, suckling, nipple search, pheromone.

Blas, E.; Amber, K.; Pascual, J.J.; Cervera, C. (1999). **Live weight, feed intake and faecal digestibility in rabbits fitted with ileal cannula.** *Investigacion Agraria Produccion y Sanidad Animales* 14 (1-3): 95-101, ISSN: 0213-5035.

NAL Call Number: SF15.S7 A52

Keywords: feces, digestive system, ileum, crude protein, ileal cannulation, surgical method, diet, fecal digestibility, feed intake, live weight, organic matter, Spanish language.

Blas, E.; Fernandez, C.J.; Cervera, C.; Pascual, J.J. (2000). **Nutritive value of coarse and fine wheat brans for rabbits.** *Animal Feed Science and Technology* 88 (3-4): 239-251, ISSN: 0377-8401.

NAL Call Number: SF95.A55

Keywords: breed, New Zealand x Californian, wheat bran, feed, coarse, digestibility, energy content, fiber content, fine, nutritive value.

Bonomi, A.; Bonomi, B.M.; Quarantelli, A. (2000). **Limpiego della DL-Carnitina nell'alimentazione del coniglio da carne. [The use of DL-carnitine in the rabbits feeding.]** *Rivista di Scienza dell'Alimentazione* 29 (4): 443-453.

NAL Call Number: TX501.R58

Keywords: DL carnitine, feed supplement, body weight gain, feed utilization, digestibility, meat, tenderness, yield, Italian language.

Bonomi, A.; Bonomi, B.M.; Quarantelli, A. (1999). **Il cromo organico nell'alimentazione del coniglio da carne (contributo sperimentale). [Organic chromium in the feeding of rabbits (experimental report).]** *Rivista di Scienza dell'Alimentazione* 28 (3): 351-362.

NAL Call Number: TX501.R58

Keywords: organic chromium, dietary supplement, ration integration, body weight gain, carcass composition, meat yield, fat content, meat digestibility.

Bonomi, A.; Bonomi, B.M.; Sussi, C. (2002). **L'impiego della propoli nell'alimentazione del coniglio da carne. [The use of propolis in rabbits feeding.]** *Rivista di Scienza dell'Alimentazione* 31 (1): 29-41.

NAL Call Number: TX501.R58

Keywords: propolis, animal feeding uses, carcass quality traits, analysis, feed utilization, rabbit meat, chemical analysis, meat product, quality, texture, rabbit production, weight gain, Italian language.

Bousses, P.; Chapuis, J.L. (1998). **Deferred seasonal increase in testes weight under poor nutritional conditions in a sub-Antarctic population of rabbits (*Oryctolagus cuniculus*).** *Journal of Zoology* 245 (3): 285-291, ISSN: 0952-8369.

NAL Call Number: 410.9 L84P

Keywords: body weight, seasonal changes related to nutrition, food plants, seasonal nutritional quality related to testis weight, food availability, testis seasonal weight changes, relationships, testis, seasonal weight changes in relation to nutrition, evolutionary adaptation, testis weight, nutrition relationships, Indian ocean islands, Kerguelen islands, armor, molloy and morne, testis weight related to nutrition.

Carabano, R.; Garcia, J.; de Blas, J.C. (2001). **Effect of fibre source on ileal apparent digestibility of non-starch polysaccharides in rabbits.** *Animal Science* 72 (2): 343-350, ISSN: 1357-7298.

Keywords: breed, New Zealand White x Californian, female, doe, diet, non-starch polysaccharides, arabinose, mannose, rhamnose, galactose, glucose, xylose, paprika meal, olive leaves, lucerne hay, soya-bean hulls, ileal apparent digestibility, dietary fiber, fiber source effect.

Castellini, C.; Dal Bosco, A.; Bernardini, M. (1999). **Effect of dietary vitamin E supplementation on the characteristics of refrigerated and frozen rabbit meat.** *Italian Journal of Food Science* 11 (2): 151-160, ISSN: 1120-1770.

NAL Call Number: TX511.F62

Keywords: n-3 fatty acids, vitamin E, dietary supplement, longissimus dorsi muscle, chemical characteristics, meat, oxidative stability, physical characteristics, frozen, refrigerated.

Castellini, C.; Lattaioli, P.; Bernardini, M.; Dal Bosco, A. (2000). **Effect of dietary alpha-tocopheryl acetate and ascorbic acid on rabbit semen stored at 5 degree C.** *Theriogenology* 54 (4): 523-533, ISSN: 0093-691X.

NAL Call Number: QP251.A1T5

Keywords: semen, storage, spermatozoa, motility, viability, alpha tocopheryl acetate, vitamin E, antioxidant, dietary supplements, dosage, ascorbic acid, antioxidant, artificial insemination, sperm cryopreservation, fertility, oxidative stability, storage temperature.

Cavalcante, S.G.; Ferreira, W.M.; Valente, S.S.; Santiago, G.S.; Dias, J.C.C.A.; Naranjo, A.P. (2002).

Biodisponibilidade de cobre de diferentes fontes para coelhos. [Copper bioavailability from different sources for rabbits.] *Arquivo Brasileiro de Medicina Veterinaria e Zootecnia* 54 (3): 290-294, ISSN: 0102-0935.

NAL Call Number: SF604 .A76

Keywords: breed, Californian, New Zealand White, female, male, copper, dietary bioavailability, inorganic sources, organic sources, copper carbonate, dietary supplement, copper oxide, copper quelate, daily weight gain, dry matter intake, feed conversion, Portuguese language.

Cervera, C.; Carmona, J.F. (1998). **Climatic environment.** In: *The Nutrition of the Rabbit*, de Blas, C.; Wiseman, J. (Eds.), CAB International, England, UK; CAB International, New York, New York, pp. 273-295, ISBN: 0-85199-279-X.

NAL Call Number: SF454.N88 1998

Keywords: breeding, growing, climatic environment, nutrient allowances, nutritional value, thermoneutral zone.

Chakurkar, E.B.; Barbuddhe, S.B.; Sundaram, R.N.S. (2000). **Biochemical profile of rabbit serum in coastal climatic conditions.** *Indian Veterinary Journal* 77 (2): 167-168, ISSN: 0019-6479.

NAL Call Number: 41.8 IN2

Keywords: breed, Californian White cross, New Zealand White, Soviet Chinchilla, crossbred, calcium, glucose, inorganic phosphorus, total protein, biochemical profile, body weight, diet, nutritional status, tropical coastal climate.

Chiou, P.W.S.; Yu, B.; Kuo, Chung, Y. (2000). **Comparison of digestive function among rabbits, guinea-pigs, rats and hamsters. I. Performance, digestibility and rate of digesta passage.** *Asian Australasian Journal of Animal Sciences* 13 (11): 1499-1507.

NAL Call Number: SF55.A78A7

Keywords: laboratory animals, comparison, digestive function, guinea pig, Syrian hamster, rabbit, rat, cecum, colon, large intestine, rectum, crude protein, digestibility, fiber, digesta passage, digestive function comparison, digestive performance, fermentation site.

Christ, B. (1999). **Effect of dietary fat on fertility and rearing ability of does and on fattening performance and carcass yield of hybrid rabbits.** *Archiv fuer Gefluegelkunde* 63 (3): 133-135, ISSN: 0003-9098.

NAL Call Number: 47.8 AR2

Keywords: fat, diet, carcass yield, fattening performance, fertility, meat quality, milk, dairy product, rapeseed oil, fats and oils, rearing ability, soybean oil, fats and oils.

Corino, C.; Pastorelli, G.; Pantaleo, L.; Oriani, G.; Salvatori, G. (1999). **Improvement of color and lipid stability of rabbit meat by dietary supplementation with vitamin E.** *Meat Science* 52 (3): 285-289, ISSN: 0309-1740.

NAL Call Number: TX373.M4

Keywords: New Zealand White, breed, rabbit, thiobarbituric acid, reactive substances, vitamin E, dietary supplement, longissimus lumborum, meat, color, lipid stability.

Corino, C.; Bontempo, V.; Magni, S.; Pastorelli, G. (2001). **Effects of dietary conjugated linoleic acid (CLA) on carcass characteristics and serum leptin and lipid profile of rabbits.** *Journal of Dairy Science* 84 (Suppl. 1): 401, ISSN: 0022-0302.

NAL Call Number: 44.8 J822

Keywords: perirenal fat, serum, blood and lymphatics, conjugated linoleic acid, dietary supplement leptin, lipid, total cholesteroltriglycerides, carcass characteristics, growth, sunflower oil.

Corino, C.; Mourot, J.; Magni, S.; Pastorelli, G.; Rosi, F. (2002). **Influence of dietary conjugated linoleic acid on**

growth, meat quality, lipogenesis, plasma leptin and physiological variables of lipid metabolism in rabbits. *Journal of Animal Science* 80 (4): 1020-1028, ISSN: 0021-8812.

NAL Call Number: 49 J82

Keywords: breed, New Zealand White, male, female, cholesterol, lipids, plasma leptin, dietary conjugated linoleic acid, food supplement, growth, lipid metabolism, lipogenesis, meat quality, carcass characteristics, longissimus lumborum muscle.

Corino, C.; Mourot, J.; Pastorelli, G.; Bontempo, V. (2001). **Dietary conjugated linoleic acid (CLA) influence the lipogenic enzyme activities in adipose tissue and liver of rabbit.** *Journal of Dairy Science* 84 (Suppl. 1): 194, ISSN: 0022-0302.

NAL Call Number: 44.8 J822

Keywords: breed, New Zealand White, adipose tissue, lipogenic enzyme activity, skeletal system, liver, digestive system, lipogenic enzyme activity, acetyl CoA carboxylase, conjugated linoleic acid, glucose-6-phosphate-dehydrogenase, expression., sunflower oil.

Costa, L.C.; Murgas, L.D.S.; Miliorini, A.B.; Oliveira, S.L.; Silva, F.P.C.; Pereira, R.A.N. (2002). **Influencia do selenio sobre a qualidade do semen de coelhos da raca California. [Influence of selenio on quality of the semen of rabbits of the race California.]** *Revista Brasileira de Reproducao Animal* 26 (2): 117-118, ISSN: 0102-0803.

NAL Call Number: QP251.R48

Keywords: commercial species, male, breed, California, semen quality, reproductive system, sperm, morphology, motility, vigor, selenium, dietary supplement, Portuguese language.

Coureaud, G.; Schaal, B.; Coudert, P.; Hudson, R.; Rideaud, P.; Orgeur, P. (2000). **Mimicking natural nursing conditions promotes early pup survival in domestic rabbits.** *Ethology* 106 (3): 207-225, ISSN: 0179-1613.

NAL Call Number: QL750.E74

Keywords: parental care, nursing, natural vs free access nursing, pup survival, growth rate, reproductive productivity, parity effects, survival, population dynamics.

Dal Bosco, A.; Castellini, C.; Bernardini, M.; Locatelli, P.; Ragg, G. (1999). **Dietary vitamin E, oxidative stability and fatty acid profile of homogenised and lyophilised rabbit meat.** *Italian Journal of Food Science* 11 (4): 379-380, ISSN: 1120-1770.

NAL Call Number: TX511.F62

Keywords: vitamin E, docosahexanoic acid, oxidative stability, dietary intake, lipid oxidation, meat, chemical composition, energy content, homogenized, lipophilized.

de Arruda, A.M.V.; Lopes, D.C.; Ferreira, W.M.; Rostagno, H.S.; de Queiroz, A.C.; et al. (2002). **Digestibilidade aparente dos nutrientes de racoes contendo diferentes fontes de fibra e niveis de amido com coelhos em crescimento. [Nutrients apparent digestibility in diets with different starch levels and fiber source for growing rabbits.]** *Revista Brasileira de Zootecnia* 31 (3): 1166-1175, ISSN: 1516-3598.

NAL Call Number: SF1.R45

Keywords: growing rabbits, feed, apparent nutrient digestibility, dietary starch level, dietary fiber source, corn grain, feed, alfalfa hay, soybean hull, Portuguese language.

deBlas, C.; Mateos, G.G. (1998). **Feed formulation.** In: *The Nutrition of the Rabbit*, de Blas, C.; Wiseman, J. (Eds.), CAB International, England, UK; CAB International, New York, New York, pp. 241-253, ISBN: 0-85199-279-X.

NAL Call Number: SF454.N88 1998

Keywords: amino acids, dietary requirements, fat supplementation, feed formulation, fiber substitution, protein to energy ratio, recommended nutrient concentration, starch substitution.

deBlas, C.; Wiseman, J. (1998). *The Nutrition of the Rabbit*, CAB International: Wallingford England, UK; New York, New York, 344 p., ISBN: 0-85199-279-X.

NAL Call Number: SF454.N88 1998

Keywords: breeding, fur production, meat production, feeding, nutrition, digestive system, feed evaluation,

environment.

- Debray, L.; Fortun, L.L.; Gidenne, T. (2002). **Influence of low dietary starch/fibre ratio around weaning on intake behaviour, performance and health status of young and rabbit does.** *Animal Research* 51 (1): 63-75.
NAL Call Number: SF1.A64
Keywords: doe, female, fiber, dietary starch, dietary low starch/fiber ratio, nutritional method, feed intake, health, lactation, milk production, mortality, weaning.
- Diaz, A.F.; Perez, A.L.M.; Perez, H.M. (1999). **Digestibility and energy retention by young rabbits fed different levels of intake.** *Annales de Zootechnie* 48 (4): 289-295, ISSN: 0003-424X.
NAL Call Number: 49 F84
Keywords: breed, White New Zealand, growing, male, young, energy retention, feed digestibility, feed intake level, dry matter, organic matter, crude protein.
- Diaz, J.M.C.; Nosedá, B.B.; Doderó J.A.A.; Sánchez, J.M.; Hernández, R.F. (1999). **The use of homeopathic therapy in rabbits farms.** *Avances en Alimentación y Mejora Animal* 39 (1): 15-16, ISSN: 0005-1896.
NAL Call Number: SF95.A9
Keywords: husbandry, homeopathic therapy, therapeutic method, animal production, growth, positive effects, feed additives, ignatia, medorrhinum, tuberculinum, farming, Spanish language.
- Dihigo, L.E.; Savon, L.; Sierra, F. (2001). **Morphometric studies of the gastrointestinal tract and internal organs of rabbits consuming sugarcane meals.** *Cuban Journal of Agricultural Science* 35 (4): 337-341, ISSN: 0864-0408.
NAL Call Number: S1.R4
Keywords: male, White Semigiant x New Zealand, commercial hybrid, feed, sugarcane meal, effects on gastrointestinal tract, randomized design, morphometry, digesta content, caecal content, stomach weight, liver weights.
- do Prado, I.N.; Lage, L.V.; Scapinello, C. (2001). **Variacoes em metabolitos no plasma e hormônios no soro sanguineo de coelhas alimentadas com farelo de canola em substituicao gradual ao farelo de soja. [Changes in metabolic plasma and serum hormones in female rabbits fed on diets with canola meal gradually replacing soybean meal.]** *Acta Scientiarum Universidade Estadual de Maringá* 23 (4): 1033-1038, ISSN: 1415-6814.
Keywords: breed, White New Zealand, commercial species, female, metabolic plasma, blood and lymphatics, serum, blood and lymphatics, T-3, T-4, estradiol, glucose, insulin, progesterone, total cholesterol, triglycerides, urea, heart puncture, blood collection method, canola meal, feed, lactation, pregnancy, soybean meal.
- Donoghue, S. (1997). **Nutrition and pet rabbits.** In: *Practical Exotic Animal Medicine /The Compendium Collection*, pp.104-107, K.L. Rosenthal (Ed.).
NAL Call Number: SF981 P72 1997
Keywords: rabbits, pets, pet care, nutrition.
- Duffy, S.G.; Fairley, J.S.; O'Donnell, G. (1996). **Food of rabbits *Oryctolagus cuniculus* on upland grasslands in Connemara.** *Biology and Environment* 96B (2): 69-75, ISSN: 0791-7945.
Keywords: nutrition, diet, habitat.
- El-Mahdy, M.R.; Karousa, M.M. (1995). **Social behaviour, growth performance and carcass traits in growing New Zealand White rabbits as affected by iodine-treated water, water source and watering system.** *Egyptian Journal of Rabbit Science* 5 (1): 65-76.
Keywords: breed, New Zealand White, feed conversion efficiency, thyroxine, feed intake, drinkers, feeding, aggression, scratching, biting, animal welfare, carcass weight, dressing percentage, liveweight gain, water intake, behavior, nipple drinkers, water troughs, water, sources, iodine, supplements, rabbit feeding, drinking water.
- Fairham, J.; Harcourt-Brown, F.M. (1999). **Preliminary investigation of the vitamin D status of pet rabbits.** *The*

Veterinary Record: Journal of the British Veterinary Association 16 (145): 452-454. ISSN: 0042-4900.

NAL Call Number: 41.8 V641

Keywords: calcitriol, blood plasma, nutritional state, solar radiation, housing, free range husbandry.

Faria, H.G.; Scapinello, C.; Furlan, A.C.; Moreira, I.; Martins, E.N. (2000). **Nutritional value of recovery yeast (*Saccharomyces* sp.), dried by rotative cylinder or by “spray-dry” for growing rabbits.** [Valor Nutritivo das Leveduras de Recuperacao (*Saccharomyces* sp.), Seca por Rolo Rotativo ou por “Spray-Dry”, para Coelho Em Crescimento.] *Revista Brasileira de Zootecnia* 29 (6): 1750-1753.

NAL Call Number: SF1.R45

Keywords: breed, New Zealand White, female, male, growth, recovery yeast, feed additive, nutritional value, rotational cylinder dried, Portuguese language.

Fernandez-Carmona, J.; Alqedra, I.; Cervera, C.; Moya, J.; Pascual, J.J. (2003). **Effect of lucerne-based diets on performance of reproductive rabbit does at two temperatures.** *Animal Science* *Penicuik* 76: 283-295.

NAL Call Number: SF1.A56

Keywords: breed, New Zealand x Californian, commercial species, doe, female, milk, reproductive system, digestible protein, diet, dry matter intake, food intake, lactation, litter-weight, lucerne, milk yield, parity, parturition, temperature.

Fernández Carmona, J.; Cervera, C.; Sabater, C.; Blas, E. (1995). **Effect of diet composition on the production of rabbit breeding does housed in a traditional building and at 30 deg C.** *Animal Feed Science and Technology* 52 (3/4): 289-297, ISSN: 0377-8401.

NAL Call Number: SF95.A55

Keywords: breed, New Zealand White crossbreds, feeding, rabbit milk, yields, heat stress, liveweight gain, mortality, litter weight, reproduction, feed intake, fibre, intake, environmental temperature, milk yield, nutrition.

Ferreira, W.M.; Cavalcante, S.G.; Naranjo, A.P.; Santiago, G.S. (2002). **Biodisponibilidade de diferentes fontes de zinco para coelhos.** [Bioavailability of different zinc sources for rabbits.] *Arquivo Brasileiro de Medicina Veterinaria e Zootecnia* 54 (6): 636-642, ISSN: 0102-0935.

NAL Call Number: SF604 .A76

Keywords: breed, California, New Zealand White, bioavailability, zinc carbonate, dietary supplement, inorganic zinc source, zinc oxide, dietary supplement, zinc quelate, organic zinc source, zinc sulfate, inorganic zinc source, weight gain, Portuguese language.

Flachowsky, G. (2002). **Efficiency of energy and nutrient use in the production of edible protein of animal origin.** *Journal of Applied Animal Research* 22 (1): 1-24, ISSN: 0971-2119.

NAL Call Number: SF55.I4J68

Keywords: cattle, chicken, broiler, layer, pig, rabbit, meat products, eggs, poultry product, energy efficiency, gross energy, crude protein, milk, dairy product, nutrient use, pork, meat product, poultry meat, poultry product, rabbit meat, meat product.

Fodor, K.; Fekete, S.; Zoldag, L.aszlo; Bersenyi, A.; Gaspardy, A.; Andrasofszky, E.; Kulcsar, M.; Eszes, F. (2002). **A takarmanyozas intenzitasanak hatasa magyar orias fajtaju nosteny hazinyulak elotomegere, testosszetetelere es kulonbozo testmereteinek alakulasara.** [Effect of feeding intensity in live weight, body composition and different body measurements of female Hungarian Giant rabbits.] *Magyar Allatorvosok Lapja* 124 (5): 285-290, ISSN: 0025-004X.

NAL Call Number: 41.8 V644

Keywords: breed, Hungarian Giant, female, ovary, reproductive system, body composition, feed restriction, ad libitum feeding, feeding intensity, live weight, sexual maturity, Hungarian language.

Fodor, K.; Fekete, S.G.; Zoldag, L.; Bersenyi, A.; Gaspardy, A.; Andrasofszky, E.; Kulcsar, M.; Eszes, F. (2001).

Influence of feeding intensity on corporeal development, body composition and sexual maturity in female rabbits. *Acta Veterinaria Hungarica* 49 (4): 399-411, ISSN: 0236-6290.

NAL Call Number: 41.8 AC83

Keywords: breed, New Zealand White, crude protein, digestibility, fat, ash content, body composition, body weight, corporeal development, dry matter content, feeding intensity, sexual maturity, water consumption.

Fodor, K.; Molnár, V.; Beregi, A.; Felkai, F.; Fekete, S. (2003). **A kedvtelésbo tartott kisemlo sök takarmányozása. [Nutrition of pet rodents and small mammals.]** *Kisállat Praxis* 4 (2): 68-76.

Keywords: pets, chinchillas, gerbils, guineapigs, hamsters, mice, rabbits, rats, squirrels, nutrition, nutrient requirements, feeding, management, Hungarian language.

Fortun-Lamothe, L.; Gidenne, T. (2003). **Besoins nutritionnels du lapereau et strategies d'alimentation autour du sevrage. [Nutritional needs of young rabbits and feeding strategy around weaning.]** *Productions Animales Paris Fevrier* 16 (1): 39-47, ISSN: 0990-0632.

Keywords: young rabbits, lactating females, dietary fiber, starch, body condition, feeding strategy, health status, lactation, nutritional needs, weaning, French language.

Fortun, L.L.; Prunier, A. (1999). **Effects of lactation, energetic deficit and remating interval on reproductive performance of primiparous rabbit does.** *Animal Reproduction Science* 55 (3-4): 289-298, ISSN: 0378-4320.
NAL Call Number: QP251.A5

Keywords: female, does, feeding, restricted, ad libitum, milk production, conception rate, adipose tissue, ovulation rate.

Fortun, L.L.; Gidenne, T.; Scapinello, C. (1999). **Feeding pattern of sucking rabbits. Effects of litter size.** *Proceedings of the Nutrition Society* 58 (3): 82A, ISSN: 0029-6651.

NAL Call Number: 389.9 N953

Keywords: sucking, milk, reproductive system, availability, feeding pattern, litter size, effect.

Fru-Nji, F.; Ekpenyong, T.E. (2003). **Effects of palm kernel oil on growth, carcass quality and fatty acid composition of some organs of growing rabbits.** *Indian Journal of Animal Nutrition* 20 (1): 49-56, ISSN: 0970-3209.

NAL Call Number: SF95.I47

Keywords: male, chinchilla rabbits, body weight gain, carcass quality, feed intake, growth performance, palm kernel oil, feed, dietary supplementation, fats, oils, tropical conditions.

Furlan, A.C.; Scapinello, C.; Moreira, I.; Martins, E.N.; Murakami, A.E.; Toral, F.L.B. (2002). **Cobre e bacitracina de zinco como promotores de crescimento em racoes para coelhos em crescimento. [Copper and zinc bacitracin utilization in growing rabbits' diets.]** *Acta Scientiarum Universidade Estadual de Maringa* 24 (4): 1027-1030.

Keywords: breed, New Zealand White, commercial species, growing rabbits, copper, zinc bacitracin, antibacterial drug, antiinfective drug, carcass weight, diet, feed conversion, feed intake, growth, performance, weight gain, Portuguese language.

Furlan, A.C.; de Faria, H.G.; Scapinello, C.; Moreira, I.; Murakami, A.E.; Da Rosa, S.M.L. (2001). **Farelo de girassol para coelhos em crescimento: Digestibilidade e desempenho. [Sunflower meal for growing rabbits: Digestibility and performance.]** *Acta Scientiarum Universidade Estadual de Maringa* 23 (4): 1023-1027, ISSN: 1415-6814.

Keywords: breed, New Zealand White, digestibility trials, digestibility coefficient, crude energy, crude protein, dry matter, dry matter based diet, performance, nutritional value, sunflower meal, soybean meal, feed, Portuguese language.

Furuta, M.; Suwa, T.; Kuwabara, Y.; Otsuhata, K.; Takeda, A. (2002). **Electron-beam sterilization of laboratory animal diets: Sterilizing effect of 10-MeV electrons from a linear accelerator.** *Experimental Animals* 51 (4): 327-334, ISSN: 1341-1357.

Keywords: laboratory animal, guinea pig, mouse, rat, rabbit, laboratory animal diets, electron beam sterilization, decontamination method, sterilization method, linear accelerator, laboratory equipment, powder diet, nutritional method, solid diet, nutritional method.

- Garcia, J.; Gidenne, T.; Falcao e cunha, L.; De Blas, C. (2002). **Identification of the main factors that influence caecal fermentation traits in growing rabbits.** *Animal Research* 51 (2): 165-173, ISSN: 1627-3583.
NAL Call Number: SF1.A64
Keywords: cecum, content weight, digestive system, fermentation traits, caecal pH, volatile fatty acid concentration, uronic acids, dry matter intake, fiber digestion, growing period, neutral detergent fiber, lignification, diet, chemical composition, nutritive value.
- Garcia, J.; Carabano, R.; Perez, A.L.; de Blas, J.C. (2000). **Effect of fiber source on cecal fermentation and nitrogen recycled through cecotrophy in rabbits.** *Journal of Animal Science* 78 (3): 638-646, ISSN: 0021-8812.
NAL Call Number: 49 J82
Keywords: cecum, digestive system, feces, stomach, neutral detergent fiber, lignification, nitrogen, recycling, starch, alfalfa hay, feed, fiber source, cecal fermentation, cecotrophy, diet, fiber digestion, olive leaves, feed, pH, paprika meal, sodium hydroxide treated barley straw, soybean hulls, sunflower hulls.
- Garcia, J.; Nicodemus, N.; Carabano, R.; de Blas, J.C. (2002). **Effect of inclusion of defatted grape seed meal in the diet on digestion and performance of growing rabbits.** *Journal of Animal Science* 80 (1): 162-170, ISSN: 0021-8812.
NAL Call Number: 49 J82
Keywords: breed, New Zealand White x California, cecal fermentation, defatted grape seed meal, feed, dietary inclusion, fiber source, nutritive value, digestion, mortality, performance.
- Garcia, J.; Carabano, R.; de Blas, J.C. (1999). **Effect of fiber source on cell wall digestibility and rate of passage in rabbits.** *Journal of Animal Science* 77 (4): 898-905, ISSN: 0021-8812.
NAL Call Number: 49 J82
Keywords: breed, New Zealand White x California, alfalfa hay, feed, barley straw, sodium hydroxide treated, cell wall digestibility, dry matter intake, fiber digestion efficiency, fiber rate of passage, fiber source, olive leaves, paprika meal, particle size, soybean hulls.
- Gidenne, T.; Fortun, L.L. (2002). **Feeding strategy for young rabbits around weaning: A review of digestive capacity and nutritional needs.** *Animal Science Penicuik* 75 (pt. 2): 169-184.
NAL Call Number: SF1.A56
Keywords: commercial species, female, immature, mature, young, diet, fiber, dietary starch, digestion, energy requirements, feeding strategy, lactation, nutritional requirements, weaning, literature review.
- Gidenne, T.; Pinheiro, V.; Cunha, L.F. (2000). **A comprehensive approach of the rabbit digestion: Consequences of a reduction in dietary fibre supply.** *Livestock Production Science* 64 (2-3): 225-237, ISSN: 0301-6226.
NAL Call Number: SF1.L5
Keywords: dietary fiber level, effects of, husbandry, ileum, digestive system, rectum, acid detergent fiber, starch, volatile fatty acids, bacterial fibrolytic activity, organic matter.
- Gidenne, T.; Perez, J.M. (2000). **Replacement of digestible fibre by starch in the diet of the growing rabbit. I. Effects on digestion, rate of passage and retention of nutrients.** *Annales de Zootechnie* 49 (4): 357-368, ISSN: 0003-424X.
NAL Call Number: 49 F84
Keywords: breed, New Zealand White, growing, lignocellulose, starch, dietary level, digestible fiber replacement, fecal digestibility, nutrient retention, rate of passage.
- Gidenne, T. (2003). **Fibres in rabbit feeding for digestive troubles prevention: Respective role of low-digested and digestible fibre.** *Livestock Production Science* 81 (2-3): 105-117, ISSN: 0301-6226.
NAL Call Number: SF1.L5
Keywords: digestive system, dietary fiber intake, digestive health, fiber digestibility.
- Gidenne, T.; Arveux, P.; Madec, O. (2001). **The effect of the quality of dietary lignocellulose on digestion, zootechnical performance and health of the growing rabbit.** *Animal Science* 73 (1): 97-104, ISSN: 1357-7298.

Keywords: cellulose, dietary intake, lignin dietary intake, lignocellulose, quality, protein, digestion, daily weight gain, dry matter, digestibility, food intake, growth performance, morbidity, mortality.

Gondret, F.; Lebas, F.; Bonneau, M. (1999). **Effects of feed restriction during fattening on muscle lipid traits in the rabbit.** *Proceedings of the Nutrition Society* 58 (3): 84A, ISSN: 0029-6651.

NAL Call Number: 389.9 N953

Keywords: New Zealand White, male, muscle, muscular system, lipid content, lipid metabolism, feed restriction, effects, rabbit meat.

Gutierrez, I.; Espinosa, A.; Garcia, J.; Carabano, R.; de Blas, J.C. (2002). **Effects of starch and protein sources, heat processing, and exogenous enzymes in starter diets for early weaned rabbits.** *Animal Feed Science and Technology* 98 (3-4): 175-186, ISSN: 0377-8401.

NAL Call Number: SF95.A55

Keywords: young rabbits, early weaned, feeding trials, crude protein, dietary intake, digestibility, enzyme supplement, neutral detergent fiber, starch, heat processing, feed processing method, average daily gain, dry matter, feed efficiency, growth performance, feed, peas, wheat, soyabean meal, starter diet.

Gutierrez, I.; Espinosa, A.; Garcia, J.; Carabano, R.; de Blas, J.C. (2002). **Effect of levels of starch, fiber, and lactose on digestion and growth performance of early-weaned rabbits.** *Journal of Animal Science* 80 (4): 1029-1037, ISSN: 0021-8812.

NAL Call Number: 49 J82

Keywords: early weaned, 25 days of age, lactose, starch, starter diet, carbohydrates, digestion, early weaning, fiber, food supplement, growth performance, average daily gain, feed efficiency, gut histology, cecal fermentation traits, diarrhea.

Harcourt-Brown, F. (1997). **Diagnosis, treatment and prognosis of dental disease in pet rabbits.** *In Practice* 19 (8): 407-421, ISSN: 0263-841X.

NAL Call Number: SF601 I4

Keywords: tooth diseases, teeth, osteodystrophy, abscesses, vitamin deficiencies, vitamin D, mineral deficiencies, calcium, diets, restraint of animals, radiography, dentistry, incisors, malocclusion, tooth trimming.

Hartmann, K.; Fischer, S.; Kraft, W. (1994). **Heimtiere als Patienten in der Kleintierpraxis. Teil 1. Abstammung, Physiologie, Haltung, Fuetterung.** [Small pet animals as patients in veterinary practice. Part 1. Descent, physiology, husbandry, feeding.] *Tieraerztliche Praxis* 22 (6): 585-591, ISSN: 0303-6286.

Keywords: rabbits, guinea pigs, gerbils, hamsters, mice, rats, chinchillas, husbandry, feeding, ancestry, physiology, German language.

Hoy, S.; Seitz, K.; Selzer, D. (2002). **Investigations on time of nursing in domestic and wild rabbit does (*Oryctolagus cuniculus*).** *Advances in Ethology* 37: 39, ISSN: 0931-4202.

NAL Call Number: 410 Z35B

Keywords: doe, domestic, female, immature, pup, wild, diurnal variation, housing, nursing time, photoperiod.

Igwebuikwe, J.U.; Anugwa, F.O.I.; Ikurior, S.A.; Ehiobu, N.G. (2003). **Effect of feeding graded levels of soaked *Acacia albida* pods on the performance of growing rabbits.** *Indian Journal of Animal Sciences* 73 (7): 802-806, ISSN: 0367-8318.

NAL Call Number: 41.8 IN22

Keywords: breed, Dutch x New Zealand, commercial species, crossbred, forage, nutrition, crude fiber, crude protein, dietary, ether extract, diet, dry matter digestibility, feed conversion ratio, growth, liveweight gain, soaked, *Acacia albida* pods.

Jenkins, J.R. (1999). **Feeding recommendations for the house rabbit.** *The Veterinary Clinics of North America. Exotic Animal Practice* 2 (1): 143-51, ISSN: 1094-9194.

NAL Call Number: SF997.5.E95E97

Abstract: The feeding recommendations for the pet or house rabbit include grass hay fed ad libitum, dark leafy green vegetables fed at one cup per 5 pounds of body weight, and a maximum of 1 cup of high fiber pellets per

5 pounds of body weight. These recommendations are based on the feeding behavior, anatomy, and gastrointestinal physiology of the rabbit. Feeding this diet reduces the occurrence of common gastrointestinal tract disease in the house rabbit. This article reviews the feeding behavior, anatomy, and gastrointestinal physiology of the rabbit.

Keywords: review, feeding, nutrition, dietary fiber, administration, dosage, physiology.

Kalita, P.; Bhuyan, R.; Konwar, B.K. (2000). **Carcass characteristics and meat composition of broiler rabbits on different dietary levels of protein and energy.** *Indian Veterinary Journal* 77 (11): 972-975, ISSN: 0019-6479.

NAL Call Number: 41.8 IN2

Keywords: protein, dietary, body weight, carcass characteristics, diet, dietary energy, meat composition, nutrition.

Kamphues, J. (2001). **Die artgerechte Fütterung von Kaninchen in der Heimtierhaltung. [The species-specific feeding of rabbits as pets.]** *DTW Deutsche Tierärztliche Wochenschrift* 108 (3): 131-135, ISSN: 0341-6593.

NAL Call Number: 41.8 D482

Keywords: concentrates, crude fiber, nutrition, digestive system, physiology, rabbit, German language.

Kamphues, J. (2000). **Zum Wasserbedarf von Nutz- und Liebhabertieren. [Water requirement of food producing and companion animals.]** *DTW Deutsche Tierärztliche Wochenschrift* 107 (8): 297-302, ISSN- 0341-6593.

NAL Call Number: 41.8 D482

Keywords: poultry, cattle, horses, rabbits, care, health, animal welfare, nutrition, dry matter intake, water consumption, water requirements, water restriction, literature review, German language.

Kamphues, J. (2001). **Die artgerechte Fütterung von Kaninchen in der Heimtierhaltung. [The species-specific feeding of rabbits in pet husbandry.]** *DTW Deutsche Tierärztliche Wochenschrift* 108 (3): 131-5, ISSN: 0341-6593.

NAL Call Number: 41.8 D482

Abstract: To meet nutrient demands as well as the species specific requirements of an animal it is absolutely necessary to know its nutrition physiology (KAMPHUES et al. 1999). Characteristics of the nutrition physiology of rabbits include the anatomy of the intestinal tract (i.e. the teeth, the size of gut as well as the small intestine and colon), the special ingesting behaviour (selection, intensity of gnawing and chewing) and digestive processes within the intestinal tract (digestion by own as well as by microbial enzymes, processes of separation (producing soft faeces) and the excretion of digested or undigested nutrients (excretion via faeces or kidneys, quality of faeces). In feeding pet rabbits it has to be recommended, that these species do not need concentrates, but ingredients with higher crude fiber contents due to their origin and their intestinal tract. Therefore these herbivorous species should be fed with hay, straw or vegetables and not with concentrates exclusively. If these components are not offered (an usual feeding practice in rabbits kept as companion animals), other products rich in crude fibre have to be fed. The offer of a pressed diet in cube form with long fibrous ingredients would be a possibility to upgrade a ration poor in crude fibre. To meet the gnawing requirement of the rabbits this cubes should be pressed intensively. Furthermore it is advisable to exchange ingredients of the mixed feed with a high energy content (i.e. sunflower seeds, nuts) for ingredients of lower energy density (i.e. oat hulls, pelleted ground hay). Finally calcium oversupply has to be avoided because higher calcium intake may result in urolithiasis (calcium stones/concrements).

Keywords: feeding, nutrition, calcium, administration, dosage, feeding behavior, physiology, species specificity, German language.

Kiwull, S.H.; Kalhoff, H.; Manz, F.; Diekmann, L.; Kiwull, P. (2001). **Minimal-invasive approach to study pulmonary, metabolic and renal responses to alimentary acid-base changes in conscious rabbits.**

European Journal of Nutrition 40 (5): 255-259, ISSN: 1436-6207.

NAL Call Number: QP141.A1E97

Keywords: carbonic anhydrase, alimentary acid base load analysis, analytical method, minimal invasive, nutritional method, physiological method, food mineral content, nutrition, rabbit chow, respiratory control.

Kovacs, M.; Gyarmati, T.; Szendro, Z.; Bencsne, K.Z.; Donko, T.; Tornoyos, G.; Lukacs, H.; Bota, B. (2002). **A ketszer**

szoptatas es a korai elvalasztas hatasa a hazinyul vakbelflorajanak fejlodesere. [Effect of double nursing and early weaning on development of caecal microflora of the rabbit.] *Magyar Allatorvosok Lapja* 124 (12): 742-748, ISSN : 0025-004X.

NAL Call Number: 41.8 V644

Keywords: cecal microflora, coliform, breed, Pannon White, commercial species, doe, female, host, young, cecum, digestive system, barley, feed, commercial non medicated feed, double nursing, early weaning, feed consumption, hay, pH, meat production, Hungarian language.

Krohn, T.C. (1999). **The effects of feeding and housing on the behaviour of the laboratory rabbit.** *Laboratory Animals* 33 (2): 101-107, ISSN: 0023-6772.

NAL Call Number: QL55 A1L3

Keywords: feeding, timing, abnormal behavior, bar biting, housing, group housing, floor pens, cages.

Kumar, S.; Bhatt, R.S. (2000). **Feeding of lucerne hay to economise feed cost for Angora rabbits.** *Indian Journal of Animal Nutrition* 17 (1): 90-93, ISSN: 0970-3209.

NAL Call Number: SF95.I47

Keywords: breed, Angora, weanling, ether extract, nitrogen retention, body weight, crude fiber retention, feed cost economy, lucerne hay, feed, nutrient digestibility, wool yield.

Kumar, S.; Bhatt R.S. (1999). **Feeding of white clover (*Trifolium repens*) hay in Angora rabbits.** *Indian Journal of Animal Nutrition* 16 (2): 167-170, ISSN: 0970-3209.

NAL Call Number: SF95.I47

Keywords: breed, German Angora, performance, body weight, white clover hay, feed, pelleted feed replacement, wool yield.

Kumar, S.; Bhatt, R.S. (2000). **Nutrient utilization and wool yield in Angora weaning rabbits fed on three levels of *Robinia* leaves.** *Indian Journal of Animal Nutrition* 17 (2): 171-174, ISSN: 0970-3209.

NAL Call Number: SF95.I47

Keywords: breed, Angora, weaner, body weight, nutrient utilization, sun dried robinia leaves, feed, dietary level, wool yield.

Lambertini, L.; Cavani, C.; Zucchi, P.; Vignola, G. (2000). **Effect of different feed grinding fineness on the performances and digestive efficiency of growing rabbits.** *Annales de Zootechnie* 49 (2): 141-150, ISSN: 0003-424X.

NAL Call Number: 49 F84

Keywords: cecum, digestive system, cell wall polysaccharide, digestibility, commercial feed, particle size, digestive efficiency, feed grinding, growth performance.

Lebas, F. (2000). **Particle size in compound feeds and digestive tract activity in the rabbit.** *Productions Animales* 13 (2): 109-116, ISSN: 0990-0632.

NAL Call Number: SF1.P77

Keywords: cecum, digestive system, colon, digestive system, animal performance, compound feed, feed, digestibility, grinding intensity, particle size, digestion, feed utilization, literature review, French language.

Lebas, F.; Thebault, R.G.; Allain, D. (1998). **Nutritional recommendations and feeding management of Angora rabbits.** In: *The Nutrition of the Rabbit*, de Blas, C.; Wiseman, J. (Eds.), CAB International, England, UK; CAB International, New York, New York, pp. 297-307, ISBN: 0-85199-279-X.

NAL Call Number: SF454.N88 1998

Keywords: breed, Angora, feeding management, nutritional recommendations, wool production.

Linga, S.S.; Lukefahr, S.D.; Lukefahr, M.J. (2003). **Feeding of *Lablab purpureus* forage with molasses blocks or sugar cane stalks to rabbit fryers in subtropical south Texas.** *Livestock Production Science* 80 (3): 201-209, ISSN: 0301-6226.

NAL Call Number: SF1.L5

Keywords: husbandry, developing countries, commercial species, fryer, nutrition, crude protein, ash, carcass

yield, diet, feed, dry matter, feed to gain conversion, growth rate, molasses block, pelleted commercial feed, forage based diets, hay, supplements, sugar cane, molasses blocks, subtropical climate.

Longland, A.C.; Theodorou, M.K.; Burger, I.H. (2000). **The nutrition of companion animals.** In: *Feeding Systems and Feed Evaluation Models*. Theodorou, M.K.; France, J. (Ed.), pp. 435-471, CABI Publishing: Wallingford, UK, ISBN: 0-85199-346-X.

NAL Call Number: SF97.F39 2000

Keywords: pets, birds, rats, dogs, cats, rabbits, aquarium fishes, ornamental fishes, aviary birds, reviews, nutrition, nutrient requirements, feeding.

Lowe J A. (1998). **Pet rabbit feeding and nutrition.** In: *The Nutrition of the Rabbit* de Blas, C; Wiseman, J. (Eds.), CAB International: Wallingford, UK; CAB International: New York, New York, pp. 309-331, ISBN- 0-85199-279-X.

NAL Call Number: SF454.N88 1998

Keywords: nutrition, feeding management, nutrient requirements, raw materials.

Maertens, L.; Villamide, M.J. (1998). **Feeding systems for intensive production.** In: *The Nutrition of the Rabbit*, de Blas, C.; Wiseman, J. (Eds.), CAB International, England, UK; CAB International, New York, New York, pp. 255-271, ISBN: 0-85199-279-X.

NAL Call Number: SF454.N88 1998

Keywords: raw material grinding, feed processing method, diet number, feed conservation, feed management, feed storage, feeding systems, intensive production, pellet quality, pellet size.

Marounek, M.; Skrivanova, V.; Duskova, D. (2000). **In vitro caecal fermentation of nitrogenous substrates in rabbits.** *Journal of Agricultural Science* 135 (4): 437-442, ISSN: 0021-8596.

NAL Call Number: 10 J822

Keywords: three month old, cecum, cecal contents, digestive system, in vitro fermentation, RNA, nitrogenous substrate, casein, nitrogenous substrate, gliadin, glucose, gluten, mucin, zein.

Matrai, K.; Altbacker, V.; Hahn, I. (1998). **Seasonal diet of rabbits and their browsing effect on juniper in Bugac Juniper Forest (Hungary).** *Acta Theriologica* 43 (1): 107-112. ISSN: 0001-7051.

NAL Call Number: 410 AC88

Keywords: food plants, seasonal composition, browsing impacts, impact on habitat, browsing impact on food plants, forest, seasonal diet composition, Hungary.

Meena, S.; Mohammed, F.; Satyanarayan, K.; Rajeshwari, Y.B.; Singh, K.C. (1999). **Nutritional evaluation of mulberry leaves in broiler rabbits.** *Indian Veterinary Journal* 76 (7): 625-629, ISSN: 0019-6479.

NAL Call Number: 41.8 IN2

Keywords: breed, New Zealand White, broiler, digestible crude protein, total digestible nutrients, nutritional evaluation, analytical method, concentrate pellets, animal feed, dry matter intake, growth, mulberry leaves, feed, organic matter.

Mendez, J.; Rial, E.; Santoma, G. (1998). **Feed manufacturing.** In: *The Nutrition of the Rabbit*, de Blas, C; Wiseman, J. (Eds.), CAB International: Wallingford England, UK; New York, New York, pp. 215-239, ISBN: 0-85199-279-X.

NAL Call Number: SF454.N88 1998

Keywords: grinding, feed processing method, mixing feed, molasses addition, pelleting, feed manufacturing, feed presentation, liquid additives, pellet quality, weighing.

Mondal, D.B.; Pandey, N.N. (1999). **Nitrate toxicity after feeding sewage water irrigated cauliflower leaves in rabbits.** *Indian Journal of Animal Sciences* 69 (3): 192-194, ISSN: 0367-8318.

NAL Call Number: 41.8 IN22

Keywords: leaf, cauliflower, breed, New Zealand White, male, nitrate toxicity, sewage water, soil contamination.

- Muriu, J.I.; Njoka Njiru, E.N.; Tuitoek, J.K.; Nanua, J.N. (2002). **Evaluation of sorghum (*Sorghum bicolor*) as replacement for maize in the diet of growing rabbits (*Oryctolagus cuniculus*).** *Asian Australasian Journal of Animal Sciences* 15 (4): 565-569, ISSN: 1011-2367.
NAL Call Number: SF55.A78A7
Keywords: breed, New Zealand White, sorghum, forage crop, grain crop, maize, crude protein, tannin, chatechin equivalent, feed conversion efficiency, feed digestibility, feed intake, weaning weight, weight gain, Kenya.
- Narute, S.T.; Shelke, A.D.; Thorat, B.P.; Fulpagare, Y.G. (2000). **Effect of feeding different levels of protein on growth of rabbits: Soviet Chinchilla.** *Indian Veterinary Medical Journal* 24 (3): 193-195, ISSN: 0250-5266.
NAL Call Number: SF601.I45
Keywords: breed, Soviet Chinchilla, broiler, kit, crude protein, dietary, nitrogen, digestibility, excretion, intake, apparent nitrogen balance, average daily gain, body weight, growth performance, meat production.
- Nicodemus, N.; Garcia, J.; Carabano, R.; de Blas, J.C. (2002). **Effect of inclusion of sunflower hulls in the diet on performance, disaccharidase activity in the small intestine and caecal traits of growing rabbits.** *Animal Science Penicuik* 75: 237-243.
NAL Call Number: SF1.A56
Keywords: commercial species, growing rabbits, basal diet, nutrient requirements, feed, sunflower hulls, food efficiency, food intake, cecal fermentation, growth rate, mortality, weaning.
- Nicodemus, N.; Carabano, R.; Garcia, J.; Mendez, J.; de Blas, C. (1999). **Performance response of lactating and growing rabbits to dietary lignin content.** *Animal Feed Science and Technology* 80 (1): 43-54, ISSN: 0377-8401.
NAL Call Number: SF95.A55
Keywords: weanling, butyric acid, lignin, dietary intake, propionic acid, neutral detergent fiber, volatile fatty acid, alfalfa hay, performance, average daily gain, feed intake, lactation, milk production, soya bean hulls, wheat straw.
- Nizza, A.; Infascelli, F. (2000). **Contemporary administration of high and low concentrated diets in lactating rabbit does.** *Animal Science* 71 (2): 309-316, ISSN: 1357-7298.
Keywords: New Zealand, doe, female, crude fiber, dietary, diet, digestible energy, energy intake, feeding behavior, lactation.
- Oduguwa, O.O.; Fanimu, A.O.; Onyekwere, E.A.; Oyenuga, A.B.; Sobogun, G.O. (2000). **Utilisation of raw and autoclaved whole pods of *Samanea saman* (Jacq Merrill) by the domestic rabbit.** *Tropical Agriculture* 77 (3): 194-198, ISSN: 0041-3216.
NAL Call Number: SB111.A2T76
Keywords: monkey pod, rain tree, ornamental, live weight, daily feed intake, potential livestock feed source, shade tree, *Samanea saman* pods, feed, autoclaved, digestibility, quality, raw, packed cell volume, hemoglobin, red blood cell, white blood cell, tropical agriculture.
- Oehme, F.W.; Pickrell, J.A. (1999). **An analysis of the chronic oral toxicity of polyether ionophore antibiotics in animals.** *Veterinary and Human Toxicology* 41 (4): 251-257, ISSN: 0145-6296.
NAL Call Number: SF601.A47
Keywords: calcium, furazolidone, antibiotic, feed additive, polyether ionophore, lasalocid antibiotic, polyether ionophore, maduramicin, monensin, polyether ionophore, narasin antibiotic, polyether ionophore, nitrogen, salinomycin, tiamulin, polyether ionophore, cardiomyopathy, heart disease, cardiopulmonary clinical signs; inotrophy; poultry litter, feed, Brazil.
- Onifade, A.A.; Adejumo, D.O.; Onipede, E.O.; Obiyan, R.I.; Abu, A.O.; Abanikannda, O.T.F.; Babatunde, G.M.; Abubakar, A. (1999). **Comparison of the performance of, hematology and serum chemistry of rabbits fed supplementary antibiotics or copper or yeast or *Leuceana leucocephala*.** *Journal of Animal Science* 77 (Suppl. 1): 200, ISSN: 0021-8812.

NAL Call Number: 49 J82

Keywords: yeast, copper, feed additives, supplementary antibiotics, hematology, performance, serum chemistry, meeting.

Ouhayoun, J. (1998). **Influence of the diet on rabbit meat quality.** In: *The Nutrition of the Rabbit*, de Blas, C.; Wiseman, J. (Eds.), CAB International, England, UK; CAB International, New York, New York, pp. 177-195, ISBN: 0-85199-279-X.

NAL Call Number: SF454.N88 1998.

Keywords: growth factors, dietary fat, dietary fiber content, dietary flavors, feeding level, meat quality, diet influence, protein quality, protein/energy ratio.

Pascual, J.J.; Tolosa, C.; Cervera, C.; Blas, E.; Fernandez, C. (1999). **Effect of diets with different digestible energy content on the performance of rabbit does.** *Animal Feed Science and Technology* 81 (1-2): 105-117, ISSN: 0377-8401.

NAL Call Number: SF95.A55

Keywords: breed, New Zealand x Californian crossbreeds, doe, performance, litter mortality, milk yield, diet, digestible energy, food intake.

Pascual, J.J.; Motta, W.; Cervera, C.; Quevedo, F.; Blas, E.; Fernandez, C.J. (2002). **Effect of dietary energy source on the performance and perirenal fat thickness evolution of primiparous rabbit does.** *Animal Science: An International Journal of Fundamental and Applied Research* 75 (2): 267-279, ISSN 1357-7298.

NAL Call Number: SF1.A56

Keywords: breed, New Zealand x Californian, doe, female, milk, reproductive system, ultrasound, imaging and microscopy techniques, laboratory techniques, dietary energy source, fat enriched diets, feed, cereal starch, diet, food intake, gestation, growth, lactation, live weight, milk composition, milk yield, parturition, perirenal fat thickness, vegetable oil, weaning weight.

Pascual, J.J.; Cervera, C.; Fernandez, C.J. (2000). **The effect of dietary fat on the performance and body composition of rabbits in their second lactation.** *Animal Feed Science and Technology* 86 (3-4): 191-203, ISSN: 0377-8401.

NAL Call Number: SF95.A55

Keywords: breed, Californian x New Zealand, doe, female, body composition, dietary fat, digestible energy intake, digestible protein intake, energy balance, food intake, litter weight, partum, weaning, milk production, reproductive performance, second lactation.

Perez, J.M.; Gidenne, T.; Bouvarel, I.; Arveux, P.; Bourdillon, A.; Briens, C.; Le-Naour, J.; Messenger, B.; Mirabito, L. (2000). **Replacement of digestible fibre by starch in the diet of the growing rabbit. II. Effects on performances and mortality by diarrhoea.** *Annales de Zootechnie* 49 (4): 369-377. ISSN: 0003-424X.

NAL Call Number: 49 F84

Keywords: breed, New Zealand White, growing, diet, lignocellulose, starch, dietary level, effects of, diarrhea, digestive system disease, digestible fiber replacement, fecal digestibility, mortality, nutrient retention, performance, rate of passage.

Ponce De Leon, R.; Guzman, G.; Forte, C. (1999). **Citrus meal in pelleted diets for fattening rabbits.** *Cuban Journal of Agricultural Science* 33 (2): 157-164, ISSN: 0864-0408.

NAL Call Number: S1.R4

Keywords: New Zealand White rabbits, nutrition, feed, citrus meal, pelleted diet component, fattening, seasonal variation, wet, dry.

Ponce De Leon, R.; Guzman, G.; Quesada, M.E. (2002). **Growth and feed efficiency of four rabbit breeds.** *Cuban Journal of Agricultural Science* 36 (1): 7-14, ISSN: 0864-0408.

NAL Call Number: S1.R4

Keywords: breed, California, Chinchilla, New Zealand, Semi Giant, weaning, feed efficiency, maize soybean alfalfa feed, animal feed, molasses supplement, Cuba.

- Prasad, R.; Sankhyan, S.K.; Karim, S.A.; Jakhmola, R.C. (2000). **Growth performance and economics of broiler rabbits maintained on diets containing different energy supplements.** *Indian Journal of Animal Nutrition* 17 (2): 116-120, ISSN: 0970-3209.
NAL Call Number: SF95.I47
Keywords: breed, New Zealand White, Soviet, Chinchilla, broiler, bajra, feed, dietary level, energy supplement, barley, broken rice, damaged wheat, growth performance, jowar, maize, production economics, semi-arid environment.
- Prasad, R.; Sankhyan, S.K.; Karim, S.A. (2000). **Utilization of different protein supplements in the diet of broiler rabbits.** *Indian Journal of Animal Sciences* 70 (12): 1266-1267, ISSN: 0367-8318.
NAL Call Number: 41.8 IN22
Keywords: breed, broiler, protein, supplementation, utilization, cottonseed cake, feed, diet, chemical composition, groundnut cake, guar meal, mustard cake, performance, rapeseed meal, soybean meal.
- Prasad, R.; Sankhyan, S.K.; Karim, S.A. (1999). **Growth performance of broiler rabbits maintained on concentrate pellets and roughage in cafeteria system.** *Indian Journal of Animal Sciences* 69 (7): 525-527, ISSN: 0367-8318.
NAL Call Number: 41.8 IN22
Keywords: rabbit, broiler, cafeteria system, concentrate pellets, growth performance, roughage.
- Quesenberry, K. (1998). **Nutritional and gastrointestinal diseases of rabbits.** In: *Internal Medicine: Small Companion Animals. The T G Hungerford Course for Veterinarians. Proceedings 306, Stephen Roberts Lecture Theatre, University of Sydney, Australia, June 15 -19, 1998*, Bryden, D. (Ed.), pp. 61-65, University of Sydney, Post Graduate Foundation in Veterinary Science: Sydney, Australia. ISBN: 1-875582-69-X.
NAL Call Number: SF604.R37 no. 306
Keywords: digestive system, gastrointestinal diseases, diets, nutrition, diarrhea, bezoar, digestive system diseases.
- Radev, V.; Ribarski, S.; Pamukova, D. (2002). **Influence of protozin on the breeding and quality of rabbit meat.** *Zhivotnov'dni Nauki* 39 (4-5): 77-80, ISSN: 0514-7441.
Keywords: breed, New Zealand, nutrition, protozin, multi enzyme, feed additive, daily gain, fattening period, live weight, meat, ash content, calcium content, composition, fat content, mineral content, pH, phosphorus content, protein content, quality, water content, Bulgarian language.
- Rogelj, I. (2000). **New possibilities of raising rabbit young by alternative nursing methods.** *Agriculture Scientific and Professional Review* 6 (1): 136-139, ISSN: 1330-7142.
Keywords: breed, Pannon White, suckling, weaning, induction, pseudopregnancy, kit production, feed intake, GnRH, insemination, milk yield, animal husbandry.
- Rohilla, P.P.; Bujarbaruah, K.M.; Kumar, M.; Singh, G. (2000). **Haematological and biochemical responses of various levels of subabul (*Leucaena leucocephala*) leaves in growing rabbits.** *Indian Journal of Animal Nutrition* 17(1): 28-33, ISSN: 0970-3209.
NAL Call Number: SF95.I47.
Keywords: breed, New Zealand White, Soviet Chinchilla, blood, albumin, calcium, cholesterol, creatinine, hemoglobin, iron, phosphorus, urea, dry matter intake, mean cell volume, growth rate, packed cell volume, subabul leaf diet.
- Rohilla, P.P.; Bujarbaruah, K.M. (2000). **Effect of feeding broom grass (*Thysanolaena maxima*) to rabbits.** *Indian Journal of Animal Nutrition* 17 (1): 87-89, ISSN: 0970-3209.
NAL Call Number: SF95.I47
Keywords: juvenile, broom grass, feed, dried, ground, concentrate mixture, daily weight gain, dry matter intake, growth rate.
- Rohilla, P.P.; Bujarbaruah, K.M. (2001). **Carcass characteristics of rabbits fed *Morus alba* leaves.** *Indian Veterinary*

Journal 78 (7): 619-621, ISSN: 0019-6479.

NAL Call Number: 41.8 IN2

Keywords: *Morus alba* leaves, diet, carcass characteristics, diet, concentrate feed.

Rohilla, P.P.; Pal, D.T.; Choudhory, H. (2002). **Growth performance of broiler rabbits under different levels of protein.** *Indian Journal of Animal Sciences* 72 (6): 516-517, ISSN: 0367-8318.

NAL Call Number: 41.8 IN22

Keywords: broiler, crude protein, dietary intake, average daily gain, body weight gain, dry matter intake, feed conversion efficiency, feed costs, growth performance.

Rohilla, P.P.; Bujarbaruah, K.M. (2000). **Effect of banana leaves feeding on growth of rabbits.** *Indian Veterinary Journal* 77 (10): 902-903, ISSN: 0019-6479.

NAL Call Number: 41.8 IN2

Keywords: banana leaves, feed, evaluation, growth.

Rommers, J.M.; Kemp, B.; Meijerhof, R.; Noordhuizen, J.P.T.M. (1999). **Rearing management of rabbit does: a review.** *World Rabbit Science* 7 (3): 125-138, ISSN: 0984-7847.

Keywords: reviews, birth weight, diets, energy intake, energy requirements, feed intake, nutrition programs, reproduction, reproductive performance, nutrition, husbandry.

Saikia, G.; Mukit, A.; Baruah, K.K. (2000). **Pathological studies in rabbits fed with Ajar seed kernel incorporated diets.** *Indian Veterinary Journal* 77 (4): 293-295, ISSN: 0019-6479.

NAL Call Number: 41.8 IN2.

Keywords: breed, New Zealand White, rabbit, digestive tract, heart, circulatory system, liver, spleen, blood and lymphatics, immune system, testes, reproductive system, Ajar seed kernel incorporated diet, feed, pathological effects.

Sanz, P.E.; Surra, M.J.C.; Obiols i Vilamu, J.M.; Segui i Parpal, A. (2001). **Relacion entre el nivel de grasa e ingestion y la excrecion urinaria de nitrogeno y energia, en gazapos en crecimiento-cebo. [Relationship of fat and feed intake levels on the urinary energy and nitrogen excretion, in fattening rabbits.]** *Investigacion Agraria Produccion y Sanidad Animales* 16 (2): 227-236, ISSN: 0213-5035.

NAL Call Number: SF15.S7 A52

Keywords: urine, excretory system, fat, dietary intake, metabolizable energy, dietary intake, urinary excretion, nitrogen, Spanish language.

Scapinello, C.; de Faria, H.G.; Furlan, A.C.; Michelan, A.C.; Da Rosa, S.M.L. (2001). **Efeito do uso de oligossacarideo manose e acidificantes em racoes com alto teor de amido, para coelhos em crescimento. [Effect in growing rabbits of oligosaccharide mannose and acidifiers in diets containing high starch.]** *Acta Scientiarum Universidade Estadual de Maringa* 23 (4): 1039-1043, ISSN: 1415-6814.

Keywords: commercial species, breed, White New Zealand, female, male, fumaric acid, acidifiers, fumaric acid, oligosaccharide mannose, carcass characteristics, high starch diets, performance, carcass characteristics, Portuguese language.

Scapinello, C.; de Faria, H.G.; Furlan, A.C.; Michelan, A.C. (2001). **Effect of the utilization of oligosaccharide mannose and acidifiers on growing rabbits performance. [Efeito da Utilizacao de Oligossacarideo Manose e Acidificantes sobre o Desempenho de Coelhos em Crescimento.]** *Revista Brasileira de Zootecnia* 30 (4): 1272-1277, ISSN: 1516-3598.

NAL Call Number: SF1.R45

Keywords: breed, New Zealand white, female, male, acidifiers, dietary supplement, fumaric acid, dietary supplement, oligosaccharide mannose, dietary supplement, growth performance, Portuguese language.

Scapinello, C.; de Faria, H.G.; Furlan, A.C.; Martins, E.N.; Moreira, I. (1999). **Performance of growing rabbits fed with different levels of restorative yeast (*Saccharomyces* sp.), dried by rotative roller or by spray-dry.** *Revista Brasileira de Zootecnia* 28 (2): 334-342.

NAL Call Number: SF1.R45

Keywords: breed, New Zealand White, crude protein, rotative roller yeast drying, food processing method, yeast spray dry method, food processing method, daily weight gain, feed:gain ratio, mortality, soybean meal, feed, yeast, feed additive, Portuguese language.

Scapinello, C.; Falco, J.E.; Furlan, A.C.; de Faria, H.G. (1999). **Nutritional value of cassava foliage hay (*Manihot esculenta*, Crantz) for growing rabbits.** *Revista Brasileira de Zootecnia* 28 (5): 1063-1067.

NAL Call Number: SF1.R45

Keywords: *Manihot esculenta*, cassava, forage, female, male, feed, chemical composition, digestibility, nutritive value, growth performance, Portuguese language.

Scapinello, C.; Lage, L.V.; do Prado, I.N. (2001). **Evaluation of the performance of female rabbits fed on canola meal in partial and total substitution of crude protein by soybean meal.** *Acta Scientiarum Universidade Estadual de Maringa* 23 (4): 1029-1032, ISSN: 1415-6814.

Keywords: adult, breed, New Zealand White, commercial species, female, juvenile, feed, canola meal, soybean meal, diet comparison, crude protein, daily weight gain, feed conversion, live weight, performance, reproductive period, weaning period.

Schroder, A. (2000). **Vergleichende Untersuchungen Zur Futteraufnahme von Zwergkaninchen, Meerschweinchen und Chinchilla bei Angebot Unterschiedlich Konfektionierter Einzel- und Mischfuttermittel / Vorgelegt von Alexandra Schroder. [Comparative Investigations on Feed Intake of Dwarf Rabbits, Guinea Pigs and Chinchillas Fed Diets Differing in Physical Form.]** Tierärztliche Hochschule Hannover: West Germany, 177 p.

NAL Call Number: DISS F2000366

Keywords: doctoral dissertation, nutrition, diet, German language.

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Keywords: pets, rabbits, golden hamsters, chinchilla and guinea pigs, urine, blood composition, blood picture, body weight, animal welfare, nutrition, succulent plants, organic matter, green feed, pelleted feeds, apples, carrots, drinking water, water intake, water metabolism, thesis, German language.

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NAL Call Number: SF601.I45.

Keywords: fern, poisonous plant, toxicity, *Dryopteris juxtaposita*, *Polystichum squarrosus*, *Pteridium aquilinum*, bladder, excretory system, kidney, liver, digestive system, small intestine, spleen, blood and lymphatics, immune system, testes, reproductive system, adenosine deaminase, catalase, creatinine, serum, glutathione S transferase, hemoglobin, urea, serum, lymphocytosis, body weight, erythrocyte sedimentation rate, grain mixture, feed, heteropenia, lipid peroxidation, mortality, packed cell volume.

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Keywords: housing, feeding, probiotics, Italian language.

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Keywords: breed, New Zealand White, female, male, housed, individual wire cages, digestive system, amylase, maltase, starch, cassava, corn, ileal digestibility, total digestibility, Portuguese language.

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Keywords: nutrition, feed, forage, *Azadirachta indica*, *Zea mays*, breed, Soviet Chinchilla, White Giant, roaster,

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Keywords: broiler rabbit, forage, blood, lymphatics, cecum digestive system, fermentation, intestine, kidney, liver, lung, histopathology, immune system, alanine aminotransferase, alkaline phosphatase, aspartate aminotransferase, creatinine, glucose, heart, hemoglobin, total protein, urea nitrogen, neem seed kernel cake, animal feed.

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NAL Call Number: 41.8 IN22

Keywords: male, broiler, nitrogen, deoiled groundnut cake, growth, neem seed kernel cake.

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[Return to Top](#)

[Return to Contents](#)

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NAL Call Number: SF453.R225 2000

Keywords: history, taxonomy, domestication, production around the world, breeds, facilities, housing, management, economics, nutrition, feeding, diseases, health, reproduction, behavior, genetics, breeding systems, genetic selection, herd improvement, coat color genetics, showing, pet rabbits, animal welfare, small farm development, production in developing countries, Rex fur production, Angora wool production, meat production, slaughter, meat and skin preparation, marketing rabbits and rabbit products.

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NAL Call Number: SF981.B78 2002

Keywords: anesthesia, analgesics, behavior, breeding, housing, biology, dental caries, dentition, diagnostic techniques, diet, digestive tract, drug formulations, drug therapy, handling, nutritional support, sex differences, surgery, surgical operations, tooth diseases, trauma.

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NAL Call Number: SF605 N672.

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Keywords: pets, care, housing, husbandry, feeding, health, behavior, training.

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Keywords: breeds, production, genetics, French language.

Reich, E. (1995). *Morpho- und Histometrische Untersuchungen an Rückenmark und Unterschenkelknochen Verschiedener Genotypen von Punktscheckenkaninchen (Oryctolagus cuniculus F. Dom.) ein Beitrag zur Klärung der Pathogenese des Megacolon-syndroms Homozygoter Weiss-schecken. [Morphometrical and Histometrical Study of Spinal Cord and Bones of Shanks in Spotted Rabbits of Different Genotypes: a Contribution to Elucidate the Pathogenesis of the Megacolon-syndrome of Homozygous Spotted Rabbits.]* Tierärztliche Hochschule Hannover, West Germany, 94 p.

NAL Call Number: DISS F1995156

Keywords: doctoral thesis, German language, veterinary science.

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NAL Call Number: SF997.5 R2R335 2000

Keywords: diseases, health, husbandry, nutrition, clinical examination, skin, reproductive system, neonatal rabbit, urinary system, respiratory system, digestive system, musculoskeletal system, teeth, head and neck, neurological and neuromuscular disorders, viral diseases, behavior, anesthesia, surgery, drugs and treatments, zoonotic aspects.

Sandford, J.C. (1996). *The Domestic Rabbit*. 5th ed., Blackwell Science: Oxford; Cambridge, MA, 278 p., ISBN: 0632038942.

NAL Call Number: SF453.S33 1996

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Keywords: chinchillas, gerbils, guinea pigs, hamsters, mice, rabbits, rats anatomy, housing, breeding, digestive system, nutrient requirements, restraint of animals, sex determination.

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NAL Call Number: SF745.S63 1998

Keywords: practical reference, care, management, housing, feeding, restraint, breeding, kindling, abscesses, cannibalism, coccidiosis, conjunctivitis, ear mites, enteritis, heat exhaustion, hutch burn, lice, mange, mastitis, pneumonia, ringworm, snuffles, sore hocks, wet dewlap, worms.

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Keywords: production, reproduction, breeding stock, housing, equipment, care, feed, feeding, breeding, record keeping, diseases, slaughter, dressing.
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Keywords: cats, rabbits, hamsters, gerbils, rats, mice, guineapigs, chinchillas, ferrets, amphibia, reptiles, birds, dogs, domestic animals, pets, fish, classification, history, careers, veterinarians, veterinary medicine, technicians, feeding, training, grooming, breeds, diseases, housing, reproduction, zootechny, husbandry.
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NAL Call Number: SF997.5.R2W46 1996
Keywords: diseases, German language.
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Keywords: laboratory tests, techniques, interpretation, blood count and bone marrow examination, erythrocyte, leukocyte disorders, hemostatic abnormalities, serum chemistries, point of care instruments, electrolyte and acid-based disorders, urinary disorders, endocrine, metabolic, and lipid disorders, gastrointestinal disorders, fluid accumulation disorders, respiratory disorders, immunologic disorders, reproductive disorders, neurologic disorders, infectious disease, cytology of neoplastic and inflammatory masses, diagnostic toxicology, therapeutic drug monitoring appendices, listing of referral laboratories, reference values, color illustrations, appendices, tables.
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Keywords: breeds, New Zealand White, Pannon White, Danish White, meat animals, fur bearing animals, pets, husbandry, physiology, reproduction, feeding, diseases, housing, slatted floors.
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Keywords: dissertation, anesthesia, isoflurane, sevoflurane, comparison.

[Return to Top](#)

[Return to Contents](#)

Health

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Keywords: heat stress, husbandry, Egypt.
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Keywords: bone, skeletal system, spine, skeletal system, X-ray, examination method, Convention STE 123 of the European Council, abnormal bone development, caged housing conditions, French language.
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Keywords: pets, rodents, rabbits, helminths, diagnosis, drug therapy, detection, pathogenicity, parasites, French language.
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NAL Call Number: SF602.P6
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NAL Call Number: SF602.P6
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Keywords: pets, chinchillas, guineapigs, rabbits, rodents, dystocia, parturition, surgery.
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Keywords: viral diseases, rabbit hemorrhagic disease, disease incidence effect on demography, population dynamics, observations and impact of disease, significance for control, effects of viral disease incidence, Australia.
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Keywords: gastrointestinal diseases, cecum, stomach, mouth, concretions, bezoar, digestive tract motility,

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NAL Call Number: 41.8 V641
Abstract: A serological survey of 238 rabbits for antirabbit haemorrhagic disease virus (RHDV) antibodies was made in an industrial rabbitry where no signs of the disease had been reported for four years. Seroconversion was repeatedly detected and was due to a calicivirus antigenically related to RHDV but without its pathogenicity. There was a seroprevalence of 33.3 per cent among young animals at weaning at 31 days old, 27.6 per cent at five to seven days after weaning, 56.1 per cent at 13 to 14 days after weaning, 90.3 per cent at 19 to 20 days and 100 per cent at 32 to 33 days after weaning, and all the breeding rabbits were seropositive. In the last group and in the young at weaning, the anti-RHDV antibodies were mainly class IgG, but they were IgM and IgA at 13 to 14 days after weaning. In older fattening rabbits, there was a decrease of IgM and IgA and an increase of IgG confirmed seroconversion without any specific signs of rabbit haemorrhagic disease. On the basis of these results, the probable time of infection of the meat rabbits with this non-pathogenic virus was immediately after weaning.
Keywords: husbandry, antibodies, viral immunology, caliciviridae infections, hemorrhagic disease virus, prevalence, serology.
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NAL Call Number: 436.8 Ex7
Keywords: coccidia, *Eimeria media*, diagnostic techniques, identification, new method.
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Keywords: pets, cats, rabbits, turtles, rodents, reptiles, disease transmission, rabies, treatment, vaccines, zoonoses, *Pasteurella multocida*, *Bartonella henselae*, *Yersinia*, *Campylobacter*, *Salmonella*, *Toxoplasma*.
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NAL Call Number: S960.W5
Keywords: *Oryctolagus cuniculus*, viral diseases, rabbit hemorrhagic disease, New Zealand, Australia.
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NAL Call Number: SF997.5.E95E97
Abstract: Rabbit medicine, and dentistry in particular, is still at an early stage of development. With an understanding of the underlying oral physiology it is possible to devise an appropriate treatment regime for most dental problems after the nature and extent of disease has been assessed. Although many of the dental problems that are seen in practice cannot be cured, most can be controlled or managed to allow the affected rabbit to

maintain a good quality of life. The continuously growing nature of the teeth makes recurrence and progression of problems the norm, so owner education and ongoing monitoring of animals is essential. By assessing the effects, beneficial or otherwise, of our treatments and communicating this to others, we will develop our knowledge and skills. Several treatments that are suggested in this article must be considered as “experimental” because they have not been assessed in large numbers of animals. If they work for you, or more importantly, if you find unexpected complications with a treatment method (as has happened with the use of calcium hydroxide paste treatment of abscess cavities) then please publicize the fact so that others can avoid the problem. Until the message on prevention can be reliably transmitted to owners, we will continue to have oral and dental problems to manage. After confidence and experience has been gained in anesthetizing rabbits it is possible to refine one's dental skills to be able to rapidly perform a thorough examination and basic treatments. Major and complex treatments require careful consideration because they may add to the animal's problems, rather than improving the situation. The best method for learning rabbit dentistry is to routinely perform postmortem examinations following euthanasia of affected animals, and spend an hour or two practicing handling the instruments and performing procedures on a cadaver. If you are not confident in your ability or do not have the best equipment for the job, the client should be informed and offered the opportunity to be referred to a “specialist.”

Keywords: dental care, veterinary, anatomy, histology, tooth diseases, pathology, therapy.

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NAL Call Number: 41.8 J8292

Keywords: *Psoroptes cuniculi*, infestation, skin lesions, otitis externa, ears, abdomen, ivermectin, insecticides, case reports.

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NAL Call Number: SF601.I45

Keywords: adult, breed, White Giant, crossbreed, local breed, climate, humidity, physiological response, pulse rate, rectal temperature, respiration rate, temperature, West Bengal, India.

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NAL Call Number: QL55 A1L33

Keywords: laboratory animals, appetite, intake, feed dispensers, pelleted feeds.

Delisle, F. (1996). **La cancérologie des autres animaux de compagnie. 1. Les mammifères. [Neoplasms of other companion animals. 1. The mammals: Mice, rats, hamsters, guinea pigs, gerbils, rabbits and ferrets.]** *Le Point Vétérinaire* 28 (177): 272, ISSN: 0335-4997.

NAL Call Number: SF602.P6

Keywords: pets, rats, hamsters, guinea pigs, gerbils, rabbits, neoplasms, treatment, symptoms, French language.

Drescher, B.; Schlender-Böbbs, I. (1996). **Pododermatitis beim Kaninchen. [Pododermatitis in the rabbit.]** *Kleintierpraxis* 41 (2): 99-104, ISSN: 0023-2076.

NAL Call Number: 41.8 K67

Keywords: foot diseases, dermatitis, skin diseases, histopathology, pathology, classification, disease control, etiology, animal welfare, pododermatitis, German language.

Dubey, J.P.; Sreekumar, C.; Lindsay, D.S.; Hill, D.; Rosenthal, B.M.; Venturini, L.; Venturini, M.C.; Greiner, E.C. (2003). ***Besnoitia oryctofelisi* n. sp. (Protozoa: Apicomplexa) from domestic rabbits.** *Parasitology* 126 (6): 521-539, ISSN: 0031-1820.

NAL Call Number: 448.8 P21

Keywords: *Besnoitia oryctofelisi*, protozoan parasite, new species, hosts on rabbits, experimentally infected, mice, gerbils, rabbits, cats, cell cultures, Argentina.

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Keywords: rabbit meat, animal welfare, drug residues, disease control, nutrition, feeds, drinking water, hygiene, meat production, zoonoses, husbandry, Italy.

Ewringmann, A.; Göbel, T. (1999). **Untersuchungen zur Klinik und Therapie der Encephalitozoonose beim Heimtierkaninchen. [Clinical examination and therapy of encephalitozoonosis in pet rabbits.]**

Kleintierpraxis 44 (5): 357-372, ISSN: 0023-2076.

NAL Call Number: 41.8 K67

Keywords: antibodies, central nervous system, kidney diseases, uveitis, eye diseases, symptoms, blood chemistry, hematology, oxytetracycline, dexamethasone, vitamin B complex, inflammation, treatment, renal function, drug therapy, parasites, protozoal infections, *Encephalitozoon cuniculi*, protozoa, German language.

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Keywords: hygiene, animal welfare, animal health, drug therapy, animal husbandry, Italy.

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Keywords: household pets, dog, cat, rabbit, guinea-pig, disease vector, host, disease vector, group A streptococci (Gram-Positive Cocci), human pathogen, eye secretions, disease transmission, zoonosis.

Fenner, F. (2002). **Viruses, rabbits and wildlife.** In: *Perspectives on Wildlife Research: Celebrating 50 Years of CSIRO Wildlife and Ecology* Saunders, Denis; Spratt, David; van Wensveen, Monica [Eds]. Surrey Beatty & Sons Pty Limited: Chipping Norton, New South Wales, p. 1-7. ISBN: 0949324914.

Keywords: *Oryctolagus cuniculus*, population Control, biological control, Myxomatosis, virus, history, Australia.

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NAL Call Number: SF602.P6

Keywords: pets, rodents, rabbits, ringworm, drug therapy, oral administration, application methods, dermatomycoses, infectious diseases, mycoses, skin diseases, therapy, French language.

Fisher, P.G.; Lackner, P.A.; Donnelly, T.M. (2002). **What's your diagnosis? Epicorneal membrane on the eye of a rex rabbit.** *Lab Animal* 31 (5): 23-25, ISSN: 0093-7355.

NAL Call Number: QL55 A1L33

Keywords: pets, rabbits, case reports, diagnosis, surgery, clinical aspects, eyes, conjunctiva, membranes, eye diseases, topical application, corticoids, ciclosporin, postoperative care, postoperative complications, drug effects, regrowth.

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NAL Call Number: SF601 I4

Keywords: pets, rabbits, rodents, treatment, anesthesia, antibiotics, toxicity, dosage, rodents, blood sampling, drug therapy.

Frolich, K.; Streich, W.J. (1998). **Serologic evidence of bovine viral diarrhea virus in free ranging rabbits from Germany.** *Journal of Wildlife Diseases* 34 (1): 173-178, ISSN: 0090-3558.

NAL Call Number: 41.9 W64B

Keywords: wild rabbits, viral diseases, bovine diarrhea virus, antibodies recorded, immune response, Germany,

Europe.

Fukase, T. (1998). **Pets 19. Rabbits (clinical part I).** *Journal of Veterinary Medicine* 51 (2): 114-115, ISSN: 0447-0192.

Keywords: pets, hematology, blood chemistry, Japanese language.

Fukase, T. (1998). **Pets. 20. Rabbits (clinical part II).** *Journal of Veterinary Medicine* 51 (3): 198-199, ISSN: 0447-0192.

Keywords: pets, rabbit diseases, *Pasteurella multocida*, Gracilicutes, bacteria, prokaryotes, Japanese language.

Fukase, T. (1998). **Pets. 21. Rabbits (clinical part III).** *Journal of Veterinary Medicine* 51 (4): 291-292, ISSN: 0447-0192.

Keywords: pets, tooth diseases, teeth, fractures, Japanese language.

Gabrisch, K.; Zwart, P. (2001). **Krankheiten der Heimtiere. [Diseases of pets.]** Krankheiten der Heimtiere, Schlütersche Verlagsanstalt und Druckerei GmbH & Co.: Hannover, Germany, 1000 p., ISBN: 3-87706-527-9.

Keywords: pets, rabbits, guineapigs, hamsters, rats, mice, gerbils, Chinchilla, squirrels, ferrets, skunks, parakeets, parrots, pigeons, tortoises, snakes, lizards, fish, diagnosis, viral diseases, fungal diseases, parasites, risk, health, zoonoses, veterinary products, German language.

Garcia, A.; Fox, J.G. (2003). **The rabbit as a new reservoir host of enterohemorrhagic *Escherichia coli*.** *Emerging Infectious Diseases* 9 (12): 1592-1597, ISSN: 1080-6040.

NAL Call Number: RA648.5.E46

Keywords: breed, Dutch Belted, New Zealand White, enterohemorrhagic *Escherichia coli* (EHEC), bacterial disease, commercial vendors, local petting zoo, fecal samples, zoonosis, bacterial disease, transmission.

Göbel, T. (1999). **Small mammals/exotics: treatment of bacterial infectious diseases in pet rabbits and other small mammals.** *Compendium on Continuing Education for the Practicing Veterinarian* 21 (Suppl. 12): 95-106, ISSN: 0193-1903.

NAL Call Number: SF601 C66

Keywords: rabbits, rodents, *Pasteurella*, *Bordetella bronchiseptica*, *Streptococcus pneumoniae*, *Mycoplasma*, infectious diseases, drug therapy, treatment, bacterial diseases, antibiotics, fluoroquinolones.

Gorrel, C.J. (1997). **Humane dentistry.** *The Journal of Small Animal Practice* 38 (1): 31, ISSN: 0022-4510.

NAL Call Number: 41.8 J8292

Keywords: letter, animal welfare, dentistry, methods, surgery.

Gres, V; Voza, T; Chabaud, A; Landau, I. (2003). **Coccidiosis of the wild rabbit (*Oryctolagus cuniculus*) in France.** *Parasite* 10 (1): 51-57, ISSN: 1252-607X.

NAL Call Number: QL757.P3737

Keywords: *Oryctolagus cuniculus*, wild rabbits, Mammalian hosts, coccidia, protozoan parasite, *Eimeria perforans*, *E. flavescens*, *E. piriformis*, *E. exigua*, *E. media*, *E. magna*, *E. coecicola*, *E. stiedai*, *E. roobroucki*, *E. intestinalis*, prevalence, seasonal effects, France.

Grilli, G.; Lavazza, A.; Gallazzi, D. (2001). **Allevamento cunicolo e implicazioni sanitarie. [Rabbit farming and implications for human health.]** *Rivista di Coniglicoltura* 38 (1): 20-26, ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: meat animals, husbandry, housing, indoor, outdoor, livestock farming, pathogens, production data, farm licensing, public health, Italian language, Italy.

Grilli, G.; Piccirillo, A.; Pisoni, A.M.; Cerioli, M.; Gallazzi, D.; Lavazza, A. (2003) **Re-emergence of fibromatosis in farmed game hares (*Lepus europaeus*) in Italy.** *Veterinary Record: Journal of the British Veterinary Association* 153 (5): 152-3, ISSN: 0042-4900.

NAL Call Number: 41.8 V641

Keywords: husbandry, disease outbreaks, veterinary care, fibroma virus, pathogenicity, epidemiology,

poxviridae infections, epidemiology, tumor virus infections, Italy.

- Haffar, A. (1996). **La consultation du lapin de compagnie: examen clinique, contention, prelevement.** [Consultation of the pet rabbit: clinical examination, restraint.] *Le Point Veterinaire* 28 (178): 55-61, ISSN:0335-4997.
NAL Call Number: SF602.P6
Keywords: pets, physiology, health, diagnosis, veterinary medicine, French language.
- Haffar, A. (1997). **La visita del coniglio da compagnia. [Pet rabbit consultations.]** *Summa* 14 (1): 23-30.
Keywords: pets, physiology, nutrition, blood specimen collection, veterinary practice, restraint of animals, clinical examination, Italian language.
- Haffar, A. (1996). **La consultation du lapin de compagnie. [Treating the pet rabbit.]** *Le Point Veterinaire* 28 (178): 347-353, ISSN: 0335-4997.
NAL Call Number: SF602.P6
Keywords: pets, feeding, diets, natural, commercial, blood chemistry, hematology, clinical examination, restraint, physiology, anatomy, reproduction, hematology, blood sampling, radiography, pet foods, reviews.
- Harcourt-Brown, F.M. (2001). **Parathyroid hormone, haematological and biochemical parameters in relation to dental disease and husbandry in rabbits.** *The Journal of Small Animal Practice* 42 (3): 130-136. ISSN: 0022-4510.
NAL Call Number: 41.8 J8292
Keywords: parathyrin, hematology.
- Harcourt-Brown, F.M. (1995). **A review of clinical conditions in pet rabbits associated with their teeth.** *Veterinary Record: Journal of the British Veterinary Association* 137 (14): 341-6. ISSN: 0042-4900.
NAL Call Number: 41.8 V641
Abstract: Pet rabbits are frequently treated by veterinary surgeons but most of the literature is based on diseases encountered in laboratory or commercial rabbits. Many pet rabbits suffer from dental abnormalities and 40 clinical cases of diseases associated with teeth problems are reviewed. The clinical and radiological examination of the oral cavity of conscious and anaesthetised rabbits is described and the treatment of dental disorders is discussed. Post mortem studies of 20 of the skulls revealed bone of poor quality. Deformed teeth with little or no enamel were found during clinical examination and post mortem. The poor quality of the teeth and bone was not related to malocclusion. Distorted growth of the crowns led to lacerations to the tongue or inside the cheek, causing anorexia, weight loss and problems with grooming. Distorted growth of the roots resulted in penetration of the weakened bones of the maxillae, mandibles and orbits. Osteomyelitis, abscess formation or infections of the lacrimal duct or nasal cavity were a result of this disease process. The cause of the defective teeth and poor bone quality was not determined but preventative measures are proposed.
Keywords: abscess, diagnosis, anorexia, lacrimal apparatus, mandible, pathology, osteomyelitis, diagnosis, paranasal sinus disease, tooth, pathology, radiography.
- Harcourt-Brown, F.M. (1996). **Calcium deficiency, diet and dental disease in pet rabbits.** *Veterinary Record: Journal of the British Veterinary Association* 139 (23): 567-571, ISSN: 0042-4900.
NAL Call Number: 41.8 V641
Keywords: calcium, tooth diseases, mineral deficiencies, diet, calcification, feeding preferences, mineral metabolism, guidelines, surveys, phosphorus, vitamin D, nutrient content, pet foods, urolithiasis, osteodystrophy, rabbit feeding.
- Harcourt-Brown, F.M.; Holloway, H.K. (2003). **Encephalitozoon cuniculi in pet rabbits.** *Veterinary Record: Journal of the British Veterinary Association* 152 (14): 427-31, ISSN: 0042-4900.
NAL Call Number: 41.8 V641.
Abstract: The results of a serological test for *Encephalitozoon cuniculi* in 125 pet rabbits are reviewed, together with follow-up studies of clinical cases. Blood samples were taken from 38 asymptomatic rabbits and 87 rabbits showing neurological, renal or ocular signs suggestive of encephalitozoonosis. In the asymptomatic group, six

of 26 (23 per cent) apparently healthy rabbits, sampled as part of a health screen, were seropositive; of the remaining 12 asymptomatic rabbits, sampled because they lived with seropositive companions, eight (66 per cent) were seropositive. Fifty-eight of the rabbits with clinical disease showed neurological signs, including head tilt, seizures, ataxia and swaying; three of them also showed renal signs and two showed ocular signs, and these five rabbits were all seropositive. Head tilt was the most common neurological sign in 21 of 23 (91 per cent) of the seropositive cases. All nine rabbits with ocular lesions were seropositive. In follow-up studies of clinical cases, the rabbits showed variable responses to treatment with albendazole, fenbendazole, antibiotics or corticosteroids, and some cases recovered without treatment.

Keywords: pet rabbits, parasitology, *Encephalitozoon cuniculi*, diagnosis, drug effects, adrenal cortex hormones, therapeutic use.

Hartmann, K.; Fischer, S.; Kraft, W. (1995). **Heimtiere als Patienten in der Kleintierpraxis. Teil 2. Handhabung, Geschlechtsbestimmung, Blutentnahme, Medikamentenapplikation.** [Small pet animals as patients in veterinary practice. Part 2. Handling, sex determination, blood collection, drug application.] *Tieraerztliche Praxis* 23 (1): 83-91. ISSN: 0303-6286.

Keywords: rabbits, gerbils, guinea pigs, hamsters, chinchillas, pets, sampling, blood, application methods, drugs, sex, handling, German language.

Hartmann, K.; Fischer, S.; Kraft, W. (1994). **Heimtiere als Patienten in der Kleintierpraxis. Teil 1. Abstammung, Physiologie, Haltung, Fuetterung.** [Small pet animals as patients in veterinary practice. Part 1. Descent, physiology, husbandry, feeding.] *Tieraerztliche Praxis* 22 (6): 585-591, ISSN: 0303-6286.

Keywords: rabbits, guinea pigs, gerbils, hamsters, mice, rats, chinchillas, husbandry, feeding, ancestry, physiology, German language.

Heard, D.J. (1995). **Rabbit supportive care.** *Proceedings of the North American Veterinary Conference* 9: 670-671. **NAL Call Number:** SF605 N672

Keywords: veterinary medicine, heart rate and rhythm, blood pressure, hypolemia, intravenous catheterization, intra-osseous catheterization, electrolytes, blood transfusion, endotoxemia, respiratory rate, arterial blood gases, endotracheal intubation, nutritional indicators, dental problems, nasogastric intubation, total parenteral nutrition, product information.

Hem, A.; Hansen, A.K.; Reh binder, C.; Voipio, H.M.; Engh, E. (1995). **Preliminary recommendations for health monitoring of mouse, rat, hamster, guinea pig, gerbil and rabbit experimental units.** *Scandinavian Journal of Laboratory Animal Science* 22 (1): 49-51, ISSN: 0901-3393.

NAL Call Number: QL55.S322

Keywords: laboratory animals, mice, rats, hamsters, guinea pigs, gerbils, rabbits, monitoring, health, diseases, infection, environmental factors, feeding, housing, disease transmission.

Hermans, K.; Haesebrouck, F.; Vaneechoutte, M.; Devriese, L.A.; Godard, C; De Herdt, P. (2000). **Differentiation between high and low virulence *Staphylococcus aureus* strains from rabbits by randomly amplified polymorphic DNA (RAPD) analysis.** *Veterinary Microbiology* 72 (3-4): 311-319, ISSN: 0378-1135.

NAL Call Number: SF601.V44

Keywords: *Staphylococcus aureus*, pathogen, strains, bacterial disease, infected commercial rabbitries, randomly amplified polymorphic DNA analysis, analytical method, diagnosis, prevention virulence.

Hermans, K.; Devriese, L.A.; Haesebrouck, F. (2003). **Rabbit staphylococcosis: difficult solutions for serious problems.** *Veterinary Microbiology* 91 (1): 57-64, ISSN: 0378-1135.

NAL Call Number: SF601.V44.

Abstract: *Staphylococcus aureus* infections are a major problem in rabbitries. The main manifestations are subcutaneous abscesses, mastitis, pododermatitis and septicaemia. Two patterns of infection can be distinguished. In the first type, clinical signs remain limited to a small number of rabbits in a flock. This type has little economic importance and is caused by low-virulence *S. aureus* strains. In the second type, the disease shows an epidemic spread. Consequences are poor production results, infertility and death. This leads to chronic problems and a subsequent decline in production. The latter type is caused by high-virulence strains. Biotyping,

phage typing and RAPD typing contribute to the characterisation of high-virulence *S. aureus* strains. Administration of antibiotics, disinfection of the environment and vaccination are not able to solve the problems. Therefore, the only effective measure is to cull the entire flock and to restart with a new rabbit population after thorough disinfection. Limiting the introduction of new rabbits in existing rabbitries and reducing contacts between rabbitries to an absolute minimum are currently the only way to face this most difficult problem.

Keywords: husbandry, disease outbreaks, prevention and control, microbiology, staphylococcal infections, epidemiology, pathology, prevention and control, growth and development, pathogenicity.

Hernandez-Divers, S.J. (2001). **Molar disease and abscesses in rabbits.** *Exotic DVM* 3 (3): 65-69, ISSN: 1521-1363.
NAL Call Number: SF981.E96

Keywords: clinical aspects, dental health, diagnosis, pets, postoperative care, surgical operations, tooth diseases.

Hobbs, R.; Twigg, L. (1998). **Coccidia (*Eimeria* spp.) of wild rabbits in southwestern Australia.** *Australian Veterinary Journal* 76 (3): 209-210. ISSN: 0005-0423.

NAL Call Number: 41.8 Au72

Keywords: *Eimeria*, coccidia, mammalian hosts, protozoan parasite prevalence, parasite identification guide, first records for Australia, Western Australia.

Hood, G.M.; Chesson, P.; Pech, R.P. (2000). **Biological control using sterilizing viruses: Host suppression and competition between viruses in non-spatial models.** *Journal of Applied Ecology* 37 (6): 914-925, ISSN: 0021-8901.

NAL Call Number: 410 J828

Keywords: pests, domestic cat, house mouse, European rabbit, viruses, biocontrol agent, competitor, pathogen, myxomatosis, fungal disease, viral infection, viral disease, sterilization, pest control, method, viral vectored immunocontraception [VVIC], contraception method, pest control method, biological control, birth rates, competition, demographics, epidemiology, genetic engineering, host suppression, host parasite models, mortality rates, non spatial models.

Hunt, T.K.; Hopf, H.W. (June 1997). **Wound healing and wound infection. What surgeons and anesthesiologists can do.** *The Surgical Clinics of North America* 77 (3): 587-606, ISSN: 0039-6109.

Abstract: Wound healing can be enhanced and wound infections prevented, often by simple, inexpensive, readily available means. Preoperative evaluation for impediments to healing, such as malnutrition, vasoconstriction, hyperglycemia, and steroid use, allows correction prior to operation. Intraoperatively, the surgeon should concentrate on surgical technique, appropriate antibiotic use, and prevention of vasoconstriction (volume, warming). Postoperatively, the focus should be on prevention of vasoconstriction through pain relief, warming, and adequate volume resuscitation and on maintaining nutrition and normoglycemia. These approaches apply as well to chronic wounds. Additionally, maintenance of a moist environment, correction of local vasospasm with sympathetic blockade or warming, and stimulation of angiogenesis through aggressive debridement or hyperbaric oxygen therapy enhance healing of chronic wounds.

Keywords: review, human, rabbits, anesthesiology, cicatrix, physiopathology, growth substances, physiology, human, intraoperative care, ischemia, complications, prevention and control, oxygen consumption, postoperative care, preoperative care, surgery, surgical wound infection, wound healing.

Jager, C. (1997). **Vergleichende Untersuchungen and Rohrenknochen unterschiedlich gehaltener Kaninchen mittels Rontgenstrukturanalyse. [X-ray analysis of the structure of long bones from rabbits kept under different conditions.]** Fachbereich Veterinarmedizin, Freie Universitat: Berlin, Germany, 101 p.

Keywords: thesis, radiography, intensive husbandry, exercise, bones, German language.

Jarvinen, L.Z.; Hogen, E.H.; Suckow, M.A.; Bowersock, T.L. (2000). **Intranasal vaccination of New Zealand white rabbits against pasteurellosis, using alginate encapsulated *Pasteurella multocida* toxin and potassium thiocyanate extract.** *Comparative Medicine Memphis* 50 (3): 263-269.

Keywords: breed, New Zealand White, animal care, infection, *Pasteurella multocida*, pathogen, host, male, toxin vaccine, antibacterial drug, efficacy, intranasal administration, potassium thiocyanate extract vaccine,

pasteurellosis, bacterial disease, microsphere vs. unencapsulated vaccine, mucosal immune response, systemic immune response.

Jasni, S.; Noordin, M.M.; Zamri-Saad, M.; Chulan, U.; Lydia, M. (1997). **Metastatic uterine adenocarcinoma in a pet rabbit.** *Jurnal Veterinar Malaysia* 9 (2): 81, ISSN: 0128-2506.

NAL Call Number: SF604.J87

Keywords: pets, case reports, neoplasms, microscopy, lungs, kidneys, uterus, respiratory diseases, adenocarcinoma.

Jimenez, A.; Quirce, S.; Maranon, F.; Fernandez-Caldas, E.; Cuesta, J.; de las Hares, M.; Sastre, J. (2001). **Allergic asthma to pet hares.** *Allergy* 56 (11): 1107-8, ISSN: 0105-4538.

Keywords: human, case report, rabbit, asthma, antibody specificity, immunoglobulin E, blood.

Kaliste, E.; Linnainmaa, M.; Meklin, T.; Nevalainen, A. (2002). **Airborne contaminants in conventional laboratory rabbit rooms.** *Lab Animal* 36 (1): 43-50.

NAL Call Number: QL55 A1L33

Abstract: Besides the well known allergens, several other risk factors may exist for health in a laboratory animal unit. The exposure to these factors may be significant in animal units with poor general or local ventilation systems. Moreover, means to prevent the distribution of airborne contaminants may be limited in animal units housing rabbits or other bigger laboratory animals. Airborne contaminants in conventional laboratory rabbit rooms were sought to evaluate the occupational exposure of animal care personnel. Concentrations of airborne dust, bacteria, fungi, ammonia and endotoxins were measured during 2 days in three phases: before working activities began, during them and afterwards. Both stationary and some personal samples were taken. All of the contaminants sought were found in the rabbit room air. When compared to reported levels in farm animal production areas, the concentrations measured were generally low. However, moderate or high levels of airborne bacteria and fungi were found occasionally during work routines. Airborne contaminants should be considered as a potential occupational health risk for persons working with laboratory animals.

Keywords: air microbiology, air pollutants, occupational hazards, ammonia, analysis, husbandry, laboratory animals, dust, endotoxins, occupational exposure, analysis, pilot projects, ventilation substances, occupational endotoxins.

Kelleher, S.A. (2003). **Surgical considerations.** In: *Scientific Proceedings Veterinary Programme: British Small Animal Veterinary Association 46th Annual Congress, Birmingham, UK, April 3-6, 2003*, Coles, G.; Dobson, J.; Elliott, J.; Elwood, C. (Eds.), British Small Animal Veterinary Association: Quedgeley, UK, pp. 503-508, ISBN: 0-905214-77-3.

Keywords: abscesses, anesthesia, castration, entropion, enucleation, fracture fixation, ovariectomy, preoperative care, surgery, surgical operations, wound treatment.

Kerr, P.; Twigg, L.; Silvers, L.; Lowe, T.; Forrester, R. (1998). **Serological monitoring of the epidemiology of myxoma virus to assess the effects of imposed fertility control of female rabbits on myxomatosis.** *Wildlife Research* 25 (2): 123-131. ISSN: 1035-3712.

NAL Call Number: S960.W5

Keywords: fertility, imposed fertility control on females, epidemiology, natural viral disease, viral diseases, myxomatosis, epidemiology, implications for effects of fertility control, viral disease epidemiology, fertility control, Western Australia, Wellstead.

Klusek, J.; Rafay, J.; Swiderska-Kolacz, G.; Kolataj, A. (1995). **Influence of displacement stress on the concentration of some lipids in rabbit organs.** *Archiv für Tierzucht* 38 (6): 673-677, ISSN: 0003-9438.

Keywords: New Zealand White, Zobor, Nitran breed, genetic strain, displacement, stress, lipids, organs, cholesterol, animal welfare, housing, breeds, kidneys, liver, serum, lipid metabolism, breed differences, triglycerols, husbandry, cage changes.

Kontio-Jalanka, K. (1997). **Eläinsuojelu joidenkin pienten lemmikkien ja eksoottisten eläinten hoidossa.** [Animal

welfare and the treatment of small and exotic pets.] *Suomen Eläinlääkärilehti* 103 (3): 146-147, ISSN: 0039-5501.

NAL Call Number: 41.8 F49

Keywords: pets, aviary birds, hamsters, gerbils, rodents, reptiles, rabbits, behavior, animal welfare, veterinary practice, exotic pets, small mammals, Finnish language.

Kovaliski, J. (1998). **Monitoring the spread of rabbit hemorrhagic disease virus as a new biological agent for control of wild European rabbits in Australia.** *Journal of Wildlife Diseases* 34 (3): 421-428. ISSN: 0090-3558.

NAL Call Number: 41.9 W64B

Keywords: viral diseases, rabbit hemorrhagic disease virus, spread of disease following accidental release, Australia, monitoring study.

Kpodekon, M.; Alogninouwa, T. (Dec. 1998). **Control of rabbit viral haemorrhagic disease in Benin by vaccination.** *Veterinary Record: Journal of the British Veterinary Association* 143 (25): 693-4, ISSN: 0042-4900.

NAL Call Number: 41.8 V641

Keywords: husbandry, methods, caliciviridae infections, prevention and control, disease outbreaks, hemorrhagic disease virus, immunology, virology, viral vaccines, Benin.

Lange, I.G.; Daxenberger, A.; Meyer, H.H.D.; Rajpert, D.M.E.; Skakkebaek, N.E.; Veeramachaneni, D.N.R. (2002). **Quantitative assessment of foetal exposure to trenbolone acetate, zeranol and melengestrol acetate, following maternal dosing in rabbits.** *Xenobiotica* 32 (8): 641-651, ISSN: 0049-8254.

NAL Call Number: QD415.A1X4

Keywords: growth promoting agents, meat residue, endocrine disruptor, fetal toxicity, hormone, drug, metabolism, pharmacokinetics, placental barrier passage, reproductive toxicity, toxin, melengestrol acetate, trenbolone acetate, high performance liquid chromatography, maternal dosing, drug administration method.

Lebas, F.; Coudert, P.; De Rochambeau, H.; Thebault, R.G. (1997). **The Rabbit: Husbandry, Health and Production.** FAO (Food & Agriculture Organization), Animal Production and Health Division: Rome, Italy, 205 p., ISBN: 92-5-103441-9.

Keywords: husbandry, production, health, nutrition, feeding, reproduction, breeds, breeding, housing, rabbit meat, hides and skins, hair, rural development, diseases, animal products, meat, production, socioeconomic development.

Lebastard, D.; Morisset, M.C.; Michel, F.; Rubillard, P.; Dupont, P. (1995). **Salmonella typhimurium in un allevamento cunicolo intensivo. [Salmonella typhimurium infection on an intensive rabbit farm.]** *Summa* 12 (7): 55-59.

Keywords: intensive husbandry, salmonellosis, disease, *Salmonella typhimurium*, France, Italian language.

Lenarduzzi, M.; Borso, F. da (1997). **Aspetti igienico-sanitari in diverse tipologie di allevamenti cunicoli. [Hygiene and health aspects of various types of rabbit housing.]** *Rivista di Coniglicoltura* 34 (2): 51-55, ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: diseases, hygiene, housing, Italian language.

Lindsey, M.J. (2000). **Adverse experiences to veterinary immunobiologicals and the profession's duty of care.** *Australian Veterinary Practitioner* 30 (3): 111-119, ISSN: 0310-138X.

NAL Call Number: SF601.A9

Keywords: pet animals, cats, dogs, rabbits, adverse effects, maternal antibodies, safety, vaccination, vaccines, veterinary products.

Litwin, C.M. (2003). **Pet-transmitted infections: diagnosis by microbiologic and immunologic methods.** *Pediatric Infectious Disease Journal* 22 (9):768-77, ISSN: 0891-3668.

Keywords: human, children, birds, cats, dogs, rabbits, bacterial infections, diagnosis, etiology, bites, complications, risk factors, mycoses, protozoan infections, virus diseases.

- Lucas, A. (1998). **Small companion animal emergencies.** In: *Internal Medicine: Small Companion Animals. The T G Hungerford Course for Veterinarians. Proceedings 306, Stephen Roberts Lecture Theatre, University of Sydney, Australia, June 15 -19, 1998*, Bryden, D. (Ed.), pp. 1-40. University of Sydney, Post Graduate Foundation in Veterinary Science: Sydney, Australia. ISBN: 1-875582-69-X.
NAL Call Number: SF604.R37 no. 306
Keywords: pets, ferrets, mice, rabbits, emergencies, small animal practice, diagnostic techniques, diagnosis, treatment, therapy, case reports, body temperature regulation, hematology, blood chemistry.
- Luzi, F.; Heinzl, E.; Crimella, C.; Orsenigo, R. Piantanida, L.; Vallone, L.; Dragoni, I.; Gallazzi, D. (July-Aug. 1996). **Utilizzo di materiali alternativi per la preparazione del nido nella specie cunicola. Aspetti produttivi e sanitari (Veneto).** [Alternative materials for nests in rabbit species. Productive and health aspects (Veneto).] *Rivista di Coniglicoltura* 33 (7-8): 53-57, ISSN: 0010-5929.
NAL Call Number: SF451.R5
Keywords: nest boxes, statistical methods, mortality, weight gain, animal performance, biological contamination, cladosporium, wool, paper, respiratory diseases, veterinary hygiene, microbiological analysis, housing, biological analysis, contamination, deuteromycotina, fungi, hygiene, Italy, Italian language.
- Malley, A.D. (1995). **The pet rabbit in companion animal practice. 2. General clinical examination.** *Irish Veterinary Journal* 48 (9): 307-311, ISSN: 0368-0762.
NAL Call Number: 41.8 IR4
Keywords: handling, restraint, small animal practice, veterinary practice, pets, fractures, lacrimal apparatus, skin, thorax, abdomen, mouth, limbs, diagnostic techniques, clinical examination.
- Marai, I.F.M.; Habeeb, A.A.M.; Gad, A.E. (2002). **Rabbits' productive, reproductive and physiological performance traits as affected by heat stress: A review.** *Livestock Production Science* 78 (2): 71-90, ISSN: 0301-6226.
NAL Call Number: SF1.L5
Keywords: heat stress, seasonal effects, conception rate, disease resistance, embryonic development, energy metabolism, feed efficiency, feed intake, growth, litter size, litter weight, milk production, mortality, physiological performance, productive performance, reproductive performance, spermatogenesis.
- Marchandeau, S., Chantal, J.; Portejoie, Y.; Barraud, S.; Chaval, Y. (1998). **Impact of viral hemorrhagic disease on a wild population of European rabbits in France.** *Journal of Wildlife Diseases* 34 (3): 429-435. ISSN: 0090-3558.
NAL Call Number: 41.9 W64B
Keywords: age, mortality patterns, viral disease relationships, weight, immune response, viral diseases, rabbit viral hemorrhagic disease myxomatosis, epidemiology, patterns of mortality, development of immunity, immune response, antibodies to viral diseases, development in wild population, mortality, viral disease impacts, epidemiology, mortality patterns and immune response, France.
- Marlier, D. (2001). **Cross-sectional study of the association between pathological conditions and myxoma-virus seroprevalence in intensive rabbit farms in Europe.** *Preventive Veterinary Medicine* 48 (1): 55-64, ISSN: 0167-5877.
NAL Call Number: SF601 P7
Keywords: intensive forestry, Myxoma virus.
- Martini, L.; Giardino, R.; Bacchi Reggiani, G.; Stanzani, F. (1997). **Mixomatosi del coniglio in uno stabulario del Servizio di Chirurgia Sperimentale. [Epidemic myxomatosis in the rabbit in a stable of the Experimental Surgery Department.]** *Obiettivi E Documenti Veterinari* 18 (2): 75-80, ISSN: 0392-1913.
Keywords: myxomatosis, laboratory animals, legislation, regulations, symptoms, pathogenesis, disease surveillance, veterinary services, disease control, Italian language.
- Milon, A.; Oswald, E.; De Rycke, J. (1999). **Rabbit EPEC: A model for the study of enteropathogenic *Escherichia***

coli. *Veterinary Research* 30 (2-3): 203-219, ISSN: 0928-4249.

NAL Call Number: SF602.A5

Keywords: *Escherichia coli*, enteropathogenic pathogen, colibacillosis, bacterial disease, diarrhea, bacterial disease, digestive system disease, pathogenicity island, literature review.

Mitra, S.; Agnohotri, R.K.; Sharma, H. (1999). **Clinical management of facial mange in Angora rabbits.** *Indian Veterinary Journal* 76 (9): 834-835, ISSN: 0019-6479.

NAL Call Number: 41.8 IN2

Keywords: breed, Angora, female, host, male *Sarcoptes scabiei*, parasite, mange, integumentary system disease, parasitic disease, diagnosis, management, case study.

Molina, X.; Casanova, J.; Feliu, C.; Castien, E. (1998). **Studies of wild rabbit (*Oryctolagus cuniculus*) populations in Navarra (Spain). 3. Qualitative and quantitative composition of the rabbit parasitic helminthfauna.** *Gibier Faune Sauvage* 15 (2): 123-133. ISSN: 0761-9243.

Keywords: digenea, cestoda, nematoda, mammalian hosts, mammalian host, records and prevalence, Spain.

Morner, T. (1999). **Monitoring diseases in wildlife a review of diseases in the orders Lagomorpha and Rodentia in Sweden.** *Erkrankungen der Zootiere* 39: 255-262, ISSN: 0138-5003.

NAL Call Number: SF996.I5

Keywords: rabbits, rodents, parasites, diseases and disorders, surveys, cause of death, mortality, Sweden.

Morrison, G. (2001). **Zoonotic infections from pets. Understanding the risks and treatment.** *Postgraduate Medicine* 110 (1): 24-6, 29-30, 35-6, ISSN: 0032-5481.

Abstract: As much as we hate to admit it, even the gentlest of our friendly pets can harbor harmful pathogens, and although the fact is not widely known, pet-associated infections can significantly affect the health of humans. In this article, Dr Morrison focuses on pets and their accompanying potential zoonoses, outlining how these diseases can be transmitted to humans and how the infections are treated. Special attention is paid to rabies and toxoplasmosis, which have attained particular notoriety over time.

Keywords: human, children, child welfare, birds, cats, dogs, ferrets, fish, rabbits, reptiles, rodents, review, microbiology, parasitology, virology, transmission, bites, patient education, physician's role.

Motha, M.; Clark, R. (1998). **Confirmation of rabbit haemorrhagic disease in wild New Zealand rabbits using the ELISA.** *New Zealand Veterinary Journal* 46 (2): 83-84. ISSN: 0048-0169.

NAL Call Number: 41.8 N483

Keywords: viral diseases, rabbit hemorrhagic disease, first confirmed records after introduction, south island, introduced viral disease, first confirmed records for New Zealand.

Mullick, S.G.; Biswas, G.; Sikdar, A.; Das, S.C.; Ghosh, A.K. (1996). **A natural case of rabies in domestic rabbit.** *Indian Journal of Animal Health* 35 (1): 107-108, ISSN: 0019- 5057.

NAL Call Number: SF1.I4

Keywords: viral diseases, rabies, viral disease record, first record for India, West Bengal, Calcutta.

Mutze, G.; Cooke, B.; Alexander, P. (1998). **The initial impact of rabbit hemorrhagic disease on European rabbit populations in South Australia.** *Journal of Wildlife Diseases* 34 (2): 221-227, ISSN: 0090-3558.

NAL Call Number: 41.9 W64B

Keywords: viral diseases, rabbit hemorrhagic disease, escape from quarantine station, mortality, population size, initial impact of viral disease epidemic, viral disease escape from quarantine station, initial impact on population, Australia.

Ness, R.D. (2000). **Chiropractic care for exotic pets.** *Exotic DVM* 2 (1): 15-18.

NAL Call Number: SF981.E96

Keywords: pets, rabbits, ferrets, treatment, spine, physical therapy, spinal diseases, chiropractic.

Nicklas, W.; Baneux, P.; Boot, R.; Decelle, T.; Deeny, A.A.; Fumanelli, M.; Illgen-Wilcke, B. (2002).

Recommendations for the health monitoring of rodent and rabbit colonies in breeding and experimental

units. *Laboratory Animals* 36 (1): 20-42, ISSN: 0023-6772.

NAL Call Number: QL55 A1L3

Keywords: mice, rats, rabbits, animal diseases, prevention and control, animal husbandry, standards, laboratory, bacterial infections, prevention and control, breeding, standards, health status, laboratory animal science, standards, mycoses, prevention and control, veterinary, parasitic diseases, prevention and control, virus diseases.

O' Reilly, A.; McCowan, C.; Hardman, C.; Stanley, R. (2002). **Taenia serialis causing exophthalmos in a pet rabbit.** *Veterinary Ophthalmology* 5 (3): 227-230.

Online: <http://www.blackwell-science.com/products/journals/jnltitle.htm>

NAL Call Number: SF891 V47

Keywords: *Taenia serialis*, exophthalmos, eye diseases, symptoms, clinical aspects, case reports, treatment, cysts, histology.

O'Brien, P.; Thomas, S. (1998). **Rabbit calicivirus: update on a new biological control for pest rabbits in Australia.** *Proceedings of the Vertebrate Pest Conference* 18: 397-405. ISSN: 0507-6773.

NAL Call Number: SB950.A1V4

Keywords: viral diseases, rabbit calicivirus disease, rabbit hemorrhagic disease, biological control agent escape, population size, biological control agent impact, control agent escape, release and impact on populations, Australia.

O'Keefe, J.; Tempero, J.; Atkinson, P.; Pacciarini, L.; Fallacara, F.; Horner, G.; Motha, J. (1998). **Typing of rabbit haemorrhagic disease virus from New Zealand wild rabbits.** *New Zealand Veterinary Journal* 46 (1): 42-43, ISSN: 0048-0169.

NAL Call Number: 41.8 N483

Keywords: viral diseases, rabbit hemorrhagic disease virus, viral molecular characterization, New Zealand.

O'Malley, B. (2002). **Common problems of the alimentary tract of the pet rabbit (*Oryctolagus cuniculus*).** *Irish Veterinary Journal* 55 (2): 77, 79-81, 83-84.

NAL Call Number: 41.8 IR4

Keywords: caecotrophy, clinical aspects, diagnosis, diets, digestive disorders, digestive system, digestive system diseases, digestive tract, digestive tract motility, enteritis, feeding, teeth, therapy, tooth diseases.

Oehme, F.W.; Pickrell, J.A. (1999). **An analysis of the chronic oral toxicity of polyether ionophore antibiotics in animals.** *Veterinary and Human Toxicology* 41 (4): 251-257, ISSN: 0145-6296.

NAL Call Number: SF601.A47

Keywords: calcium, furazolidone, antibiotic, feed additive, polyether ionophore, lasalocid antibiotic, maduramicin, monensin, narasin antibiotic, nitrogen, salinomycin, tiamulin, cardiomyopathy, heart disease, cardiopulmonary clinical signs, inotrophy, poultry litter, feed, Brazil.

Orcutt, C.J. (2001). **Fluids and critical care in small mammals.** *Proceedings of the North American Veterinary Conference* 15: 886-887. In the volume: *Small Animal and Exotics*. Part of a three volume set. Meeting held January 13-17, 2001 in Orlando, Florida.

NAL Call Number: SF605 N672

Keywords: fluid therapy, catheter placement, fluid maintenance, nutrition, pain management, gastric obstruction, endotracheal intubation.

Owiny, J.R. (2001). **Hip dysplasia in rabbits: association with nest box flooring.** *Comparative Medicine* 51 (1): 85-88, ISSN: 0023-6764.

NAL Call Number: SF77 C65

Keywords: laboratory mammals, hip dysplasia, floor type.

Papini, R; Gazzano, A; Mancianti, F. (1997). **Survey of dermatophytes isolated from the coats of laboratory animals in Italy.** *Laboratory Animal Science* 47 (1): 75-7, ISSN: 0023-6764.

NAL Call Number: 410.9 P94

Keywords: cats, mice, rats, rabbits, guinea pigs, husbandry, microbiology, dermatomycoses, microsporium, isolation and purification, tinea.

Paul-Murphy, J.; Ramer, J.C. (1998). **Urgent care of the pet rabbit.** *The Veterinary Clinics of North America. Exotic Animal Practice* 1 (1): 127-52, ISSN: 1094-9194.

NAL Call Number: SF997.5.E95E97

Abstract: Emergency and critical care principles are similar for all mammals; however, the physiology and natural behavior of rabbits create an animal that is easily stressed and requires specialized handling techniques. This article reviews diagnostic and therapeutic techniques, nutritional support, and pain management for urgent care of pet rabbits. Common differential diagnoses for emergencies are briefly reviewed by the clinical presentation. A table of drug dosages used for urgent care is provided.

Keywords: disease, diagnosis, therapy, emergencies, stress.

Paul-Murphy, J.; Ramer, J.C. (1998). **Urgent care of the pet rabbit.** *The Veterinary Clinics of North America. Exotic Animal Practice* 1 (1): 127-52, ISSN: 1094-9194.

NAL Call Number: SF997.5.E95E97

Abstract: Emergency and critical care principles are similar for all mammals; however, the physiology and natural behavior of rabbits create an animal that is easily stressed and requires specialized handling techniques. This article reviews diagnostic and therapeutic techniques, nutritional support, and pain management for urgent care of pet rabbits. Common differential diagnoses for emergencies are briefly reviewed by the clinical presentation. A table of drug dosages used for urgent care is provided.

Keywords: review, diseases, diagnosis, therapy, husbandry, emergencies, emergency medical services, stress.

Peeters, J.E.; Milton, A.; Licois, D.; Morisse, J.P. (1997). **Digestive diseases of rabbits. [Le "pathologie digestive du lapin."]** *Cuniculture* 136: 174-180, ISSN: 0152-3058.

Keywords: digestive disorders, diarrhea, disease prevention, treatment, disease control, enteritis, enterotoxemia, intestinal diseases, stress, enzyme deficiencies, photoperiod, cecum, pH, water quality, etiology, lesions, diagnosis, vaccination, parasitoses, antibiotics, disease transmission, helminthoses, coccidiosis, animal husbandry, animal welfare, legislation, anthelmintics, parasites, helminths, *Escherichia*, Rotavirus, *Cryptosporidium*, *Escherichia coli*, *Eimeria*, coccidia, protozoa, *Clostridium piliforme*, *Bacillus piliformis*, French language.

Percy, D.H. (2001). **Pathology of Laboratory Rodents and Rabbits.** Charles Louis Davis, D.V.M. Foundation: Gurnee, Ill., [Video] 136 min.

NAL Call Number: Videocassette no. 3195

Abstract: A lecture utilizing slides on the pathology of various diseases of laboratory rodents and rabbits.

Keywords: disease, rodents, rabbits, laboratory animals, pathology.

Peters, M; Scheele, G. (Nov. 1996). **[Listeriosis in a rabbitry.]** *DTW Deutsche Tierärztliche Wochenschrift* 103 (11): 460-2, ISSN: 0341-6593.

NAL Call Number: 41.8 D482

Abstract: An enzootic of listeriosis in a rabbitry is reported. *Listeria monocytogenes* serotype 1/2a was isolated from the organs of a doe, which had died of septic metritis. From aborted fetuses of two other does *Listeria monocytogenes* serotype 1/2b and 4b were cultured, respectively. In feed samples of the rabbitry *Listeria monocytogenes* strains of the serotypes 1/2b and 4b besides the apathogenic *Listeria* species *Listeria seeligeri* and *Listeria innocua* were detected. Serological studies with agglutination test and complement fixation test on double serum samples of does, which had aborted, pointed to listeric infections as the cause of abortion. A doe, which had aborted and failed to become pregnant again, showed serosal adhesions of both uterine tubes and a sterile pyometra. Therefore, previous infection of the uterus by *Listeria monocytogenes* should be considered as a cause of infertility.

Keywords: abortion, bacteremia, diagnosis, housing, infertility, female, *Listeria*, isolation and purification, diagnosis, uterine diseases, German language.

Pinter, L. (1999). **Leporacarus gibbus and Spilopsyllus cuniculi infestation in a pet rabbit.** *The Journal of Small*

Animal Practice 40 (5): 220-221, ISSN: 0022-4510.

NAL Call Number: 41.8 J8292

Keywords: *Leporacarus gibbus*, *Spilopsyllus cuniculi*, infestation, pruritus, treatment, topical application, pyrethrins, case reports.

Quesenberry, K. (1998). **Dental diseases of rabbits and rodents.** In: *Internal Medicine: Small Companion Animals. The T G Hungerford Course for Veterinarians. Proceedings 306, Stephen Roberts Lecture Theatre, University of Sydney, Australia, June 15-19, 1998.* Bryden, D. (Ed.), University of Sydney, Post Graduate Foundation in Veterinary Science: Sydney, Australia, pp. 75-80, ISBN: 1-875582-69-X.

NAL Call Number: SF604.R37 no. 306

Keywords: rabbits, rodents, chinchillas, guineapigs, dentistry, tooth diseases, teeth, mouth diseases, disease prevention, treatment.

Quesenberry, K. (1998). **Nutritional and gastrointestinal diseases of rabbits.** In: *Internal Medicine: Small Companion Animals. The T G Hungerford Course for Veterinarians. Proceedings 306, Stephen Roberts Lecture Theatre, University of Sydney, Australia, June 15 -19, 1998,* Bryden, D. (Ed.), pp. 61-65, University of Sydney, Post Graduate Foundation in Veterinary Science: Sydney, Australia. ISBN: 1-875582-69-X.

NAL Call Number: SF604.R37 no. 306

Keywords: digestive system, gastrointestinal diseases, diets, nutrition, diarrhea, bezoar, digestive system diseases.

Quesenberry, K. (1998). **Urogenital diseases of rabbits and rodents.** In: *Internal Medicine: Small Companion Animals. The T G Hungerford Course for Veterinarians. Proceedings 306, Stephen Roberts Lecture Theatre, University of Sydney, Australia, June 15 -19, 1998,* Bryden, D. (Ed.), pp. 67-72, University of Sydney, Post Graduate Foundation in Veterinary Science: Sydney, Australia. ISBN: 1-875582-69-X.

NAL Call Number: SF604.R37 no. 306

Keywords: rabbits, rodents, urinary tract diseases, urogenital system, female genital diseases, male genital diseases, neoplasms.

Ramer, J.C. (1999). **Evaluating and stabilizing critically ill rabbits. II.** *The Compendium on Continuing Education for the Practicing Veterinarian* 21 (1): 116-125, 176-177, ISSN: 0193-1903.

NAL Call Number: SF601 C66

Keywords: clinical examination., radiography, blood sampling.

Ramer, J.C.; Paul-Murphy, J.; Benson, K.G. (2001). **Valutazione e stabilizzazione dei conigli in condizioni critiche. Parte I. [Evaluating and stabilizing critically ill rabbits: Part I.]** *Veterinaria* 15 (Suppl. 2): 77-85, ISSN: 0391-3151.

Keywords: anorexia, diagnosis, drug therapy, dyspnoea, fatty liver, gastrointestinal diseases, haematuria, heart diseases, infectious diseases, intensive care, paresis, reproductive disorders, splayleg, stress, tooth diseases, urolithiasis, Spanish language.

Rehbinder, C; Baneux, P; Forbes, D; van, Herck, H; Nicklas, W; Rugaya, Z; Winkler, G. (July 1996). **FELASA recommendations for the health monitoring of mouse, rat, hamster, gerbil, guinea pig and rabbit experimental units. Report of the Federation of European Laboratory Animal Science Associations (FELASA) Working Group on Animal Health accepted by the FELASA Board of Management, November 1995.** *Lab Animal* 30 (3): 193-208, ISSN: 0093-7355.

NAL Call Number: QL55 A1L3

Keywords: mouse, rat, hamster, gerbil, guinea pig, rabbit, guidelines, animal welfare, physiology, health status, laboratory animal science, standards, veterinary, records.

Reuter, K.; Pospischil, R.; Endepols, S.; Larsen, K.S.; Mencke, N. (2002). **Flea infestation in exotic pet animals.** *The Compendium on Continuing Education for the Practicing Veterinarian* 24: 10-13, ISSN: 0193-1903.

NAL Call Number: SF601 C66

Keywords: rabbits, ferrets, rats, mink, mice, pets, aviary birds.

Richardson, V.C.G. (2000). *Rabbits Health, Husbandry, and Diseases*. Blackwell Science: Oxford; Malden, MA, 178 p.

NAL Call Number: SF997.5 R2R335 2000

Keywords: diseases, health, husbandry, nutrition, clinical examination, skin, reproductive system, neonatal rabbit, urinary system, respiratory system, digestive system, musculoskeletal system, teeth, head and neck, neurological and neuromuscular disorders, viral diseases, behavior, anesthesia, surgery, drugs and treatments, zoonotic aspects.

Rosenthal, K.L. (2002). **Gastrointestinal disease in the pet rabbit.** In: *Proceedings of the North American Veterinary Conference North American Veterinary Conference 16*: 975-976. Meeting held January 12-16, 2002, Orlando, Florida.

NAL Call Number: SF605 N672

Keywords: digestive system diseases, nutritional deficiency, nutritional requirements, dental disease, physiology, signs of disease, hair ball disease, trichobezoars, foreign objects, bacterial infection, viral infection, parasitic infection, enteritis, liver disease, hepatic lipidosis, coccidiosis.

Ruiven, R. van; Meijer, G.W.; Zutphen, L.F.M. van; Ritskes-Hoitinga, J. (1996). **Adaptation period of laboratory animals after transport: a review.** *Scandinavian Journal of Laboratory Animal Science* 23 (4): 185-190, ISSN: 0901-3393.

NAL Call Number: QL55.S322

Keywords: laboratory animals, mice, rats, rabbits, adaptation, reviews, animal welfare, transport of animals.

Saito, K.; Tagawa, M.; Hasegawa, A. (2003). **Rabbit syphilis diagnosed clinically in household rabbits.** *The Journal of Veterinary Medical Science: The Japanese Society of Veterinary Science* 65 (5): 637-9, ISSN: 0916-7250.

NAL Call Number: SF604.J342

Abstract: This paper deals with 16 cases presented from April to December 2001 and diagnosed clinically as rabbit syphilis, because they showed distinct lesions around the nose and/or mouth, responded to chemotherapy, and the "Rapid Plasma Reagin" test was positive. Twelve cases exhibited initial symptoms and four were relapses. Lesions around the genitalia and/or anus as well as the nose and/or mouth were seen in 8 cases, and 6 cases indicated sneezing. Fifteen cases were successfully treated with oral administration of chloramphenicol, and one was treated with long-acting penicillin by intramuscular injection. The mean age of onset was 8.8 months. As none of these cases had any mating history, the disease was likely to be maternally transmitted.

Keywords: disease, diagnosis, disease transmission, vertical, skin pathology, skin diseases, anti-bacterial agents, administration and dosage, therapeutic use, chloramphenicol, penicillins, syphilis, drug therapy.

Saito, K.; Hasegawa, A. (2003). **Diseases and outcomes in rabbits with high BUN levels.** *Journal of Veterinary Medical Science: The Japanese Society of Veterinary Science* 65 (5): 625-628, ISSN: 0916-7250.

NAL Call Number: SF604.J342

Keywords: blood urea nitrogen, high levels, bacterial infection, bacterial disease, gastrointestinal disorder, digestive system, heart disease, liver disturbance, molar teeth, overgrowth, dental and oral disease, neoplasm, neoplastic disease, neurological disease, nervous system disease, urolithiasis, urologic disease, uterine disorder, reproductive system, husbandry, failure, mortality, prognosis.

Saito, K.; Tagawa, M.; Hasegawa, A. (2003). **RPR test for serological survey of rabbit syphilis in companion rabbits.** *The Journal of Veterinary Medical Science/ the Japanese Society of Veterinary Science* 65 (7): 797-9, ISSN: 0916-7250.

NAL Call Number: SF604.J342

Abstract: Since the RPR (rapid plasma regain) test was found to be useful for the diagnosis of rabbit syphilis, serological survey by this test has been carried out in Japanese companion rabbits. A hundred virgin household rabbits kept alone and without signs and history of syphilis were examined by RPR test from April 2001 to March 2002, in Tokyo, Japan. The test was positive in 35 cases and negative in 65 cases. RPR negative rabbits should be selected for breeding to prevent the spread of rabbit syphilis in companion rabbits in Japan.

Keywords: pet rabbits, disease, syphilis, evaluation study, diagnosis, testing, rapid plasma regain, Japan.

Sastre, J. (2001). **Allergic asthma to pet hares.** *Allergy* 56 (11): 1107-8, ISSN: 0105-4538.

Keywords: human, case report, rabbit, asthma, antibody specificity, immunoglobulin E, blood.

Schoemaker, N.J. (1999). **Selected dermatologic conditions in exotic pets.** *Exotic DVM* 1 (5): 5-11.

NAL Call Number: SF981.E96

Keywords: pets, rodents, guineapigs, rabbits, Psittaciformes, ferrets, skin diseases, exotics, dermatology, aviary birds.

Shek, W.R.; Gaertner, D.J. (2002). **Microbiological quality control for laboratory rodents and lagomorphs.** In: *Laboratory Animal Medicine*, Fox, J.G.; Anderson, L.C. ; Loew, F.M.; Quimby, F.W. (Eds.), Academic Press: London, United Kingdom, 2nd. ed., pp. 365-393, ISBN: 0-12-263951-0.

NAL Call Number: SF996.5.L33 2002

Keywords: animal welfare, health, diagnostic techniques, laboratory animals, microbiology, quality controls.

Shimoda, K.; Kimura, J.; Oguri, S.; Nakamura, N.; Urano, T.; Maejima, K. (2002). **Penetration of drug resistance in *Escherichia coli* isolated from laboratory animals.** *Journal of Veterinary Medical Science* 64 (12): 1133-1135, ISSN: 0916-7250.

NAL Call Number: SF604.J342

Keywords: *Escherichia coli*, pathogen, isolated from laboratory animals, research laboratories, commercial laboratory animal breeders, laboratory specimens, guinea pig, mouse, rabbit, rat, ampicillin, antibacterial drug, antiinfective drug, drug resistance, cephaloridine, chloramphenicol, gentamicin, kanamycin, streptomycin, sulfadimethoxine, tetracycline, drug therapy, genetics, Japan.

Simon, M.; Ortega, C.; Maynar, P.; Muzquiz, J.; de Blas, I.; Girones, O.; Alonso, J.; Sanchez, J. (1998). **Studies in wild rabbit (*Oryctolagus cuniculus*) populations in Navarra (Spain). 1. Epidemiology of rabbit viral haemorrhagic disease.** *Gibier Faune Sauvage* 15 (1): 47-64. ISSN: 0761-9243.

Keywords: conservation measures, viral disease epidemiology implications, age, susceptibility, resistance relationships, reproduction, sexual activity influence on viral disease, sex differences, viral disease prevalence, viral diseases, rabbit viral hemorrhagic disease, prevalence, management implications, prevalence, susceptibility, resistance, epidemiology, myxomatosis, epizootiology, Spain.

Singla, L.; Kaur, A.; Sandhu, B.; Chowdhury, N. (1998). **Experimental infection of amphistome metacercariae (*Paramphistomum cervi*) in rabbit. A preliminary study.** *Indian Veterinary Journal* 75 (8): 690-692. ISSN: 0019-6479.

NAL Call Number: 41.8 IN2

Keywords: *Paramphistomum cervi*, Digenea, mammalian hosts, new host record, experimental infection.

Sommerville, L.M. (1998). **Treatment of a uterine adenocarcinoma in a domestic rabbit by ovariohysterectomy.** *Veterinary Record: Journal of the British Veterinary Association* 142 (20): 550-1, ISSN: 0042-4900.

NAL Call Number: 41.8 V641

Keywords: adenocarcinoma, surgery, female, hysterectomy, ovariectomy, postoperative care, treatment outcome, uterine neoplasms.

Suckow, M.A.; Brammer, D.W.; Rush, H.G.; Chrisp, C.E. (2002). **Biology and diseases of rabbits.** In: *Laboratory Animal Medicine*, Fox, J.G.; Anderson, L.C. ; Loew, F.M.; Quimby, F.W. (Eds.), Academic Press: London, United Kingdom, 2nd. ed., pp. 329-364, ISBN: 0-12-263951-0.

NAL Call Number: SF996.5.L33 2002

Keywords: animal welfare, bacterial diseases, biology, parasites, viral diseases.

Suedmeyer, K. (1998). **Myiasis in exotic pets.** *Exotic Pet Practice* 3 (2): 9-10.

Keywords: pets, rabbits, rodents, myiasis, parasites, diagnosis, treatment.

Szulowski, K. (1999). **Diagnosis of *Brucella suis* infections in pigs and hares by ELISA.** *Polish Journal of Veterinary Sciences* 2 (2): 65-70, ISSN:1505-1773.

NAL Call Number: SF604.P65

Keywords: pigs, hares, *Brucella suis* infection, bacterial disease, diagnosis, anti-*Brucella* antibodies, diagnostic method, ELISA kits, evaluation, serology.

Takimoto, K.; Yamada, Y.K.; Ami, Y.; Suzaki, Y.; Yabe, M.; Asano, T. (1999). **Endotoxin, sepsis, and the primrose path. Experiences of microbial contamination of animal colonies maintained in the National Institute of Infectious Diseases, Japan (NIID).** *Japanese Journal of Infectious Diseases* 52 (6): 255-6, ISSN: 1344-6304.

Keywords: mice, rabbits, laboratory animals, husbandry, microbiology, virology, *Bordetella* infections, epidemiology, veterinary, *Bordetella bronchiseptica*, isolation and purification, coronavirus infections, epidemiology, virology, disease outbreaks, viral hepatitis, housing, Japan.

Taylor, K.C. (Oct. 1996). **Viral haemorrhagic disease of rabbits.** *Veterinary Record: Journal of the British Veterinary Association* 139 (17): 427, ISSN: 0042-4900.

NAL Call Number: 41.8 V641

Keywords: animal welfare, caliciviridae infections, hemorrhagic disease virus, epidemiology, immunology, prevention and control, viral vaccines, Great Britain.

Thomson, S.E. (1997). **Rabbit calicivirus disease in Australia: implications for the pet rabbit.** *Australian Veterinary Practitioner* 27 (1): 40-44, ISSN: 0310-138X.

NAL Call Number: SF601.A9

Keywords: pets, rabbits, disease transmission, symptoms, pathology, immunity, disease control, calicivirus, Australia.

Toula, F.H.; Ramadan, H.H. (1998). **Studies on coccidia species of genus *Eimeria* from domestic rabbit (*Oryctolagus cuniculus domesticus* L.) in Jeddah, Saudi Arabia.** *Journal of the Egyptian Society of Parasitology* 28 (3): 691-698. ISSN: 1110-0583.

Keywords: *Eimeria exigua*, *Eimeria piriformis*, *Eimeria stiedae*, coccidia, mammalian hosts, new host record for Saudi Arabia.

Turuno, S.; Kagawa, N.; Saeki, H. (2001). **Experimental trials on the use of imidacloprid against ectoparasitic insects on various exotic pets.** *Journal of Veterinary Medicine, Japan* 54 (7): 537-540, ISSN: 0447-0192.

Keywords: pets, ferrets, guineapigs, rabbits, rodents, ectoparasites, ectoparasiticides, imidacloprid, insecticides, Japanese language.

Tynes, V.V. (2001). **Managing common gastrointestinal disorders in pet rabbits.** *Veterinary Medicine* 96 (3): 226, 228, 232-233, ISSN: 8750-7943.

NAL Call Number: 41.8 M69

Keywords: treatment, diagnosis, digestion, feeding, bezoar, obstruction, enteritis, parasitism.

Tynes, V.V. (1998). **Fibrosarcoma in a house rabbit.** *Exotic Pet Practice* 3 (1): 5, 7.

Keywords: pets, rabbits, neoplasms, case reports, skin diseases, rabbit diseases, fibrosarcoma.

Vangeel, I.; Pasmans, F.; Vanrobaeys, M.; De Herdt, P.; Haesebrouck, F. (2000). **Prevalence of dermatophytes in asymptomatic guinea pigs and rabbits.** *Veterinary Record: Journal of the British Veterinary Association* 146 (15): 440-1, ISSN: 0042-4900.

NAL Call Number: 41.8 V641

Keywords: guinea pigs, rabbits, arthrodermataceae, isolation and purification, dermatomycoses, epidemiology, housing, prevalence.

Vangili, R.A. (1999). **Rischio da animali familiari. Ruolo del veterinario. [Risks from pet animals. Role of the veterinarian.]** *Obiettivi e Documenti Veterinari* 20 (1): 13-16, ISSN: 0392-1913.

Keywords: pets, dogs, cats, birds, rabbits, rodents, veterinary services, zoonoses, bites, Italian language.

Verstraete, F.J.M. (2003). **Advances in diagnosis and treatment of small exotic mammal dental disease.** *Seminars in Avian and Exotic Pet Medicine* 12 (1): 37-48, ISSN: 1055-937X.

NAL Call Number: SF994.2.A1S36

Keywords: rabbits, rodents, dental disease, care, diagnosis, treatment, pathology, dentition.

Weber, K.O.; Willimzik, H.F. (1998). **Intrathorakales malignes Lymphom und Pseudochylothorax bei einem Zwergkaninchen (*Oryctolagus cuniculus*).** [Intrathoracic malignant lymphoma and pseudochylothorax in a pet rabbit.] *Kleintierpraxis* 43 (8): 617-626, ISSN: 0023-2076.

NAL Call Number: 41.8 K67

Keywords: pets, lymphoma, diagnosis, case reports, neoplasms, histopathology, lymph nodes, German language.

White, P.C.L.; Newton, C.G. (2000). **An introduced disease in an invasive host: the ecology and economics of rabbit calicivirus disease (RCD) in rabbits in Australia.** In: *The Economics of Biological Invasions*, Perrings, C.; Williamson, M.; Dalmazzone, S. (Eds.), Edward Elgar: Cheltenham, Northampton, p.117-137, ISBN: 1840643781.

NAL Call Number: QH353.E36 2000

Keywords: disease, viral, control, ecological consequences, food webs, population dynamics, habitat impact, Australia.

White, P.C.L.; Newton, C., Geraldine, A.; Gray, M.; Ashford, R.; White, C.; Saunders, G. (2003). **Spatial interactions and habitat use of rabbits on pasture and implications for the spread of rabbit haemorrhagic disease in New South Wales.** *Wildlife Research* 30 (1): 49-58. ISSN: 1035-3712.

NAL Call Number: S960.W5

Keywords: *Oryctolagus cuniculus*, viral diseases, rabbit hemorrhagic disease, population control, habitat utilization, surface range rabbits, warren based rabbits.

Wilkinson, M.J.; Bell, S.; McGoldrick, J.; Williams, A.E. (2001). **Unexpected deaths in young New Zealand White rabbits (*Oryctolagus cuniculus*).** *Contemporary Topics in Laboratory Animal Science* 40 (4): 49-51, ISSN: 1060-0558.

NAL Call Number: SF405.5A23

Keywords: breed, New Zealand White, liver pathology, hepatic coccidiosis, parasitic disease, differential diagnosis, symptoms, histopathology, microscopy method, unexpected deaths, origin of outbreak.

Wolvekamp, W.T.C. (1996). **Radiology of exotic pets (small mammals, birds, and reptiles).** *Veterinary Quarterly* 18 (Suppl.): S52-S54, ISSN: 0165-2176.

NAL Call Number: SF601.V46

Keywords: pets, diagnosis, radiography, poultry, rodents, mammals, birds, reptiles, guineapigs, rabbits, pigeons.

Worell, A.B.; Nelson, W.B.; Vogel, K.; Goebel, G. (1999). **Potential zoonotic diseases in exotic pets.** *Exotic Pet Practice* 4 (8): 57-58, 60.

Keywords: birds, reptiles, rabbits, ferrets, guineapigs, rodents, zoonoses.

Zheng, T.; Napier, A.M.; Parkes, J.P.; O'Keefe, J.S.; Atkinson, P.H. (2002). **Detection of RNA of rabbit haemorrhagic disease virus from New Zealand wild rabbits.** *Wildlife Research* 29 (6): 683-688, ISSN: 1035-3712.

NAL Call Number: S960.W5

Keywords: wild rabbits, parasites, diseases and disorders, rabbit hemorrhagic disease virus (RHDV), antibodies, New Zealand.

[Return to Top](#)

[Return to Contents](#)

Housing

Amand, D. (1999). **Les points faibles des batiments lapins. [Weak points in rabbit housing.]** *Cuniculture* (147): 137-138, 140, ISSN: 0152-3058.

Keywords: housing, animal health, respiratory diseases, digestive disorders, rabbit diseases, ventilation, heating, environmental control, isolation, rabbit droppings, animal diseases, Staphylococcus, French language, France.

Anous, M.R.; Mourad, M.; Ayyat, M.S. (2002). **Evaluation of carcass composition of New Zealand White rabbits raised in two different housing systems.** *Egyptian Journal of Rabbit Science* 12 (2): 155-164, ISSN: 1110-2594.

Keywords: New Zealand White breed, housing, husbandry, carcass composition, carcass quality, carcass weight, carcass yield, selection criteria, selective breeding, slaughter weight, Egypt.

Ashour, G. (2001). **Physiological adaptation of rabbits' kits to housing conditions as related to growth.** *Egyptian Journal of Rabbit Science* 11 (1): 115-137, *Egyptian Rabbit Science Association*, ISSN: 1110-2594.

Keywords: breed, New Zealand White, housing, environmental impact, type of roofing, concrete roof, double metal sheets, single metal sheet roof, age differences, feed conversion efficiency, feed intake, growth, hematocrit, liveweight, seasonal variation.

Association Francaise de Cuniculture (2001). **12th Symposium on Housing and Diseases of Rabbits, Furbearing Animals and Pet Animals. Celle, Germany, 9-10 May 2001.** *World Rabbit Science* 9 (3): 123-133, ISSN: 1257-5011.

NAL Call Number: SF402.3.A7 2001

Keywords: furbearing animals, pets, animal diseases, housing, nutrition, animal products, animal welfare, disease control, genetics, quality, reproduction, rabbits.

Autissier, C.; Bougneux, P.; Chayer, J.; Pouchelon, E. (2002). **Observation des rachis de lapins hébergés sur de longues périodes dans les conditions de stabulation conformes celles préconisées dans l'annexe A de la convention STE 123. [Observation of rachis in rabbits during long periods in caged conditions conforming to those described in annex A of the STE 123 convention.]** *STAL* 27 (2): 143-151, ISSN: 0339-722X.

Keywords: housing, animal welfare, legislation, lack of justification, cages, cage size, platforms, abnormal bone development, rachis, study validation, x-rays, French language.

Bargain, V. (2002). **Systeme Cuniconfort, un concept d'atelier performant. [The "Cuniconfort" system, a concept for high performance.]** *Cuniculture* 163: 13-15, 17-18, ISSN: 0152-3058.

Keywords: meat animals, feeding, housing. interconnected sheds, mutiple-purpose flat-deck cages, air conditioning

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NAL Call Number: QL55 I5

Keywords: breed, Sandy lop, housing, behavior, enrichment, group housing, floor pens.

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NAL Call Number: QL55 I5
Keywords: body weight, weight losses.
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NAL Call Number: SF1.A66
Keywords: breed, New Zealand White, meat animals, housing systems, comparison, double-tiered, galvanized metal cages, pens on deep litter, multi-tiered wooden cages kept outdoors, animal welfare, carcass composition, carcass weight, feed intake, finishing, growth, liveweight gain, pens, performance traits.
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NAL Call Number: SF1.L5
Keywords: hybrid males, housing systems, comparison, wire netting, litter, straw bedded, animal behavior, growth, meat quality, stocking density, growth rate, liveweight gain, mortality, dressing percentage, carcass composition, body fat, muscles, pH, color, lipid peroxidation, oxidation, inhibitors.
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NAL Call Number: S542.A8A34 no. 99
Keywords: breed, Canberra, half lop rabbits, fryer rabbits, deep litter housing, stocking densities, fattening performance, feed conversion, efficiency, feed intake, stocking density, Papua New Guinea.
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NAL Call Number: 41.8 IN2
Keywords: New Zealand White, Soviet Chinchilla, breeds, meat animals, housing, hutches, breed differences, coccidiosis, floor space, morbidity, mortality, seasonal variation, summer, India.
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NAL Call Number: 41.8 IN2
Keywords: breed differences, Soviet Chinchilla, New Zealand Whites, carcass composition, carcass weight, dressing percentage, floor space, liveweight, offal, housing, slaughter weight.
- Drescher, B.; Reiter, J. (1996). **Untersuchungen zur Optimierung der Gruppengröße bei Mastkaninchen in Gruppenhaltung auf Kunststoffrosten.** [The optimization of group size for fattening rabbits in group housing on grids made of artificial material.] *Berliner und Münchener tierärztliche Wochenschrift* 109 (8): 304-8.
NAL Call Number: 41.8 B45
Abstract: ZIKA-fattening rabbits in groups of 4, 8, 16, 32 and 64 animals (5 rabbits/m²) have been proved in 6 repetitions with all together 144 animals during the fattening period of nine weeks in regard to their fattening performance, health and behaviour. The aim was to find an optimal group size for fattening rabbits with respect to animal welfare. The results show, that fattening performance and health of the rabbits have not been influenced remarkably by group size, whereas behaviour was different in so far, as the rabbits in groups of 16 showed a greater percentage of relaxed positions as well as a remarkable smaller percentage of aggressive behaviour. Therefore the group with 16 fattening rabbits is that, which can be advised for the fattening of rabbits in the Hohenheimer group housing.

Keywords: husbandry, animal welfare, behavior, female, male, floors, floor coverings, health status, housing, population density, growth and development, psychology, German language.

Fantuzzi, P. (1999). **Attrezzature giuste per allevatori in gamba. [Correct equipment for good breeders.]** *Rivista di Coniglicoltura* 36: 2, 21-24.

NAL Call Number: SF451.R5

Keywords: housing, animal welfare, production, intensive rabbit rearing, cage flooring, wall design, water dispensers.

Fernández Carmona, J.; Cervera, C.; Sabater, C.; Blas, E. (1995). **Effect of diet composition on the production of rabbit breeding does housed in a traditional building and at 30 deg C.** *Animal Feed Science and Technology* 52 (3/4): 289-297, ISSN: 0377-8401.

NAL Call Number: SF95.A55

Keywords: breed, New Zealand White crossbreds, feeding, rabbit milk, yields, heat stress, liveweight gain, mortality, litter weight, reproduction, feed intake, fibre, intake, environmental temperature, milk yield, nutrition.

Finzi, A.; Margarit, R. (1999). **Gabbie del passato e modelli per il futuro. [Cages from the past and models for the future.]** *Rivista di Coniglicoltura* 36: 2, 25-29, ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: housing, traditional systems, modern systems, caging, outdoor rearing, cement rearing units, Italian language.

Finzi, A.; Amici, A. (1996). **A new open-air rabbit-farming system.** In: *Livestock Farming Systems: Research, Development Socio-Economics and Land Management. Proceedings of the Third International Symposium Aberdeen, Scotland, 1-2 September, 1994*, Dent, J.B.; McGregor, M.J.; Sibbald, A.R. (Eds.), pp. 178-182. Wageningen Pers: Wageningen, Netherlands, ISBN: 90-74134-40-8.

NAL Call Number: 49.9 Eu7 no.79

Keywords: husbandry, breeding, extensive farming, reproduction, animal welfare, Southern Europe.

Gacek, L.; Barabasz, B. (2002). **Improvement of welfare using plastic crates in commercial rabbit breeding.** *Annals of Animal Science* 2 (Suppl. 1): 191-194, ISSN: 1642-3402.

NAL Call Number: SF1.A66

Keywords: New Zealand White, commercial breeding, animal welfare, meat animals, plastic crates, disinfection, feed conversion efficiency, female animals, reproductive performance, finishing, liveweight gain, pups, housing.

Gacek, L. (2002). **Effect of visual contact on reproductive and rearing performance of rabbits.** *Annals of Animal Science* 2 (Suppl. 1): 181-184, ISSN: 1642-3402.

NAL Call Number: SF1.A66

Keywords: cages, cage design, galvanized wire-mesh cages, plastic cages allowing visual contact, non-transparent plastic cages, indoor rearing, outdoor rearing, conception rate, fattening performance, feed conversion, feed intake, finishing, liveweight gain, housing, reproductive performance, Poland.

Gao, W.Y.; Wu, Y.; Xue, J. (2003). **Natural lighting rabbitry design.** *Journal of Economic Animal* 7 (2): 18-20, ISSN: 1007-7448.

Keywords: housing, design, husbandry, farm structure, natural light, lighting parameters, open angle of incident daylight, span of incident daylight and incident angle, Chinese language.

Gerson, P. (2000). **The modification of "traditional" caging for experimental laboratory rabbits and assessment by behavioural study.** *Animal Technology: Journal of the Institute of Animal* 51 (1): 13-36.

NAL Call Number: QL55 I5

Keywords: cages, enrichment.

Gilmore, J. (1995). **Building a rabbit shelter for temperate climates.** *Small Farm Today* 12 (3): 38-39.

NAL Call Number: S1 M57

Keywords: housing, design, construction.

Hackbarth, H.; Bohnet, W.; Tsai, P. (1999). **Allometric comparison of recommendations of minimum floor areas for laboratory animals.** *Laboratory Animals* 33 (4): 351-5, ISSN: 0023-6772.

NAL Call Number: QL55 A1L3

Abstract: The recommendations for minimum floor area given in the European Convention for the Protection of Vertebrate Animals used for Experimental and other Scientific Purposes (1986), as well as in the Publication on the Planning and Structure of Animal Facilities for Institutes Performing Animal Experiments of the Society for Laboratory Animal Science (GV-SOLAS 1989), are plotted in a double logarithmic system in order to get an allometric function of recommended floor area to body weight. Both recommendations correspond very well with the so-called metabolic body weight seen at the allometric exponent of 0.73 and 0.70 respectively. Thus the recommendations in general attribute the floor space according to the metabolic body weight of the animal. Nevertheless, despite this general rule, some species are recommended less space than others when measured on this allometric scale. Thus it must be questioned why, for example, rabbits, chicken and pigs are recommended less space than other species. The general allometric measure seems at least to be a good scale for the comparison of recommended floor space, and for the discussion of species-specific needs for more or less space.

Keywords: cats, dogs, guinea pigs, rodents, rabbits, primates, swine, chickens, husbandry standards, laboratory animals.

Hansen, L.T.; Berthelsen, H. (2000). **The effect of environmental enrichment on the behaviour of caged rabbits (*Oryctolagus cuniculus*).** *Applied Animal Behaviour Science* 68 (2): 163-178, ISSN: 0168-1591.

NAL Call Number: QL750 A6

Keywords: housing, cages, conventional caging, enriched caging, shelter, platforms, animal welfare, space requirements, stress, enrichment, behavior, restlessness, timidity grooming, bar-gnawing.

Held, S.D.E. (1995). **Choices of laboratory rabbits for individual or group-housing.** *Applied Animal Behaviour Science* 46 (1/2): 81-91, ISSN: 0168-1591.

NAL Call Number: QL750 A6

Keywords: housing, groups, social dominance.

Held, S.D.E. (2001). **The behavioural repertoire of non-breeding group-housed female laboratory rabbits (*Oryctolagus cuniculus*).** *Animal Welfare* 10 (4): 437-443. ISSN: 0962-7286.

NAL Call Number: HV4701 A557

Keywords: female animals, floor pens.

Hubrecht, R.; Beeston, D.; Cubitt, S.; Gunn-Dore, D.; Grey, C.; Hawkins, P.; Howard, B.; McBride, A.; Moore, S.; Ostle, T.; Wickens, S.; Weduwen, S. der; Wills, T. (1999). **Refining rabbit housing, husbandry and procedures: report of the 1998 UFAW/RSPCA Rabbit Behaviour and Welfare Group Meeting.** *Animal Technology* 50 (3): 155-164, ISSN: 0264-4754.

NAL Call Number: QL55 I5

Keywords: housing, husbandry, animal welfare, behavior, floors, cages, legislation, laboratory animals.

Hubrecht, R. (2000). **Advancing rabbit and rodent housing and husbandry research.** In: *Progress in the Reduction, Refinement and Replacement of Animal Experimentation: Proceedings of the 3rd World Congress on Alternatives and Animal Use in the Life Sciences, Bologna, Italy, August 29 to September 2, 1999*, Balls, M.; Zeller, A.M. van; Halder, M.E. (Eds.), Elsevier Science B.V.: Amsterdam, Netherlands, pp. 1257-1267, ISBN: 0-444-50529-6.

NAL Call Number: QL1.D48 v. 31

Keywords: laboratory animals, rodents, rabbits, experiments, housing, husbandry, animal welfare, enrichment.

Ivan, T.; Guido, G.; Clara, C. (2003). **Effetto della tecnica del cambio gabbia sulle performance di coniglie sottoposte ad un ritmo riproduttivo estensivo. [Effect of changing cages on the reproductive performance of extensively reared rabbits.]** *Rivista di Coniglicoltura* 40 (1): 57-60.

NAL Call Number: SF451.R5

Keywords: housing, cages, cage changing, conception rate, litter size, mortality, reproduction, stillbirths, Italy, Italian language.

Kersten, A.M.P. (1995). **Nesting behaviour and reproduction of individually caged and group housed rabbits.** In: *Proceedings of the 29th International Congress of the International Society for Applied Ethology: Exeter, UK, 3-5 August, 1995*, Rutter, S.M.; Rushen, J.; Randle, H.D.; Eddison, J.C. (Eds.), Universities Federation for Animal Welfare (UFAW): Potters Bar, United Kingdom, pp. 189-190, ISBN: 0-900767-92-8.

NAL Call Number: SF756.7.I57 1995

Keywords: mating behavior, cages, groups.

Klusek, J.; Rafay, J.; Swiderska-Kolacz, G.; Kolataj, A. (1995). **Influence of displacement stress on the concentration of some lipids in rabbit organs.** *Archiv für Tierzucht* 38 (6): 673-677, ISSN: 0003-9438.

Keywords: New Zealand White, Zobor, Nitran breed, genetic strain, displacement, stress, lipids, organs, cholesterol, animal welfare, housing, breeds, kidneys, liver, serum, lipid metabolism, breed differences, triglycerols, husbandry, cage changes.

Kowalska, D.; Bielanski, P.; Brzozowski, M. (2002). **Effect of pen size on young rabbit welfare.** *Annals of Animal Science* 2 (Suppl. 1): 195-198, ISSN: 1642-3402.

NAL Call Number: SF1.A66

Keywords: breed, New Zealand White, animal welfare, female animals, floor area, milk production, pens, rabbit housing, reproductive performance, size, space requirements.

Krohn, T.C. (1999). **The effects of feeding and housing on the behaviour of the laboratory rabbit.** *Laboratory Animals* 33 (2): 101-107, ISSN: 0023-6772.

NAL Call Number: QL55 A1L3

Keywords: feeding, timing, abnormal behavior, bar biting, housing, group housing, floor pens, cages.

Kuznetsov, L.V. (1999). **Systems for housing rabbits. Russia.** *Krolikovodstvo i Zverovodstvo* (3): 28-30, ISSN: 0023-4885.

NAL Call Number: 40.28 K9

Keywords: production, housing, cages, sheds, structures, microclimate, Russia, Russian language.

Lambertini, L.; Vignola, G.; Zaghini, G. (2001). **Alternative pen housing system for fattening rabbits: effects of group density and litter.** *World Rabbit Science* 9 (4): 141-147, ISSN: 1257-5011.

NAL Call Number: SF402.3.A7 2001.

Keywords: housing systems, comparison, cages, cage raised, group housed, pen raised, wheat straw litter, wood shavings litter, meat animals, meat quality, carcass quality, carcass weight, dressing percentage, fat, feed conversion efficiency, feed intake, finishing, growth rate, liveweight gain, mortality, protein content, slaughter weight, stocking density, water content.

Lambertini, L.; Vignola, G.; Gramenzi, A.; Zaghini, G.; Benassi, M.C. (2001). **Allevamento alternativo del coniglio su lettiera: effetti di densità e livello proteico dei mangimi. [Alternative husbandry for rabbits on litter. Effects of rabbit density and the protein content of feed.]** *Rivista di Coniglicoltura* 38 (5): 57-60, ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: husbandry, cages, deep-litter pens, feed conversion efficiency, dietary protein, litter, liveweight gain, performance, feeding, stocking density.

Lebas, F.; Coudert, P.; De Rochambeau, H.; Thebault, R.G. (1997). **The Rabbit: Husbandry, Health and Production**, FAO (Food and Agriculture Organization), Animal Production and Health Division: Rome, Italy, 205 p., ISBN-92-5-103441-9.

Keywords: husbandry, production, health, nutrition, feeding, reproduction, breeds, breeding, housing, rabbit meat, hides and skins, hair, rural development, diseases, animal products, meat, production, socioeconomic development.

- Lebas, F. (2001). **Engraissement en parcs: avantages et inconvénients. [Fattening in enclosures: advantages and disadvantages.]** *Cuniculture* 160: 163, 165-167, 169-170, ISSN: 0152-3058.
Keywords: aggressive behavior, housing, wire-walled pens, carcass yield, fattening performance, mortality, pens, French language.
- Lella, T. di; Nizza, A.; Meo, C. di; Cutrignelli, M. I.; Mascia, G. (1996). **Prestazioni produttive di conigli in accrescimento allevati all'aperto o in ambiente condizionato. [Performance of growing rabbits raised outdoors or in an air-conditioned shed.]** *Zootecnica e Nutrizione Animale* 22 (6): 379-386, ISSN: 0390-0487.
NAL Call Number: SF1.Z6
Keywords: breed, Hyla, housing, seasonal variation, outdoor cages, air-conditioned sheds, environmental temperature, liveweight gain, feed intake, winter, spring, summer, organs, body weight, carcass composition, carcass yield, feed conversion efficiency, Italian language.
- Lenarduzzi, M.; Borso, F. da (1997). **Aspetti igienico-sanitari in diverse tipologie di allevamenti cunicoli. [Hygiene and health aspects of various types of rabbit housing.]** *Rivista di Coniglicoltura* 34 (2): 51-55, ISSN: 0010-5929.
NAL Call Number: SF451.R5
Keywords: diseases, hygiene, housing, Italian language.
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NAL Call Number: 410.9 P94
Keywords: group housing, single caging, group sizes, management, space allocation, diet, stress, stereotypy, behavior, activity, disease, economic guidelines.
- Lupo, C.; Fontani, G.; Girolami, L.; Lodi, L.; Muscettola, M. (2000). **Immune and endocrine aspects of physical and social environmental variations in groups of male rabbits in seminatural conditions.** *Ethology, Ecology and Evolution* 12 (3): 281-289, ISSN: 0394-9370.
NAL Call Number: QL750.E82
Keywords: proteins, IFN [gamma], production in peripheral blood mononucleated cells, glucocorticoid receptor activity, evidence for endocrine links with social environmental changes, plasma corticosterone levels, immune parameter links, social environmental change relations, hormones, social environmental variation relations, agonistic behavior, seminatural conditions.
- Luzi, F.; Heinzl, E.; Crimella, C.; Orsenigo, R.; et al. (1996). **Utilizzo di materiali alternativi per la preparazione del nido nella specie cunicola: aspetti produttivi e sanitari. [Utilization of alternative materials for rabbit nest boxes: production and health aspects.]** *Rivista di Coniglicoltura* 33 (7/8): 53-57, ISSN: 0010-5929.
NAL Call Number: SF451.R5
Keywords: housing, nests, nest box lining, litter, wool, paper, contamination, growth, bacteria, fungi, mortality, Italian language.
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NAL Call Number: SF451.R5
Keywords: nest boxes, statistical methods, mortality, weight gain, animal performance, biological contamination, cladosporium, wool, paper, respiratory diseases, veterinary hygiene, microbiological analysis, housing, biological analysis, contamination, deuteromycotina, fungi, hygiene, Italy, Italian language.
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Keywords: breed, Hyla and Grimaud hybrids, New Zealand White, finishing, cages, fattening, performance, mortality, respiratory diseases, strains, growth, housing, outdoor rearing systems, caging, husbandry, seasons,

heat stress, Italy.

- Marionnet, V. (2001). **Optimiser le logement avec un sevrage adapté. [Optimised housing for early weaned rabbits.]** *Cuniculture* 159: 109-111, ISSN: 0152-3058.
Keywords: meat animals, housing, sheds, cages, nest boxes, “all in, all out” system, husbandry, production systems, France, French language.
- Marionnet, D. (1998). **Désinsectisation ou la destruction des mouches et insectes dans les élevages. [Disinsectization or fly and insect control in rabbit housing.]** *Cuniculture* 141: 124-125, 127-128, ISSN: 0152-3058.
Keywords: livestock, housing, pest control, insects, French language, France.
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NAL Call Number: HV4701 A557
Keywords: meat animals, finishing, cages.
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NAL Call Number: SF402.3.A7 2001
Keywords: production, reproduction, breeding, nutrition, management, milk yield, growth, meat carcasses, probiotics.
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NAL Call Number: SF402.3.A7 2001
Keywords: disease, housing, care, production, German and English language.
- Meo, C. di; Piccolo, G.; Stanco, G.; Gazaneo, M.P.; Taranto, S.; Nizza, A. (2003). **Effect of density and group composition on the performance of fattening rabbits.** *Italian Journal of Animal Science* 2 (Suppl. 1): 441-443, ISSN: 1594-4077.
NAL Call Number: SF1.I83
Keywords: housing, feed conversion, feed conversion efficiency, feed intake, finishing, growth rate, liveweight gain, mortality, sex differences, skin lesions, stocking density, trauma.
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NAL Call Number: SF402.3.A7 2001
Keywords: New Zealand White, housing, deep litter, pen-housed, cage-housed, carcass composition, carcasses, dressing percentage, fat, legs, liveweight, meat quality, pens, pH, protein, rabbit meat, water content.
- Michl, R.; Hoy, S. (1996). **Ergebnisse kontinuierlicher Gasmessungen in der Mastkaninchenhaltung mit Hilfe des Multigasmonitoring. [Results of continuous gas measurements rabbit housing by using multi-gas monitoring.]** *Berliner und Munchener tierarztliche Wochenschrift* 109 (9): 340-3, ISSN: 0005-9366.
NAL Call Number: 41.8 B45
Abstract: Investigations of slatted floor keeping of rabbits in an air conditioned chamber with multigas monitoring over a period of more than two month have shown that the average values per week were on a low level between 575 and 685 ppm (carbon dioxide), 3.4 and 5.6 ppm (ammonia) resp. Concentration of ammonia reached in maximum 12.3 ppm for a short time. Nitrous oxide concentration was measured on a global value (253 up to 317 ppb). A slight tendency of increasing CO₂ and NH₃ values with the begin of light period--obviously related to increased locomotoric activity--approximately was observed. In slatted floor keeping

calculated emission of ammonia was very low (0.23 gram per 500 kg an hour).

Keywords: air conditioning, air pollution, ammonia, analysis, carbon dioxide, gases, housing, nitrous oxide, time factors, German language.

Mobolaji-Bukola, P.U.; Allison-Oguru, E.A.; Berepubo, N.A.; Oruwari, B.M. (2002). **Bio-economic evaluation of the performance of rabbits raised under two different housing systems.** *Tropicultura* 20 (4): 176-180, ISSN: 0771-3312.

NAL Call Number: HD1417.T76

Keywords: breed, Chinchilla, New Zealand White, Dutch housing, comparison, conventional hutch with cage system versus non-conventional floor housing system, meat animals, body weight, cost benefit analysis, economic evaluation, housing, Nigeria, West Africa.

Morisse, J.P. (1999). **Benessere animale, obiettivo prioritario. [Animal welfare, an important objective.]** *Rivista di Coniglicoltura* 36 (1): 20-27, ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: animal welfare, behavior, housing, Italian language.

Morisse, J.P. (1999). **Preference testing in intensively kept meat production rabbits for straw on wire grid floor.** *Applied Animal Behaviour Science* 64 (1): 71-80, ISSN: 0168-1591.

NAL Call Number: QL750 A6

Keywords: litter, straw, floor type.

Mucci, G. (2001). **Un buon ambiente per un buon coniglio. [A good environment provides good rabbits.]** *Rivista di Coniglicoltura* 38 (2): 26-28, ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: meat animals, drinking water, female fertility, light, meat quality, housing, temperature, ventilation, water quality, water temperature, Italian language, Italy.

Nieves, D.; Luna, A.; Febres, D. (1996). **Effecto de la densidad de alojamiento en conejos de engorde. [Effect of housing density in fattening rabbits.]** *Revista Unelvez de Ciencia y Tecnología, Producción Agrícola* 14 (2): 21-32.

Keywords: housing, stocking density, growth, feed conversion efficiency, mortality, stress, feed intake, Spanish language, Venezuela.

Nizza, A.; Cutrignelli, M.I.; Sandulli, S. (2001). **Influenza del vuoto sanitario sulle performances di conigli in accrescimento. [Effect of “all in-all out” on performance of growing rabbits.]** *Rivista di Coniglicoltura* 38 (2): 31-34, ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: meat animals, housing, sheds, “all in-all out” system, husbandry, carcass weight, contamination, disinfection, fattening performance, feed conversion, hygiene, liveweight gain, performance, bacteria, Italy, Italian language.

Odier, C.; Lafargue-Hauret, P.; Remois, G.; Ledan, L (1999). **Quel est l’avenir de la pratique d’un vide sanitaire global? [What is the future of the all in-all out method (in rabbit housing)?].** *Cuniculture* 149: 223-229, ISSN: 0152-3058.

Keywords: housing, mortality, disease prevention, French language.

Oliveira, M.C.; Almeida, C.V. (2002). **Desempenho de coelhos em crescimento criados em diferentes densidades populacionais. [Performance of growing rabbits reared under different stocking densities.]** *Arquivo Brasileiro de Medicina Veterinaria e Zootecnia*. 54 (5): 530-533, ISSN: 0102-0935.

NAL Call Number: SF604 .A76

Keywords: growing rabbits, body weight, daily ration consumption, daily weight gain, feed gain ratio, production performance, rearing conditions, stocking density, total meat production, Portuguese language.

Owiny, J.R. (2001). **Hip dysplasia in rabbits: association with nest box flooring.** *Comparative Medicine* 51 (1): 85-

88, ISSN: 0023-6764.

NAL Call Number: SF77 C65

Keywords: laboratory mammals, hip dysplasia, floor type.

Paci, G.; Cossato, M.M.F. di; Piloni, S.; Bagliacca, M. (1999). **Effetto della stagione e della tecnica di allevamento sulle prestazioni produttive e sulla qualità della carne di coniglio.** [Effect of season and housing system on productive performance and meat quality of rabbit.] *Rivista di Coniglicoltura* 36 (9): 30-36, ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: meat animals, meat quality, performance, cages, open air housing, dry matter, feed intake, growth rate, mortality, winter, feed conversion, summer, housing, Italian language.

Papp, Z. (1997). **Klímaélettani vizsgálatok nyulakon.** [Studies on the climate physiology of broiler rabbits.]

Magyar Állatorvosok Lapja 119 (2): 85-88, ISSN: 0025-004X.

NAL Call Number: 41.8 V644

Keywords: climate, physiology, housing, climatic factors, environmental temperature, Hungarian language.

Radev, V.; Petkova, O.; Varlyakov, I.; Otuzbirov, R. (1997). **Influence of free box raising and final fattening in cages on some biochemical parameters of rabbit meat from White New Zealand breed.** *Zhivotnov'dni Nauki* 0 (Suppl.): 18-22.

Keywords: breed, New Zealand White, finishing, amino acids, liver, longissimus dorsi, muscles, protein synthesis, free range husbandry, lipids, nucleic acids, body weight, Bulgarian language.

Raje, S. (1997). **Group housing for male New Zealand White rabbits.** *Lab Animal* 26 (4): 36-38, ISSN: 0093-7355.

NAL Call Number: QL55 A1L33

Keywords: strains, housing, behavior patterns, enrichment, animal welfare.

Restelli, G.L.A.; Tangorra, F.M. (2000). **La gestione delle deiezioni negli allevamenti intensivi.** [Excrement management in intensive animal rearing.] *Rivista di Coniglicoltura* 37 (5): 40-42, ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: intensive rabbit breeding, meat animals, manure, removal, animal welfare, toxic gases, costs, droppings, housing, belt conveyors, noise, Italian language, Italy.

Rommers, J.M.; Meijerhof, R. (1998). **La dimension de la cage influence-t-elle la productivité et le bien-tre des lapines?** [Does cage size affect the productivity and welfare of female rabbits?] *Cuniculture* 140: 67-72, ISSN: 0152-3058.

Keywords: females, female fertility, litter size, behavior, animal welfare, housing, management, cages, cage size, weaning weight, French language, Netherlands.

Rommers, J.; Meijerhof, R. (1998). **Effect of group size on performance, bone strength and skin lesions of meat rabbits housed under commercial conditions.** *World Rabbit Science* 6: 3-4, 299-302, ISSN: 0984-7847.

NAL Call Number: SF402.3.A7 2001

Keywords: housing, group size, density, floor space, finishing, behavior, aggression, skin lesions, weight gain, trauma, bones, bone strength.

Skolarski, I. (2001). **Vergleichende Untersuchungen zur Käfighaltung von Weiblichen Laborkaninchen in Einzel- und Paarhaltung.** [Comparative studies on the housing of single and pair-caged female laboratory rabbits.]

Freie Universität Berlin: Berlin, Germany, 176 p.

Keywords: laboratory animals, thesis, behavior, aggressive, animal welfare, cages, physical activity, housing, German language.

Stauffacher, M. (2000). **Refinement in rabbit housing and husbandry.** In: *Progress in the Reduction, Refinement and Replacement of Animal Experimentation: Proceedings of the 3rd World Congress on Alternatives and Animal Use in the Life Sciences, Bologna, Italy, August 29 to September 2, 1999*, Balls, M.; Zeller, A.M. van; Halder,

M.E. (Eds.), Elsevier Science B.V.: Amsterdam, Netherlands, pp. 1269-1277, ISBN: 0-444-50529-6.

NAL Call Number: QL1.D48 v. 31

Keywords: laboratory animals, rabbits, behavior, experiments, housing, husbandry, cages, stocking density.

Tangorra, F.M.; Restelli, G.L.A. (2000). **Il tunnel, una soluzione alternativa.** [The tunnel, an alternative solution.] *Rivista di Coniglicoltura* 37 (3): 11-15, ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: housing, tunnels, protective structures, plastic tunnels, environmental control, domestic animals, livestock, Italian language.

Turner, R.J.; Held, S.D.; Hirst, J.E.; Billingham, G.; Wootton, R.J. (Oct, 1997). **An immunological assessment of group-housed rabbits.** *Laboratory Animals* 31 (4): 362-72, ISSN: 0023-6772.

NAL Call Number: QL55 A1L3

Abstract: Laboratory rabbits kept in barren "traditional" cages tend to develop stereotypic behaviours and bone deformities. We have used an alternative regime, housing adult does as groups of four or five in floor pens (2.5-3 m²) supplied with hiding places and bedding. High- and low-ranking members of each group were identified, and their immunological status compared in terms of blood leucocyte function (chemiluminescence and mitogen tests), complement activity, and antibody production to soluble and cellular antigens. We found no evidence of immunosuppression, either in groups of a "docile" breed (New Zealand White) or Dutch crosses. These results, together with the animals' general health and ease of handling, lead us to conclude that group-housed does are suitable for raising antisera and other purposes, provided that they are adequately monitored.

Keywords: antibody formation, immunology, animal behavior, physiology, complement activation, housing, phagocytes, drug effects, metabolism, respiratory burst.

Verga, M.; Ferrante, V. (2002). **La ricerca su benessere e adattamento nel coniglio.** [Studies on well-being and adaptation of intensively-reared rabbits.] *Rivista di Coniglicoltura* 39 (2): 31-34, 36-39, ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: animal welfare, well-being, adaptation, housing, Italian language.

World Rabbit Science Association (1996). **Abstracts of papers presented during the 9th Symposium on Housing and Diseases of Rabbits, Furbearing Animals and Fancy Pet Animals, Celle, Germany, May 10-11, 1995.** *World Rabbit Science* 4 (1): 1-10, ISSN: 0984-7847.

NAL Call Number: SF402.3.A7 2001

Keywords: rabbit diseases, furbearing animals, breeding, nutrition, physiology, feeding.

Xylouri-Frangiadaki, E.; Tserveni-Gousi, A.; Kouris, J. (2003). **L'allevamento del coniglio in Grecia.** [Rabbit farming in Greece.] *Rivista di Coniglicoltura* 40 (1): 28-31, ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: housing, hutches, sheds, cages, husbandry, litter size, meat production, Greece, Italian language.

[Return to Top](#)

[Return to Contents](#)

Laboratory and Clinical Techniques

Abell, P. (1995). **Novel restraint device for oral dosing of rabbits.** *Contemporary Topics in Laboratory Animal Science* 34 (6): 86-87, ISSN: 1060-0558.

NAL Call Number: SF405.5.A23

Keywords: oral administration, restraint of animals, behavior, animal welfare.

Aleman, C.L.; Noa, M.; Mas, R.; Rodeiro, I.; Mesa, R.; Menendez, R.; Gamez, R.; Hernandez, C. (2000). **Reference data for the principal physiological indicators in three species of laboratory animals.** *Laboratory Animals London* 34 (4): 379-385.

NAL Call Number: QL55.A1L3

Keywords: laboratory animal, mouse, strain, NMRI, dog, breed, beagle, rabbit, New Zealand, reference data, principal physiological indicators, inter laboratory comparisons, species related reference data, sex differences, hematology, organ weight to body weight ratio, serum biochemistry.

Barnett, S.W. (2001). **Introduction to Animal Technology** Blackwell Science Ltd.: Oxford, UK; Malden, MA, 112 p., ISBN: 0632055944.

NAL Call Number: SF406.I58 2001

Keywords: laboratory animal, care and use, scientific research, hamster, cat, dog, ferret, guineapig, marmoset, mouse, rat, rabbit, rhesus monkey, housing, environment, management, routine procedures, technology, animal welfare, breeding, caging, euthanasia, experimentation, feeding, handling, health status, hygiene, identification, laboratory safety, physical development, sexing, watering, careers, animal technology, legislation, Animals Scientific Procedures Act of 1986.

Bayans, M. (1998). **Some Preferred Techniques for the Laboratory Rabbit.** [*Quelques Techniques Choisies Pour Le Lapin De Laboratoire.*] Canadian Association of Laboratory Animals Science: Winnipeg, Canada. VHS video cassette (17 min).

NAL Call Number: Videocassette no. 2792

Abstract: This is the second video in our species specific series on laboratory techniques. Safe handling and restraint for injections, blood sampling and anesthesia with resuscitation methods are demonstrated. This training video is designed as a teaching aid to refine, replace and reduce the numbers of rabbits used for demonstration purposes. The target audience includes animal health technologists, graduate students, laboratory assistants and members of animal care and use committees. For more information go to: <http://www.calas-acsal.org/>.

Keywords: laboratory techniques, injections, anesthesia with resuscitation, animal welfare.

Boucher, S. (2001). **Imagerie medicale chez les NAC (nouveaux animaux de compagnie): L'échographie chez les Rongeurs et chez les Lagomorphes.** [*Imaging in new pets: ultrasonography in Rodentia and lagomorphs.*] *Le Point Veterinaire* 32 (214): 12-13, ISSN: 0335-4997.

NAL Call Number: SF602.P6

Keywords: pets, echography, diagnosis, French language.

Brown, S.A. (2001). **The domestic rabbit: husbandry and clinical techniques.** *Proceedings of the North American Veterinary Conference* 15: 843-844. In the volume: *Small Animal and Exotics*. Part of a three volume set.

Meeting held January 13-17, 2001 in Orlando, Florida.

NAL Call Number: SF605 N672

Keywords: caging, exercise, diet, tooth wearing, feed, injuries, handling, veterinary methods, nasogastric tubing, blood collection, fluid administration, catheterization, dacryocystitis.

Chatham, J.C., Blackband, S.J. (2001). **Nuclear magnetic resonance spectroscopy and imaging in animal research.** *ILAR Journal* 42 (3): 189-208, ISSN: 1084-2020.

NAL Call Number: QL55.A1143

Abstract: Nuclear magnetic resonance (NMR) spectroscopy and imaging can be used to investigate, noninvasively, a wide range of biological processes in systems as diverse as protein solutions, single cells, isolated perfused organs, and tissues in vivo. It is also possible to combine different NMR techniques enabling metabolic, anatomical, and physiological information to be obtained in the same experiment. This review provides a simple overview of the basic principles of NMR and outlines both the advantages and disadvantages of NMR spectroscopy and imaging. A few examples of potential applications of NMR spectroscopy and imaging are presented, which demonstrate the range of questions that can be asked using these techniques. The potential impact of using NMR techniques in a biomedical research program on the total number of animals required for specific investigations, as well as the number of animals used in research, are discussed. The article concludes with a personal perspective on the impact of continuing improvements in NMR technology for future applications in animal research.

Keywords: review, mice, rabbits, rats, anatomy, cross-sectional, animal welfare, laboratory animals, physiology, aplysia, cytology, magnetic resonance imaging, magnetic resonance spectroscopy, research methods, tumor cells.

Ewringmann, A.; Göbel, T. (1998). **Untersuchung blutchemischer Parameter bei Heimtierkaninchen.**

[**Examination of chemical parameters in the serum of pet rabbits.**] *Kleintierpraxis* 43 (6): 447-448, 450-452, ISSN: 0023-2076.

Keywords: healthy pet rabbits, blood serum, blood chemistry, urea, creatinine, alkaline phosphatase, parasites, immunodiagnosis, electrolytes, enzymes, urea, creatinine, blood sugar, alkaline phosphatase, protozoal infections, *Encephalitozoon cuniculi*, German language.

Fehr, M. (2002). **Nyulak, tengerimalacok, kistrágcsalók és hüllök állatvédelmi követelményeknek megfelelő eutanáziája.** [Euthanasia of rabbits, guineapigs, rodents and reptiles, respecting animal welfare requirements.] *Magyar Állatorvosok Lapja* 124 (5): 307-311, ISSN: 0025-004X.

NAL Call Number: 41.8 V644

Keywords: guineapigs, mice, rabbits, rats, reptiles, animal welfare, euthanasia, Hungarian language.

Fehr, M. (2002). **Tierschutzgerechte Euthanasie bei Kaninchen, Meerschweinchen, kleinen Nagern und Reptilien.** [Humane euthanasia of rabbits, rodents and reptiles.] *Praktische Tierarzt* 83 (2): 128-135, ISSN: 0032-681X.

NAL Call Number: 41.8 P882

Keywords: rabbits, reptiles, rodents, animal welfare, euthanasia, techniques, German language.

Forcada, F.; Lopez, M. (2000). **Repeated surgical embryo recovery and embryo production in rabbits.** *Animal Reproduction Science* 64 (1-2): 121-126, ISSN: 0378-4320.

NAL Call Number: QP251.A5

Keywords: breed, Gigante de Espana, doe, embryo, female, gonadotropin releasing hormone, corpora lutea, endocrine system, reproductive system, oviduct, intramuscular injection, repeated surgical embryo recovery, experimental method, surgical method, embryo production, ovulation.

Fukase, T. (1998). **Pets. 22. Rabbits clinical (part IV).** *Journal of Veterinary Medicine* 51 (5): 383-384, ISSN: 0447-0192.

Keywords: rabbit diseases, parasitoses, *Eimeria*, *Passalurus ambiguus*, *Cheyletiella*, mites, Japanese language.

Girling, S.J. (2002). **Mammalian imaging and anatomy.** In: *BSAVA Manual of Exotic Pets*, Meredith, A.; Redrobe, S.

(Eds.), 4 ed., pp. 1-12, British Small Animal Veterinary Association: Quedgeley, UK, ISBN: 0-905214-47-1.
NAL Call Number: SF981.B78 2002

Keywords: chinchillas, ferrets, guineapigs, hamsters, rabbits, rats, rodents, anatomy, computed tomography, diagnostic techniques, laboratory animals, magnetic resonance imaging, radiography, ultrasonography.

Haffar, A. (1996). **La consultation du lapin de compagnie: examen clinique, contention, prelevement.**

[**Consultation of the pet rabbit: clinical examination, restraint.**] *Le Point Veterinaire* 28 (178): 55-61, ISSN: 0335-4997.

NAL Call Number: SF602.P6

Keywords: pets, physiology, health, diagnosis, veterinary medicine, French language.

Halliday, L.C.; Artwohl, J.E.; Hanly, W.C.; Bunte, R.M.; Bennett, B.T. (2000). **Physiologic and behavioral assessment of rabbits immunized with Freund's complete adjuvant.** *Contemporary Topics in Laboratory Animal Science* 39 (5): 8-13.

NAL Call Number: SF405.5 A23

Abstract: Although the use of Freund's Complete Adjuvant (FCA) has been discouraged for the production of polyclonal antibodies, little clinical evidence supports the belief that FCA necessarily affects the well-being of immunized rabbits. We designed the present study to determine whether immunization at multiple sites with small volumes of Freund's adjuvant affects rabbit well-being. We injected 18 female New Zealand White rabbits (six animals per group) with antigen in FCA, Freund's Incomplete Adjuvant, or physiologic saline in the following volumes and routes: 0.02 to 0.03 mL intradermally in each of 30 to 40 sites and 0.1 mL subcutaneously in each of two sites. The body weight, temperature, complete blood count, and behavior of the rabbits in the home cage, upon handling, and in an open field did not differ significantly among the immunization groups during the 7-week assessment period. Only the degree of induration around injection sites differed: as expected, FCA induced the greatest response at the injection sites, but the sites were neither ulcerative nor necrotic, nor did palpation of the sites induce any apparent discomfort to the rabbits. We conclude that FCA may be used safely and humanely in rabbits if small volumes are injected intradermally or subcutaneously in multiple sites.

Keywords: animal welfare, behavior, physiology, blood cell count, body temperature, body weight, Freund's adjuvant, administration and dosage, adverse effects, immunology, heat shock proteins, histocytochemistry, immunization, intradermal injections, subcutaneous injections, kidney pathology, liver pathology, lung pathology, muramidase.

Hartmann, K.; Fischer, S.; Kraft, W. (1995). **Heimtiere als Patienten in der Kleintierpraxis. Teil 2. Handhabung, Geschlechtsbestimmung, Blutentnahme, Medikamentenapplikation.** [Small pet animals as patients in veterinary practice. Part 2. Handling, sex determination, blood collection, drug application.] *Tieraerztliche Praxis* 23 (1): 83-91, ISSN: 0303-6286.

Keywords: rabbits, gerbils, guineapigs, hamsters, chinchillas, pets, sampling, blood, application methods, drugs, sex, handling, German language.

Harvey, S.B.; Hatley, C.L.; Holmes, R.L.; Runner, R.R.; Tonry, L.L.; McPherson, J.C. (2001). **Adaptation of a dental RadioVisioGraph unit as a laboratory animal research tool.** *Contemporary Topics in Laboratory Animal Science* 40 (6) :37-40, ISSN: 1060-0558.

NAL Call Number: SF405.5 A23

Abstract: We have adapted the RadioVisioGraph (RVG), a digital radiography system designed for dentistry, to become a versatile research tool in a small research facility. We have used this modified digital imaging system in our institution to assess bone fractures and ossification in rabbit tibias in which titanium posts were placed in close proximity to one another, to evaluate bone fill in rats with experimental cranial critical-size defects, and to ensure the proper placement of oral gavage tubes in rodents. This method provides instantaneous digital radiographs, thus not requiring a dedicated X-ray suite or film-processing equipment, and reduces scatter radiation by < or =95%. The use of this technology in a small research facility has greatly improved the quality of both the care our animals receive and the research data we obtain.

Keywords: rabbits, rats, animal welfare, bone, radiography, equipment design, injuries, dental, tibial fractures, digital.

Hauer, P.J.; Clough, N.E. (1999). **Development of monoclonal antibodies suitable for use in antigen quantification potency tests for clostridial veterinary vaccines.** *Developments in Biological Standardization* 101: 85-94, ISSN: 0301-5149.

NAL Call Number: QR180.3.D4

Abstract: The quality control testing of clostridial veterinary vaccines currently requires large numbers of animals. Alternative in vitro test methods are being investigated by researchers in industry and by regulatory authorities in many countries. Monoclonal antibodies that neutralize *Clostridium perfringens* alpha toxin, *C. perfringens* beta toxin, *C. perfringens* epsilon toxin, and *C. sordellii* lethal toxin as well as a monoclonal antibody directed against *C. chauvoei* flagellar antigen have been developed by the Center for Veterinary Biologics Laboratory for use in antigen quantification assays. A proposal to create an international standard collection of clostridial-specific monoclonal antibodies is made.

Keywords: mice, Inbred BALB C, rabbits, guinea pigs, animal welfare, monoclonal antibodies, therapeutic use, antigens, bacterial analysis, bacterial toxins, immunology, clostridium, veterinary, *Clostridium perfringens*, enzyme-linked immunosorbent assay, hybridomas, immunoassay methods.

Heard, D.J. (1995). **Rabbit supportive care.** *Proceedings of the North American Veterinary Conference* 9: 670-671.

NAL Call Number: SF605.N672

Keywords: veterinary medicine, heart rate and rhythm, blood pressure, hypolemia, intravenous catheterization, intra-osseous catheterization, electrolytes, blood transfusion, endotoxemia, respiratory rate, arterial blood gases, endotracheal intubation, nutritional indicators, dental problems, nasogastric intubation, total parenteral nutrition, product information.

Hoffmann, J.N.; Steinhagen, S.; Kast, C.; Scheuber, H.P.; Jochum, M.; Gippner-Steppert, C.; Inthorn, D.; Schildberg, F.W.; Nolte, D. (2002). **Chronic left heart catheterization for microvascular blood flow determination in the rabbit: a minimally invasive technique using specially designed port devices.** *The Journal of Surgical Research* 102 (2): 119-25, ISSN: 0022-4804.

Abstract: This study describes a modified catheterization technique with subcutaneously implanted port catheters to be inserted in a retrograde manner across the aortic valve into the left heart ventricle through the right carotid artery to measure organ perfusion. **MATERIALS AND METHODS:** The specially designed arterial port catheters were implanted in New Zealand rabbits (n = 11, 3.7 +/- 0.1 kg [mean +/- SEM]) under iv anesthesia (medetomidine/ketamine) and single-shot perioperative antibiotic therapy. Hemodynamics were registered continuously during the operation via an ear artery catheter. **RESULTS:** Implantation of ports was performed in all animals (11/11) without major complications (mean operation time: 70 +/- 3 min). We did not observe catheter-associated arrhythmia, fall in mean arterial pressure (MAP before and post OP: 70 +/- 2 and 68 +/- 2 Torr, respectively), or change in arterial oxygen saturation (SaO₂ before and post OP: 89 +/- 3 and 95 +/- 2%, respectively). With a specifically modified microsurgical insertion technique, cerebral blood supply was effectively preserved as evidenced from postmortem histological examinations, cerebral blood flow determination with fluorescent microspheres, and measurement of S-100b protein serum concentrations, a specific marker of neuronal damage. The positioning of the catheter tip in the left ventricle was found to be correct in 10/11 animals. **CONCLUSIONS:** Repeated and a traumatic microsphere injections into the left ventricle have become feasible by transcutaneous puncture of subcutaneous port systems over several weeks under light sedation. Hence, this new approach (i) avoids the necessity of repeated intracardiac injections and port insertions via thoracotomy, thus reducing the perioperative stress for the animals, and (ii) allows for the first time minimally invasive repetitive and chronic measurements of regional organ blood flow under various experimental settings.

Keywords: breed, New Zealand, catheterization technique, aortic valve, left heart ventricle, right carotid artery, organ perfusion, hemodynamics, perioperative stress reduction.

Kelleher, S.A. (2003). **Surgical considerations.** In: *Scientific Proceedings Veterinary Programme: British Small Animal Veterinary Association 46th Annual Congress, Birmingham, UK, April 3-6, 2003*, Coles, G.; Dobson, J.; Elliott, J.; Elwood, C. (Eds.), British Small Animal Veterinary Association: Quedgeley, UK, pp. 503-508, ISBN: 0-905214-77-3.

Keywords: abscesses, anesthesia, castration, entropion, enucleation, fracture fixation, ovariectomy, preoperative

care, surgery, surgical operations, wound treatment.

- Kiwull, S.H.; Kalhoff, H.; Manz, F.; Diekmann, L.; Kiwull, P. (2001). **Minimal-invasive approach to study pulmonary, metabolic and renal responses to alimentary acid-base changes in conscious rabbits.** *European Journal of Nutrition* 40 (5): 255-259, ISSN: 1436-6207.
NAL Call Number: QP141.A1E97
Keywords: carbonic anhydrase, alimentary acid base load analysis, analytical method, minimal invasive, nutritional method, physiological method, food mineral content, nutrition, rabbit chow, respiratory control.
- Malley, A.D.; Hage, M.H. van der (1996). **The pet rabbit in companion animal practice. 6. Necropsy procedure.** *Irish Veterinary Journal* 49 (8): 488-490, ISSN: 0368-0762.
NAL Call Number: 41.8 IR4
Keywords: pets, postmortem examinations, diagnosis, rabbit diseases.
- Malley, A.D. (1996). **The pet rabbit in companion animal practice. 4. Haematological and biochemical reference values.** *Irish Veterinary Journal* 49 (6): 354-358, ISSN: 0368-0762.
NAL Call Number: 41.8 IR4
Keywords: pets, hematology, blood chemistry.
- Malley, A.D. (1995). **The pet rabbit in companion animal practice. 2. General clinical examination.** *Irish Veterinary Journal* 48 (9): 307-311, ISSN: 0368-0762.
NAL Call Number: 41.8 IR4
Keywords: handling, restraint, small animal practice, veterinary practice, pets, fractures, lacrimal apparatus, skin, thorax, abdomen, mouth, limbs, diagnostic techniques, clinical examination.
- Malley, A.D. (1996). **The pet rabbit in companion animal practice. 3. Special examinations.** *Irish Veterinary Journal* 49 (2): 112-114, ISSN: 0368-0762.
NAL Call Number: 41.8 IR4
Keywords: pets, sex determination, pregnancy diagnosis, blood specimen collection, radiography, pathology.
- Malley, A.D. (1996). **The pet rabbit in companion animal practice. 5. The administration of medication.** *Irish Veterinary Journal* 49 (7): 407-410, ISSN: 0368-0762.
NAL Call Number: 41.8 IR4
Keywords: pets, drug therapy, application methods, injection, topical application.
- Meredith, A.; Redrobe, S. (2002). **BSAVA Manual of Exotic Pets**, Meredith, A.; Redrobe, S. (Eds.), 4th ed., 304 p., British Small Animal Veterinary Association: Quedgeley, UK, ISBN: 0-905214-47-1.
NAL Call Number: SF981.B78 2002
Keywords: pets, ornamental fishes, aviary birds, amphibia, birds, chinchillas, ferrets, gerbils, guineapigs, hamsters, lizards, mice, pigeons, rabbits, rats, snakes, tortoises, turtles, anesthesia, anatomy, diseases, husbandry, diagnosis, diagnostic techniques, drug therapy, euthanasia, exotics, handbooks, restraint of animals, surgical operations.
- Morton, D.B.; Jennings, M.; Buckwell, A.; Ewbank, R.; Godfrey, C.; Holgate, B.; Inglis, I.; James, R.; Page, C.; Sharman, I.; Verschoyle, R.; Westall, L.; Wilson, A.B. (2001). **Refining procedures for the administration of substances: Report of the BVAAWF/FRAME/RSPCA /UFAW Joint Working Group on Refinement.** *Laboratory Animals* 35 (1): 1-41, ISSN: 0023-6772.
NAL Call Number: QL55.A1L3
Keywords: cat, dog, ferret, guineapig, hamster, mouse, primate, rabbit, rat, sheep, footpad, British Veterinary Association Animal Welfare Foundation [BVAAWF], Royal Society for the Prevention of Cruelty to Animals [RSPCA], Universities Federation for Animal Welfare [UFAW], administration route, intra articular administration, drug delivery method, intracerebral administration, intradermal administration, intramuscular administration, intranasal administration, intraperitoneal administration, intratracheal administration, intravaginal administration, intravenous administration, oral administration, osmotic minipumps, refining

procedures, laboratory method, respiratory administration, subcutaneous administration, topical administration, Fund for the Replacement of Animals in Medical Experiments [FRAME], animal suffering, distress, good practice, pain, substance administration.

- Mrozek, M. (1995). **Microchip implant system used for animal identification in laboratory rabbits, guineapigs, woodchucks and in amphibians.** *Laboratory Animals London* 29 (3): 339-344, ISSN: 0023-6772.
NAL Call Number: QL55.A1L3
Keywords: rabbits, guineapigs, *Marmota monax*.
- Orcutt, C.J. (2001). **Fluids and critical care in small mammals.** *Proceedings of the North American Veterinary Conference 15*: 886-887. In the volume: *Small Animal and Exotics*. Part of a three volume set. Meeting held January 13-17, 2001 in Orlando, Florida.
NAL Call Number: SF605.N672
Keywords: fluid therapy, catheter placement, fluid maintenance, nutrition, pain management, gastric obstruction, endotracheal intubation.
- Perdue, K.A.; Shaw, R.E.; Mage, R.G. (2000). **Declawing of neonatal rabbits destined for use in animal biosafety level 4 containment studies.** *Contemporary Topics in Laboratory Animal Science* 39 (3): 13-18, ISSN: 1060-0558.
NAL Call Number: SF405.5.A23
Keywords: laboratory animals, declawing, scratch prevention, human safety, Biosafety Level 4.
- Quesenberry, K. (1998). **Ferrets, rabbits, and rodents: basic medical management and clinical techniques. Parts I and II.** In: *Internal Medicine: Small Companion Animals. The T G Hungerford Course for Veterinarians. Proceedings 306, Stephen Roberts Lecture Theatre, University of Sydney, Australia, June 15 -19, 1998*, Bryden, D. (Ed.), pp. 41-51. University of Sydney, Post Graduate Foundation in Veterinary Science: Sydney, Australia. ISBN: 1-875582-69-X.
NAL Call Number: SF604.R37 no. 306
Keywords: ferrets, rabbits, rodents, guineapigs, small animal practice, diagnosis, diagnostic techniques, therapy, drug therapy, clinical examination.
- Thunder, R.M. (1998). **A method for immobilizing the forelimbs of rabbits.** *Contemporary Topics in Laboratory Animal Science* 37 (5): 94-95, ISSN: 1060-0558.
NAL Call Number: SF405.5.A23
Keywords: legs, tendons, postoperative care, casts.
- Tran, H.S. (2001). **A method of endoscopic endotracheal intubation in rabbits.** *Laboratory Animals* 35 (3): 249-252, ISSN: 0023-6772.
NAL Call Number: QL55.A1L3
Keywords: laboratory mammals, endoscopy, endoscopes, trachea.
- Willard, M.D.; Tvedten, H. (2004). ***Small Animal Clinical Diagnosis by Laboratory Methods***. 4th ed., W.B. Saunders, 448 p. ISBN: 0721689035.
NAL Call Number: SF991.S59 2004
Keywords: laboratory tests, techniques, interpretation, blood count and bone marrow examination, erythrocyte, leukocyte disorders, hemostatic abnormalities, serum chemistries, point of care instruments, electrolyte and acid-based disorders, urinary disorders, endocrine, metabolic, and lipid disorders, gastrointestinal disorders, fluid accumulation disorders, respiratory disorders, immunologic disorders, reproductive disorders, neurologic disorders, infectious disease, cytology of neoplastic and inflammatory masses, diagnostic toxicology, therapeutic drug monitoring appendices, listing of referral laboratories, reference values, color illustrations, appendices, tables.
- Wolvekamp, W.T.C. (1996). **Radiology of exotic pets (small mammals, birds, and reptiles).** *Veterinary Quarterly* 18 (Suppl.): S52-S54, ISSN: 0165-2176.

NAL Call Number: SF601.V46

Keywords: pets, diagnosis, radiography, poultry, rodents, mammals, birds, reptiles, guineapigs, rabbits, pigeons.

Worthley, S.G. (2000). **Rapid oral endotracheal intubation with a fibre-optic scope in rabbits: a simple and reliable technique.** *Laboratory Animals* 34 (2): 199-201. ISSN: 0023-6772.

NAL Call Number: QL55.A1L3

Keywords: animal welfare, anesthesia, inhaled anesthetics.

Yates, D.W. (1996). **Comparative study of two techniques of long-term venous catheterization in rabbits: matching methods to applications.** *Contemporary Topics in Laboratory Animal Science* 35 (3): 63-68, ISSN: 1060-0558.

NAL Call Number: SF405.5.A23

Keywords: laboratory mammals, catheterization.

[Return to Top](#)

[Return to Contents](#)

Production

- Anil, M.H.; Raj, A.B.M.; McKinstry, J.L. (2000). **Evaluation of electrical stunning in commercial rabbits: effect on brain function.** *Meat Science* 54 (3): 217-220, ISSN: 0309-1740.
NAL Call Number: TX373.M4
Keywords: brain, electronarcosis, stunning, electrophysiology, insensibility, slaughter, animal welfare.
- Anous, M.R. (1999). **Correlated response of meatiness indicating traits to selection for weight at prevailing marketing age in New Zealand White Rabbits.** *Archiv fuer Gefluegelkunde* 63 (5): 225-228, ISSN: 0003-9098.
NAL Call Number: 47.8 AR2
Keywords: New Zealand White, breed, male, carcass characteristics, meat, quality, selection traits, body weight, marketing age.
- Arduin, M. (2001). **L'allevamento biologico del coniglio. [Environmentally friendly rabbit rearing.]** *Informatore Agrario* 57 (8): 99-101, ISSN: 0020-0689.
NAL Call Number: 281.8 IN32
Keywords: breed selection, health, housing, husbandry, meat production, management, non-intensive rearing, farm size, Italy, Italian language.
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NAL Call Number: S542.A8A34 no. 99
Keywords: meat animals, husbandry, production, fattening performance, mortality, feeds, production possibilities, farmer training, education, subsistence farming, Papua New Guinea.
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NAL Call Number: SF402.3.A7 2001
Keywords: nutrition, production, consumer education, consumer information, farm management, market economics, housing, surveys, technical progress, technical training, Tunisia.
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NAL Call Number: SF402.3.A7 2001

Keywords: agricultural economics, breeding, husbandry, feeding, reproductive performance, rural development, Tunisia.

Bhatt, R.S.; Sawal, R.K.; Mahajan, A. (1999). **Effect of feed protein source on digestion and wool production in angora rabbit.** *Asian Australasian Journal of Animal Sciences* 12 (7): 1075-1079, ISSN: 1011-2367.

NAL Call Number: SF55.A78A7

Keywords: breed, Angora, German x British x Russian, nutrition, digestion, groundnut cake, feed, protein source, soyflakes, sunflower cake, wool production.

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NAL Call Number: 41.8 IN2

Keywords: breed, New Zealand White, birth, season, daily body weight gain, post weaning, growth efficiency, litter size, parity, sex.

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NAL Call Number: 41.8 IN2

Keywords: breed, New Zealand White, carcass characteristics, carcass weight, chest weight, dressing percentage, forefeet weight, foreleg weight, head weight, hindfeet weight, live weight, organ weight.

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NAL Call Number: SF451.R5

Keywords: housing, meat production, type of cage, density, wire-grill, straw, Italy, Italian language.

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NAL Call Number: SF451.R5

Keywords: meat producing animals, meat produce, food storage and preservation, husbandry, muscle physiology, rabbit meat, Italian language.

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Keywords: small farms, production, husbandry, reproduction, litter traits, breed differences, Poland.

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NAL Call Number: 41.8 IN2

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NAL Call Number: SF402.3.A7 2001

Keywords: small farm production, family farming, meat animals, disease, feeding, diet, housing, coccidial infection, drugs, lesions, litter size, mange, slaughter weight, weaning weight, Greece.

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Keywords: breed Canberra half lop rabbits, fryer rabbits, deep litter housing, stocking densities, fattening performance, feed conversion, efficiency, feed intake, stocking density, Papua New Guinea.

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NAL Call Number: 41.8 IN2

Keywords: air temperature, feeding, housing, body temperature, body weight, dry matter, growth rate, liveweight, liveweight gain, performance traits, pulse rate, rectum, relative humidity, respiration rate, wind speed, India.

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NAL Call Number: SF451.R5

Keywords: production costs, valuation, breeding, husbandry, finishing, Italy.

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Keywords: breed, New Zealand White, dam, female, sire, male, carcass traits, dam effects, delivery, season effects, genetic factors, heritability, meat/bone ratio, non-genetic factors, seasonal effects, sire effects, Egypt.

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Keywords: young rabbit, production, probiotics, profitability, breeding success, fattening period, feeding, mortality, rearing practices, preventive vaccination, feeding hygiene, performance, concentrate diets, dry season, weight gain, dry matter intake, Guinea grass hay, feed, Verano style hay.

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(4): 29-30, ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: meat production, health, housing, cages, outdoor caging, costs, Italian language, Italy.

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Keywords: rabbit meat, housing, management, nutrition, prices, meat production, litter size, French West Indies, French language.

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NAL Call Number: SF451.R5

Keywords: economic analysis, economies of scale, profitability, housing, production costs, farming systems, comparisons, production type, farm size, markets, Italy, Italian language.

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NAL Call Number: S1 M57

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Keywords: adaptation, husbandry, production, broiler rabbits, birth weight, body weight, bucks, economics, female animals, green fodders, growth rate, income, marketing, performance traits, feeding, housing, reproduction, reproductive efficiency, reproductive performance, survival, weaning weight, India.

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Keywords: breed, Black Brown, Soviet Chinchilla, White Giant, broiler, body weight gain, doe weight, genetic factors, litter size, non genetic factors, season, semi-arid region, India.
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NAL Call Number: SF402.3.A7 2001
Keywords: housing systems, comparison, cages, cage raised, group housed, pen raised, wheat straw litter, wood shavings litter, meat animals, meat quality, carcass quality, carcass weight, dressing percentage, fat, feed conversion efficiency, feed intake, finishing, growth rate, liveweight gain, mortality, protein content, slaughter weight, stocking density, water content.
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NAL Call Number: SF1.A53
Keywords: breed, New Zealand White, arm length, carcass traits, post-slaughter, pre-slaughter, carcass weight, chest circumference, dressing percentage, forearm length, live body weight, meat deposition, estimation, thigh circumference, trunk length.
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NAL Call Number: SF1.A53
Keywords: breed, Danish White, carcass, female, male, chest circumference, lean yield, live body weight, meat performance, pelvis width, slaughter.
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NAL Call Number: SF402.3.A7 2001
Keywords: meat animals, husbandry, production, farming, sustainable farming, small-scale farmers, reviews.
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NAL Call Number: 49 J82

Keywords: guinea pig, rabbit, rodents, local breeds, alternative farming systems, international animal agriculture, teaching methods, subsistence farming, integrated farming systems, small farming methods, malnourishment, world hunger, poverty.

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NAL Call Number: SF402.3.A7 2001

Keywords: case studies, farmers, feeding, housing, nutrition, poverty, villages, community development, meat production, projects, husbandry, French language, Cameroon.

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Keywords: breed, hybrid, Hyla and Grimaud, New Zealand White, finishing, cages, fattening, performance, mortality, daily gain, respiratory diseases, strains, growth, housing, husbandry, seasons, heat stress, Italy.

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NAL Call Number: SF451.R5

Keywords: meat animals, housing, intensive production, animal welfare, artificial insemination, crossbreeds, disease control, meat quality, feeding.

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Keywords: commercial, female, male, electrical stunning, slaughter method, video recording, recording method, alternative frequencies, clonic phase recovery, corneal reflex, recovery stage, hindleg posture, biceps femori, longissimus dorsi, muscular system, muscular pH, painful stimuli response, resumption to rhythmic breathing, spontaneous physical activity, tonic phase.

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Keywords: game birds, fishes, ostriches, pigeons, rabbits, legislation, organic farming.

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NAL Call Number: SF402.3.A7 2001

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Keywords: housing, feed conversion, feed conversion efficiency, feed intake, finishing, growth rate, liveweight gain, mortality, sex differences, skin lesions, stocking density, trauma.

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NAL Call Number: QL750 A6

Keywords: litter, straw, floor type.

Niedzwiadek, S.; Zajac, J. (1998). **The state and prospects of rabbit farming and breeding.** *Biuletyn Informacyjny Instytut Zootechniki* 36 (4): 23-28, ISSN: 0209-2492.

Keywords: farming industry, feed utilization, fertility, maturation, prolificacy, breeding, meat, quality, Poland, Polish language.

Nizza, A.; Cutrignelli, M.I.; Sandulli, S. (2001). **Influenza del vuoto sanitario sulle performances di conigli in accrescimento. [Effect of “all in-all out” on performance of growing rabbits.]** *Rivista di Coniglicoltura* 38 (2): 31-34, ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: meat animals, housing, sheds, “all in-all out” system, husbandry, carcass weight, contamination, disinfection, fattening performance, feed conversion, hygiene, liveweight gain, performance, bacteria, Italy, Italian language.

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NAL Call Number: SF453.5.A8R33 1999
Keywords: meat production, fur production, guidelines, housing systems, legislation, codes of practice, planning a farm operation, environmental concerns, disease considerations, animal welfare, waste management, transport.
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NAL Call Number: SF451.R5
Keywords: meat animals, meat quality, performance, cages, open air housing, dry matter, feed intake, growth rate, mortality, winter, feed conversion, summer, housing, Italian language.
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NAL Call Number: 41.8 IN22
Keywords: birth month, carcass traits, dressing percentage, genetic correlations, heritability, meat production, phenotypic correlations, meat product, slaughter.
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Keywords: breed, Californian, Flemish Giant, New Zealand White, crossbred, growth traits, average daily gain, body weight, litter variance, slaughter traits, carcass weight, dressing percentage purebred, slaughter traits, Australia.
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NAL Call Number: SF55.A78A7
Keywords: disease incidence, feed cost, growth rate, meat production, production traits, economic values, rabbit farming, Australia.
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Keywords: breed, New Zealand White, finishing, amino acids, liver, longissimus dorsi, muscles, protein synthesis, free range husbandry, lipids, nucleic acids, body weight, Bulgarian language.
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NAL Call Number: 41.8 IN22
Keywords: broiler, crossbred, micro-livestock, heterosis, meat characteristics.
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NAL Call Number: 41.8 IN2
Keywords: breed Gray Giant, New Zealand White, Soviet Chinchilla, White Giant, broiler, meat breeds, genetic group, kindling period, kindling season, litter size, litter weight, performance, weaning weight.
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NAL Call Number: 41.8 IN22

Keywords: breed, Flemish Giant, Grey Giant, New Zealand White, Soviet Chinchilla, commercial species, crossbred, crossbreeding, applied and field techniques, genetic techniques, laboratory techniques, birth month, body weight, heterosis, litter size, pre weaning.

Redel, H.; Fritsche, J. (1995). **Fleischkaninchenhaltung. Auf richtiges Management und gute Qualität kommt es an. [Breeding of rabbits for meat depends on good management and quality.]** *Neue Landwirtschaft* 5: 54-58, ISSN: 0863-2847.

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NAL Call Number: SF402.3.A7 2001

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NAL Call Number: SF1.A53

Keywords: breed, New Zealand White, regression equation, production, arm length, heritability, body weight, carcass bone weight, prediction, carcass composition, carcass fat weight, carcass length, carcass meat weight, prediction, carcass weight, chest girth, forepart width, genotype-phenotype correlation, head weight, intensive rearing conditions, lumbar muscle weight, meat deposition, pelvis width, perirenal fat, post-slaughter traits, pre-slaughter traits, rump length, thigh spiral circumference.

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Keywords: broiler, female, male, carcass, genetic groups, meat quality, meat.

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NAL Call Number: SF1.S26

Keywords: broiler, large scale breeding, reproduction, number of sucklings, Czech language.

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Keywords: thesis, animal welfare, housing, management, health, diseases, breeding, nutrition, hygiene, slaughter, marketing, mortality, German language.

Swiderska, K.G.; Kolataj, A.; Klusek, J. (2001). **The effect of the slaughter method, inbred, age and race on the glutathione level in some organs of rabbits (short communication).** *Archiv fuer Tierzucht* 44 (3): 323-327, ISSN: 0003-9438.

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Keywords: small animal rearing, feeding, housing.
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NAL Call Number: SF451.R5
Keywords: meat producing animals, housing, economics, meat production, small farm, family based, myxomatosis, feeding, slaughter, viral haemorrhagic disease, Italian language, Egypt.
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NAL Call Number: SF1.K7
Keywords: breed, Grand Chinchilla, New Zealand White, Termond White, female, male, offspring, fattening, reproductive performance, test station data, slaughter, Polish language.
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NAL Call Number: SF1.K7
Keywords: breed, Grand Chinchilla, New Zealand White, Termond White, buck, doe, fattening performance, feed conversion, litter size, progeny performance, reproductive performance, slaughter performance, slaughter

weight, warm carcass weight, Experimental Station in Chorzelow, Polish language, Poland.

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Keywords: breed, Grand Chinchilla, New Zealand White, Termond White, male, testing station method, evaluation method, breeding value, offspring fattening performance, offspring slaughter performance, reproductive performance, evaluation.

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Keywords: breeding method, model rabbit farm, deep litter housing, meat production, reproduction, fattening, slaughter performance, feeding, National Research Institute of Animal Production, Balice, Poland, Polish language.

Zajac, J. (2000). **U progu sezonu rozplodowego. [On the threshold of the reproductive season.]** *Biuletyn Informacyjny Instytut Zootechniki* 38 (1): 13-20. ISSN: 0209-2492.

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Keywords: small commercial farms, disease prevention, reproduction, mating, fertility, nutrition, weaning, husbandry, Polish language.

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NAL Call Number: SF1.K7

Keywords: breed, Alaskan, Californian, Grand Chinchilla, New Zealand Red, New Zealand White, Termond White, buck, doe, performance testing, applied and field techniques, fattening performance, litter size, litter weight, reproductive performance, slaughter value, Experimental Station in Chorzelow, Polish language, Poland.

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NAL Call Number: SF1.K7

Keywords: breed, Grand Chinchilla, New Zealand, White, Termond White, buck, doe, female, male, body weight, breeding value, fattening performance, feed conversion, hot carcass weight, litter size, reproductive performance, slaughter value, test station data, Polish language.

Zotte, A.D.; Bini, R.P.; Xiccato, G.; Simionato, S. (1995). **Propriet tecnologiche e sensoriali della carne di coniglio. Influenza dello stress trasporto, del sesso e dell'et di macellazione. [Effects of transport stress, sex and age on the technological and sensorial properties of rabbit meat.]** *Rivista di Coniglicoltura* 32 (6): 33-39, ISSN: 0010-5929.

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Keywords: animal welfare, transport of animals, meat hygiene, meat quality, Italian language.

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[Return to Contents](#)

Reproduction

Ambriz, G.D.; Contreras, M.; Jose, L.; et al. (2003). **Estudio comparativo de los testiculos, epididimos, glandulas sexuales accesorias y espermatozoides en tres especies de lagomorfos (*Romerolagus diazi*, *Lepus californicus* y *Oryctolagus cuniculus*).** [Comparative study of the testicles, epididymes, accessory sexual glands and spermatozoa of three lagomorph species (*Romerolagus diazi*, *Lepus californicus* and *Oryctolagus cuniculus*.)] *Acta Zoologica Mexicana Nueva Serie* 88: 257-269, ISSN: 0065-1737.

NAL Call Number: 410 Ac84

Keywords: *Lepus californicus*, *Oryctolagus cuniculus*, *Romerolagus diazi*, North American wild lagomorphs species, comparative study, male, reproductive organs, size, weight, sperm, morphology, testis, accessory glands of male, sperm ducts, epididymus.

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Keywords: sexual maturity, females, light regime, housing, males, proximity of males, estrous cycle, estrus, litter size, pseudopregnancy, kindling rate.

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NAL Call Number: 442.8 Z35

Keywords: uterus, reproductive system, analytical method, best linear unbiased prediction selection method, breeding method, uterine capacity selection response.

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NAL Call Number: SF981.E8

Keywords: chinchillas, gerbils, guineapigs, hamsters, mice, rabbits, rats, anesthesia, anesthetics, anti-infective agents, castration, drug therapy, estrus cycle, postoperative care, pseudopregnancy, reproduction, sexual maturity, sterilization, surgery, surgical operations, techniques.

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Keywords: pets, sterilization, drugs, surgical operations, French language.

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a sub-Antarctic population of rabbits (*Oryctolagus cuniculus*). *Journal of Zoology* 245 (3): 285-291, ISSN: 0952-8369.

NAL Call Number: QL1.J68

Keywords: body weight, seasonal changes related to nutrition, food plants, seasonal nutritional quality related to testis weight, food availability, testis seasonal weight changes, relationships, testis, seasonal weight changes in relation to nutrition, evolutionary adaptation, testis weight, nutrition relationships, Indian ocean islands, Kerguelen islands, armor, molloy and morne, testis weight related to nutrition.

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Keywords: pets, sex diagnosis, hamsters, gerbils, rats, mice, guineapigs, chinchillas, rabbits, Italian language.

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NAL Call Number: SF451.R5

Keywords: husbandry, artificial insemination, reproduction, semen, Italian language, Italy.

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NAL Call Number: QP251.A1T5

Keywords: semen, storage, spermatozoa, motility, viability, alpha tocopheryl acetate, vitamin E, antioxidant, dietary supplements, dosage, ascorbic acid, antioxidant, artificial insemination, sperm cryopreservation, fertility, oxidative stability, storage temperature.

Costa, L.C.; Murgas, L.D.S.; Miliorini, A.B.; Oliveira, S.L.; Silva, F.P.C.; Pereira, R.A.N. (2002). **Influencia do selenio sobre a qualidade do semen de coelhos da raca California. [Influence of selenio on quality of the semen of rabbits of the race California.]** *Revista Brasileira de Reproducao Animal* 26 (2): 117-118, ISSN: 0102-0803.

NAL Call Number: QP251.R48

Keywords: commercial species, male, breed, California, semen quality, reproductive system, sperm, morphology, motility, vigor, selenium, dietary supplement, Portuguese language.

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NAL Call Number: S1.R4

Keywords: breed, California, chinchilla, New Zealand White, Semi Giant, productive indicators, environmental effects, fertility, birth traits, total and born alive, still births, weaning traits, mortality at weaning, percentage litter weaned, number weaned per litter, litter weight, average individual weight, GLM model, mathematical and computer techniques, analysis of variance, fertility, kindling month, mixed feeding conditions, mortality, pre-weaning performance, environmental effects, reproductive performance.

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NAL Call Number: 49 F84

Keywords: spermatozoa, reproductive system, conservation time, fertility, number, refrigeration, preservation method, French language.

del Sol, M.; Vasquez, B. (2003). **Mesoscopia e histologia de la glandula vesicular en el conejo (*Oryctolagus cuniculus*).** [Mesoscopy and histology of the vesicular gland in the rabbit (*Oryctolagus cuniculus*).] *International Journal of Morphology* 21 (4): 325-330.

NAL Call Number: QH351.I58

Keywords: reproductive system, accessory glands of male, vasicular gland, morphofunctional studies, histology, anatomy, morphological analysis, Spanish language.

El-Maghawry, A.M.; Ahmed, S.S.; Yamani, K.A.; Radwan, H. (1999). **Some reproductive and productive traits of New Zealand White, Rex rabbits and their crosses.** *Journal of Rabbit Science* 9 (2): 159-177.

Keywords: breed, New Zealand White, Rex crosses, liveweight gain, gestation period, heterosis, litter size, litter weight, seasons, weaning weight, crossbreeding, conception rate, female fertility, growth, body weight, intensive husbandry, parity.

Forcada, F.; Lopez, M. (2000). **Repeated surgical embryo recovery and embryo production in rabbits.** *Animal Reproduction Science* 64 (1-2): 121-126, ISSN: 0378-4320.

NAL Call Number: QP251.A5

Keywords: breed, Gigante de Espana, doe, embryo, female, gonadotropin releasing hormone, corpora lutea, endocrine system, reproductive system, oviduct, intramuscular injection, repeated surgical embryo recovery, experimental method, surgical method, embryo production, ovulation.

Fortun, L.L.; Prunier, A. (1999). **Effects of lactation, energetic deficit and remating interval on reproductive performance of primiparous rabbit does.** *Animal Reproduction Science* 55 (3-4): 289-298, ISSN: 0378-4320.

NAL Call Number: QP251.A5

Keywords: female, does, feeding, restricted, ad libitum, milk production, conception rate, adipose tissue, ovulation rate.

Fuentes, V.; Villagran, C.; Navarro, J. (2002). **Sexual behaviour of male New Zealand White rabbits in an intensive production unit.** *Journal of Dairy Science* 85 (Suppl. 1): 83, ISSN: 0022-0302.

NAL Call Number: 44.8 J822

Keywords: breed, New Zealand white, commercial species, female, male, aggression, ejaculation, urination, environmental temperature, grasping, housing, intensive production unit, kicking, mating, mounting, photoperiod, sexual behavior.

Gacek, L. (2002). **Effect of visual contact on reproductive and rearing performance of rabbits.** *Annals of Animal Science* 2 (Suppl. 1): 181-184, ISSN: 1642-3402.

NAL Call Number: SF1.A66

Keywords: cages, cage design, galvanized wire-mesh cages, plastic cages allowing visual contact, non-transparent plastic cages, indoor rearing, outdoor rearing, conception rate, fattening performance, feed conversion, feed intake, finishing, liveweight gain, housing, reproductive performance, Poland.

Giri, S.C.; Yadav, B.P.S. (2002). **Role of gonadotropin in broiler rabbit production.** *Indian Veterinary Journal* 79 (11): 1207-1208, ISSN: 0019-6479.

NAL Call Number: 41.8 IN2

Keywords: breed, New Zealand White, Soviet Chinchilla, broiler, commercial species, pregnant mare serum gonadotropin, fertility drug, hormone, drug, parental administration, conception rate, kidding, litter size, meat, meat product.

Gogol, P.; Bochenek, M. (2000). **Sperm chromatin stability and semen fertility of transgenic and non-transgenic rabbits.** *Theriogenology* 53 (1): 514, ISSN: 0093-691X.

NAL Call Number: QP251.A1T5

Keywords: non-transgenic, transgenic, semen fertility, sperm chromatin stability, theriogenology, transgenesis.

Hood, G.M.; Chesson, P.; Pech, R.P. (2000). **Biological control using sterilizing viruses: Host suppression and competition between viruses in non-spatial models.** *Journal of Applied Ecology* 37 (6): 914-925, ISSN: 0021-8901.

NAL Call Number: 410 J828

Keywords: pests, domestic cat, house mouse, European rabbit, viruses, biocontrol agent, competitor, pathogen, myxomatosis, fungal disease, viral infection, viral disease, sterilization, pest control, method, viral vectored

immunocontraception [VVIC], contraception method, pest control method, biological control, birth rates, competition, demographics, epidemiology, genetic engineering, host suppression, host parasite models, mortality rates, non spatial models.

Ivan, T.; Guido, G.; Clara, C. (2003). **Effetto della tecnica del cambio gabbia sulle performance di coniglie sottoposte ad un ritmo riproduttivo estensivo.** [Effect of changing cages on the reproductive performance of extensively reared rabbits.] *Rivista di Conigliicoltura* 40 (1): 57-60. ISSN: 0010-5929.

NAL Call Number: SF451.R5

Keywords: housing, cages, cage changing, conception rate, litter size, mortality, reproduction, stillbirths, Italian language.

Kerr, P.; Twigg, L.; Silvers, L.; Lowe, T.; Forrester, R. (1998). **Serological monitoring of the epidemiology of myxoma virus to assess the effects of imposed fertility control of female rabbits on myxomatosis.** *Wildlife Research* 25 (2): 123-131. ISSN: 1035-3712.

NAL Call Number: S960.W5

Keywords: fertility, imposed fertility control on females, epidemiology, natural viral disease, viral diseases, myxomatosis, epidemiology, implications for effects of fertility control, western Australia, wellstead, viral disease epidemiology, implications for impact of fertility control.

Kersten, A.M.P. (1995). **Nesting behaviour and reproduction of individually caged and group housed rabbits.** In: *Proceedings of the 29th International Congress of the International Society for Applied Ethology: Exeter, UK, 3-5 August, 1995*, Rutter, S.M.; Rushen, J.; Randle, H.D.; Eddison, J.C. (Eds.), Universities Federation for Animal Welfare (UFAW): Potters Bar, United Kingdom, pp. 189-190, ISBN: 0-900767-92-8.

NAL Call Number: SF756.7.I57 1995

Keywords: mating behavior, cages, groups.

Luzi, F.; Crimella, C. (1998). **Effect of change of cage 2 days before artificial insemination on reproductive performance of rabbit does.** *World Rabbit Science* 6: 1, 195-198. ISSN: 0984-7847.

NAL Call Number: SF402.3.A7 2001

Keywords: artificial insemination, reproductive performance, change, PMSG, HCG, estrus, induction, parity, fertility, litter size, cages, lactation, biotechnology.

Moura, A.S.A.M.T.; Costa, A.R.C.; Polastre, R. (1999). **Estimates of genetic parameters and genetic trends for reproductive traits in Botucatu rabbits selected for litter and growth performance traits.** *Journal of Animal Science* 77 (Suppl. 1): 140-141, ISSN: 0021-8812.

NAL Call Number: 49 J82

Keywords: breed, Botucatu, genetic parameter estimation, growth performance, litter traits, reproductive traits, meeting.

Negatu, Z.; McNitt, J.I. (2002). **Hormone profiles and nest-building behavior during the periparturient period in rabbit does.** *Animal Reproduction Science* 72 (1-2): 125-135, ISSN: 0378-4320.

NAL Call Number: QP251.A5

Keywords: doe, female, mammary tissue, reproductive system, beta-endorphin, beta-estradiol, bromocriptine, hormone, progesterone, prolactin, nest building behavior, periparturient period, pregnancy.

Nicodemus, N.; Gutierrez, I.; Garcia, J.; Carabano, R.; De Blas, Carlos (2002). **The effect of remating interval and weaning age on the reproductive performance of rabbit does.** *Animal Research* 51 (6): 517-523, ISSN: 1627-3583.

NAL Call Number: SF1.A64

Keywords: breed, New Zealand x Californian, doe, female, early weaning, feed efficiency, fertility, lactation, litter size, mating, mortality, parturition interval, reproductive performance.

Nottola, S.A.; Macchiarelli, G.; Motta, P.M. (1997). **The angioarchitecture of estrous, pseudopregnant and pregnant rabbit ovary as seen by scanning electron microscopy of vascular corrosion casts.** *Cell and*

Tissue Research 288 (2): 353-363, ISSN: 0302-766X.

NAL Call Number: QH581.A1Z4

Keywords: blood vessels, pseudopregnant and pregnant conditions, pregnancy, ovarian angioarchitecture, ovary, angioarchitecture, estrus, SEM analysis.

Oogjes, G. (1997). **Ethical aspects and dilemmas of fertility control of unwanted wildlife: an animal welfarist's perspective.** *Reproduction, Fertility, and Development* 9 (1):163-7, ISSN: 1031-3613.

NAL Call Number: QP251.R47

Abstract: Proposals to manipulate the fertility of wild, free-living animals extend the domination humans already exercise over domesticated animals. Current lethal methods for population control include poisoning, trapping, hunting, dogging, shooting, explosives, fumigants, and deliberately introduced disease. Animal welfare interests are based on individual animal suffering, but those interests are often overshadowed by labelling of groups of animals as pests, resource species, national emblem or endangered species. Public concern for animal welfare and acceptance of new population control methods will be influenced by such labels. The animal welfare implications of new population control technology must be balanced against the existing inhumane lethal methods used. It will be difficult to resolve the dilemma of a mechanism for disseminating a fertility control agent that will cause some animal suffering (e.g. a genetically-manipulated myxoma virus for European rabbits), yet may reduce future rabbit populations and therefore the number suffering from lethal methods. An Animal Impact Statement is proposed as a tool to assist debate during development of fertility control methods and for decision making prior to their use. A comprehensive and objective Animal Impact Statement may introduce an ethic that moves the pendulum from attitudes that allow sentient animals to be destroyed by any and all available means, towards a more objective selection of the most effective and humane methods.

Keywords: review, wild animals, animal welfare, contraception, ethics, pest control, Australia.

Rodriguez, D.R.; Lopez, F.M.; Rangel, S.R.; Mariscal, A.V. (2003). **Influence of short-term relocation and male exposure on sexual receptivity and reproduction in artificially inseminated lactating doe rabbits.** *Animal Reproduction Science* 78 (1-2): 111-121, ISSN: 0378-4320.

NAL Call Number: QP251.A5

Keywords: New Zealand White, breed, doe, artificial insemination, laboratory techniques, kindling rate, lactation, litter size, male exposure, parturition, relocation effect, reproductive performance, sexual receptivity.

Rommers, J.M.; Kemp, B.; Meijerhof, R.; Noordhuizen, J.P. (2001). **The effect of litter size before weaning on subsequent body development, feed intake, and reproductive performance of young rabbit does.** *Journal of Animal Science* 79 (8): 1973-82, ISSN: 0021-8812.

NAL Call Number: 49 J82

Abstract: An experiment was performed to study the effect of litter size before weaning on subsequent body development and composition, feed intake, and reproductive performance of young rabbit does with the objective to improve reproductive performance. Litter size (LS) before weaning (treatment) was 6, 9, or 12 kits. After weaning (30 d), 58 female kits per treatment (in two successive replicates) were reared and fed for ad libitum intake to 14.5 wk of age (end of rearing). At 14.5 wk of age, receptive does were inseminated. Nonreceptive and nonpregnant does were inseminated at 17.5 wk of age. The experiment ended when the second litter was weaned. Part of the animals was slaughtered to determine body composition at the end of the experiment (replicate one) and at the end of rearing (replicate two). At weaning, BW differed among treatments ($P < 0.05$; 855, 773, and 664 \pm 15 g for LS6, 9, and 12, respectively). Compensatory growth was observed. At the end of rearing, LS12 does were smaller ($P < 0.05$) than LS9 and LS6 does (3,524, 3,778, and 3,850 \pm 48 g, respectively). After first lactation, no difference in BW among treatments was found. Compared with LS6, empty body weight (BW minus gut, bladder, and uterus content) of LS12 contained more ($P < 0.05$) nitrogen (32.5 vs 31.1 \pm 0.3 g/kg), more ($P < 0.05$) ash (30.7 vs 28.3 \pm 0.6 g/kg), and less ($P < 0.05$) fat (168.6 vs 200.2 \pm 8.6 g/kg). No differences in body composition among treatments were found at the end of the experiment. During rearing, LS12 had the lowest ($P < 0.05$) daily feed intake (152, 164, and 169 \pm 2 g/d for LS12, 9, and 6, respectively). During the reproductive period, no differences in feed intake among treatments were found. Kindling rate (the number of kindlings per number of inseminations) was not influenced by treatment. In the first parity, total litter size (number of alive and stillborn kits) was lower ($P < 0.10$) for LS12

than for LS9 (6.4 vs 8.6 +/- 0.5, respectively). When first mating was delayed by 3 wk, an increased ($P < 0.05$) total litter size was found regardless of treatment (7.5 and 9.4 +/- 0.3 for 14.5, and 17.5 wk, respectively). Decreasing litter size before weaning from nine to six kits did not alter future reproductive performance. Based on results of this study, it seems advisable to perform a limited standardization level (at nine kits) after kindling and postpone first mating to an older age (17.5 wk) to improve reproductive performance.

Keywords: husbandry methods, body composition, energy intake, female, litter size, growth and development, reproduction, weaning, weight gain.

Rommers, J.M.; Meijerhoft, R.; Noordhuizen, J.P.; Kemp, B. (2002). **Relationships between body weight at first mating and subsequent body development, feed intake, and reproductive performance of rabbit does.** *Journal of Animal Science* 80 (8): 2036-42. ISSN: 0021-8812.

NAL Call Number: 49 J82

Abstract: A retrospective study was performed to evaluate the relationships between BW at first insemination and subsequent body development, feed intake, reproductive performance, and culling rate of rabbit does. Young rabbit does are vulnerable to body energy deficit in first lactation, resulting in decreased reproductive performance and high replacement rate. Heavy does at first insemination might be able to benefit from the extra amount of BW to cope with the energy deficit during first lactation. Data of three experiments were used in which does were given ad libitum access to feed during rearing and inseminated at 14.5 wk of age. The first two parities of each doe were recorded. Does were categorized in three groups based on their BW at 14.5 wk of age (first insemination): heavy (BW \geq 4,000 g), medium (BW 3,500 to 4,000 g), and small (BW $<$ 3,500 g). Among does that kindled, differences in BW at first insemination were related to differences in voluntary feed intake and body growth rate during rearing. Heavy does consumed more feed per day (+ 45 g/d, $P < 0.001$) and had a higher BW gain (+ 12 g/d, $P < 0.001$) than small does from weaning (4.5 wk) to 14.5 wk of age. Body weight at first insemination did not affect BW, feed intake, and culling rate during the first two parities. Heavy does were heavier at first insemination and remained so throughout the reproductive period, but they followed a similar BW curve as medium and small does. A higher BW at first insemination (14.5 wk of age) improved litter size in the first parity (8.9, 7.7, and 6.4 for heavy, medium, and small does, respectively, $P < 0.05$). Extra BW at start of reproduction improves litter size in the first parity but does not contribute to an improved feed intake or increased BW development during reproduction.

Keywords: female, husbandry, body composition, body weight, physiology, eating, energy intake, lactation, litter size, parity, growth and development, reproduction

Schaal, B.; Coureaud, G.; Langlois, D.; Ginies, C.; Semon, E.; Perrier, G. (2003). **Chemical and behavioural characterization of the rabbit mammary pheromone.** *Nature* 424 (6944): 68-72, ISSN: 0028-0836.

NAL Call Number: 472 N21

Keywords: milk, reproductive system, mammary pheromone, behavior, inclusive fitness, evolutionary success, maternal care, maternal odor cues, neonatal behavioral cues, newborn feeding behavior, oral grasping behavior, reciprocal female offspring exchange, energy, immunity, information.

Schueddemaage, M.; Hoy, S.; Lange, K. (2000). **Influence of artificial and natural light on behaviour during collection of semen and on spermatological parameters in rabbit bucks.** *Archiv fuer Tierzucht* 43 (4): 351-362, ISSN: 0003-9438.

NAL Call Number: 49 AR23

Keywords: New Zealand White, hybrid, buck, male, artificial light, natural light, semen collection, sexual activity, spermatological parameters, German language.

Theau-Clément, M.; Saleil, G.; Cornet, P.; Ungar, R.; Ungar, J.C. (1998). **Etude de l'efficacité du Dermojet automatique(R) pour induire l'ovulation des lapines. [Efficiency study of the automatic Dermojet(R) to induce the ovulation of rabbits.]** *Cuniculture* 143: 234-236, ISSN: 0152-3058.

Keywords: ovulation, syringes, fertility, risk contamination, animal welfare, pregnancy, animal breeding, veterinary equipment, French language.

Twigg, L.E.; Williams, C.K. (1999). **Fertility control of overabundant species; can it work for feral rabbits?** *Ecology Letters* 2 (5): 281-285, ISSN: 1461-023X.

NAL Call Number: QH540.E262

Keywords: reproductive productivity, population dynamics, fertility control, Australia.

Ubilla, E.; Rebollar, P.G.; Pazo, D.; Esquifino, A.; Alvarino, J.M.R. (2000). **Effects of doe-litter separation on endocrinological and productivity variables in lactating rabbits.** *Livestock Production Science* 67 (1/2): 67-74, ISSN: 0301-6226.

NAL Call Number: SF1.L5

Keywords: reproduction, artificial insemination, weaning, dams, kit production, lactation stage, suckling, litter size, blood plasma, prolactin, estradiol, milk yield, animal husbandry, litter weight, parturition, estrus, fertility, productivity.

Vasquez, M.R.; Petersen, J.; Mennicken, L. (1999). **Maternal effects on development and performance of young rabbits.** *Zuechtungskunde* 71 (5): 392-403, ISSN: 0044-5401.

NAL Call Number: 49 Z8

Keywords: Zika hybrid, does, young rabbits, husbandry, kid exchange method, performance, birth weight, twelve week body weight, German language.

Villagran, C.; Navarro, J.; Fuentes, V.O. (2003). **Sexual exhaustion in White New Zealand male rabbits of different ages.** *Animal Reproduction Science* 76 (3-4): 251-255, ISSN: 0378-4320.

NAL Call Number: QP251.A5

Keywords: breed, New Zealand White, female, male, satiation, sexually receptive females, sexual activity, sexual exhaustion, number of ejaculations, age influence.

Zaja, C.J. (2002). **Effect of weaning time on young rabbit welfare.** *Annals of Animal Science* 2 (Suppl. 1): 177-179, ISSN: 1642-3402.

NAL Call Number: SF1.A66

Keywords: breed, New Zealand White, pups, age differences, fattening performance, female animals, finishing growth, litter size, liveweight, reproductive performance, weaning.

[Return to Top](#)

[Return to Contents](#)

Information Resources on the Care and Welfare of Rabbits

[Return to Contents](#)

Web Site Resources

Website addresses change periodically. The selected sites listed are current as of August 2006. It should be noted that the recommendations on the proper care of rabbits vary widely depending on many factors including what breed, type of housing, and for what purpose the rabbits are kept. The following sites include rabbit care and welfare information for companion, commercial, and laboratory rabbits.

Animal Ethics Infolink

<http://www.animalethics.org.au/reader/animal-care>

This website has been developed by the Animal Research Review Panel and NSW Agriculture's Animal Welfare Unit. Its aim is to assist researchers, teachers and members of Animal Ethics Committees to access information about the operation of the Animal Research Act 1985, Animal Research Regulation 1995 and The Code of Practice in New South Wales. Included under the Animal Care section of this site is a link to a full text document entitled Guidelines for the Housing of Rabbits in Scientific Institutions August 2003. The document reviews housing, both group and single, pen design, management, care, handling, environmental enrichment, and record keeping for rabbits kept at scientific institutions.

Animal Welfare Information Center (AWIC)

<http://awic.nal.usda.gov>

National Agricultural Library, 10301 Baltimore Ave., Room 410, Beltsville, MD 20705, Tel: (301) 504-6212, Fax: (301) 504-7125, Contact us: <http://awic.nal.usda.gov/contact-us>

The Animal Welfare Information Center (AWIC) located at the U.S. Department of Agriculture's National Agricultural Library provides reference services primarily for patrons using animals covered by the Animal Welfare Act. AWIC produces bibliographies on the welfare and husbandry of dogs, cats, rabbits, rodents, swine, cattle, horses, sheep, poultry, and other species. The Animal Welfare Information Center Bulletin contains articles on environmental enrichment programs, refinement techniques, regulatory issues, and more. Full text information to many important regulatory documents are provided.

Database on Refinement of Housing and Handling Conditions and Environmental Enrichment for Animals Kept in Laboratories

http://www.awionline.org/Lab_animals/biblio/refine.htm

An annotated database of articles, abstracts, book chapters, and books, on all aspects of refinement and environmental enrichment strategies for laboratory and farm animals are available at this site. The database is regularly updated and information on rabbits is included.

Audio Visuals Relating to Animal Care, Use and Welfare

<http://www.nal.usda.gov/awic/pubs/aw200001.htm>

This document is a listing of audiovisuals related to animal care that are currently in the National Agricultural Library (NAL) collection. All audio visuals are available to others on an interlibrary loan basis (see Document Delivery Services for more information and restrictions). They cannot be purchased from NAL. If you would like copies of the materials, please contact the producer. Use the find command in your browser and search on the word "rabbit" to find audiovisuals relating to the humane care and use of rabbits.

Biology of the Rabbit

<http://www.lvma.org/rabbit.html>

One in a series of publications aimed at educating the general public, developed by the Louisiana Veterinary Medical Association. This resource covers the biology of a rabbit, taxonomy, origin and habitat, uses, handling, anatomy, physiology, nutrition, reproduction, and diseases.

Care of Rabbits

<http://www.sPCA.bc.ca/AnimalCare/rabbitcare.asp>

Produced by the British Columbia Society for the Prevention of Cruelty to Animals, this fact sheet is aimed at pet owners and provides general information on the care of rabbits. Topics covered include housing, food and water, handling, exercise and medical problems.

Code of Recommendations for the Welfare of Livestock: Rabbits

<http://www.defra.gov.uk/animalh/welfare/farmed/>

This document is produced and made available by the Department for Environment, Food & Rural Affairs (DEFRA), United Kingdom. Click on the rabbit icon and follow the link to welfare code. These recommendations are aimed at those involved with the rearing of rabbits, and focuses on the importance of high standards of animal husbandry. Topics covered include housing, emergency precautions, accommodation, floors, ventilation, lighting, mechanical equipment, space allowances, feed and water, toe nail trimming, marking, handling and slaughtering, and care of rabbits that are kept outside.

Comfortable Quarters for Rabbits in Research Institutions

<http://www.awionline.org/pubs/cq02/Cq-rabbits.html>

Full text article discussing improvements that can be made in the housing of laboratory rabbits kept in research institutions. Topics covered include pen design, species specific behaviors, social interaction, dominance hierarchies, physical substrates, environmental enrichment, bedding, straw, shavings, shredded paper, gentle handling techniques, and human animal interaction.

CSIRO Crusader Meat Rabbit Production

<http://www.csiro.au/science/CrusaderRabbits.htm>

This site focuses on research and development of meat rabbit production in Australia. Links to full text articles on common rabbit diseases with photos, spreadsheets on expected farm income, information on rabbit breeds, husbandry, equipment, and other information.

Digital Resources for Veterinary Trainers

<http://www.digires.co.uk/products>

This site offers a large range of teaching materials - both digitized 35mm slides and digital video clips for those involved in training laboratory animal staff. Teaching materials are made available for purchase through the University of Newcastle, United Kingdom. Subject coverages of the materials include care, handling, husbandry, welfare, anesthesia, and surgical procedures of rabbits and other laboratory animal species.

DORA: Diseases of Research Animals

<http://www.radil.missouri.edu/info/dora/frame1.htm>

DORA (Diseases of Research Animals) is a teaching resource compiled by faculty and graduate students in the Laboratory Animal Medicine Area Program, Research Animal Diagnostic Laboratory (RADIL), University of Missouri. Information provided for ferrets, gerbils, guinea pigs, hamsters, mice, rabbits, and rats. This resource contains images, bibliographical references, and slides. Disease diagnosis, treatment, control, etiology, transmission, clinical signs, and pathologies are reviewed.

Exotic pet vet.net

<http://www.exoticpetvet.net/>

This site is owned and administered by two veterinarians with many years of exotic pet experience. The site contains information on the general health, diseases, and medical care of exotic pets including rabbits.

House Rabbit Society

<http://www.rabbit.org/>

The House Rabbit Society is an international nonprofit organization that rescues rabbits and educates the public on

rabbit care and behavior. This site contains many quality photos and is very comprehensive. Information is presented on the general care, diet, litter training, housing, mental health, caring for babies and orphans, grooming, handling, and environmental concerns for companion rabbits.

How to Care for Rabbits

http://www.humanesociety.org/animals/rabbits/tips/rabbit_tips.html

A fact sheet produced by the Humane Society of the United States. Basic information for the rabbit pet owner on housing, litter training, feeding, toys, and providing a safe environment.

Humane Husbandry Criteria for Rabbits

<http://www.awionline.org/farm/standards/rabbits.htm>

The Animal Welfare Institute outlines humane husbandry standards for farm animals including rabbits. The premise of AWI's humane husbandry program is that animals are allowed to behave naturally. The infliction of pain and fear are strictly prohibited. The major benefits of these criteria are increased space available to each animal and the increased opportunity for social interaction, comfort, and physical and psychological well-being. Housing, social interaction, physical substrates, environmental factors, lighting, hutch, cages, breeding, nesting, feeding, handling, transport, and slaughter guidelines are covered.

Missouri Alternatives Center

<http://agebb.missouri.edu/mac/links/index.htm>

Through this site links to extension guide sheets from university research centers in the United States are made available. Information on raising meat rabbits, running commercial rabbitries, nutrition, housing, and slaughter methods are included. Click on "R" and follow the link to "rabbits."

Pan-American Rabbit Science Site

<http://www.pan-am.uniserve.com/>

Comprehensive site containing articles written by Robert McCroskey, from the Canadian Centre for Rabbit Production Development. Information is provided on rabbitry management for home or commercial meat production including recommendations on feeding, housing, breeding, health, disease and slaughter. Access to an in house database containing literature citations on rabbit production is available for a nominal fee. Links to other rabbit production science resources listed.

The Rabbit

<http://www.aquavet.i12.com/Rabbit.htm>

This is an overview article written by veterinarian Anna Meredith, Head of Exotic Animal Services, Royal (Dick) School of Veterinary Studies, University of Edinburgh, covering the biology, husbandry, common clinical conditions and veterinary management of rabbits.

Rabbit Medicine

<http://www.exoticpetvet.net/smanimal/rabbit.html>

An article written by veterinarian Margaret A. Wissman, outlining basic information on breeds, life span, reproduction, feeding, and health.

Rabbit Pathology

<http://oslovet.veths.no/teaching/rabbit/pathology/text.html>

This collection of photographs on rabbit pathology is made available on the Web by the Laboratory Animal Unit, Norwegian School of Veterinary Science. Images of various diseases and conditions affecting the teeth, intestines, kidneys, brain, and skin of the rabbit are included.

Rabbit References

<http://homepage.mac.com/mattocks/morfz/rabrefs.html>

This site was developed by dedicated pet rabbit owners. The rabbit reference sections contain links to information resources regarding rabbit health and medicine, care and feeding, health hazards, rescue and adoption, and rabbit related mailing lists.

RabbitRehome.org.uk

<http://www.rabbitrehome.org.uk/rabbitcare.asp>

Information on the basic care of the pet rabbit including housing (indoor and outdoor), diet, handling, and companionship.

Rabbit Research Center at Texas A&M University Kingsville

<http://users.tamuk.edu/kfsdl00/rabb.html>

Description of the Rabbit Research Center at Texas A&M University Kingsville. An overview of the facility, research, management, breeds of rabbits, and out reach programs.

Rabbit Welfare Association

<http://www.rabbitwelfare.co.uk/>

The Rabbit Welfare Association is a UK based organization for those who own or are interested in rabbits. The Association works with UK veterinarians to promote better veterinary care for both house rabbits and outdoor rabbits.

Raising Healthy Rabbits

<http://gardencenter.southernstates.com/rabbit/index.shtml>

Southern States feed company provides an online guide to raising healthy rabbits. The focus of the guide is on rabbit nutrition and health. Topics covered include: selecting stock, building hutches, breeding, gestation, birth, record keeping, feed and water requirements, diseases, and parasites.

Raising Rabbits for Fun and Food: A Primer on Backyard Meat Rabbit Raising Practices

<http://www.rudolphsrabbitranch.com/rrr.htm>

A backyard rabbit meat producer shares information on raising meat rabbits for family consumption. Tips listed on breeding, feeds, feeding, and watering, how many rabbits to start with, housing, climate, performance goals, diseases, drug use, by-products and other markets, identification, sanitization, slaughtering and butchering, and start-up cost considerations. A listing of meat rabbit breeders, a recommended reading list, and related web links are available.

UFAW/RSPCA guidance on Refining Rabbit Care: A Resource for Those Working With Rabbits

<http://www.rspca.org.uk/researchrabbits>

A Resource for Those Working With Rabbits in Research.

VeterinaryPartner Home Page

<http://www.veterinarypartner.com/>

VeterinaryPartner.com provides reliable, up-to-date animal health information from the veterinarians and experts of the Veterinary Information Network (VIN). Quality information on rabbit care, health, surgery, feeding, behavior, and exercise written by Susan Brown, DVM.

World Rabbit Science Association (WRSA)

<http://world-rabbit-science.com/>

The World Rabbit Science Association is an international association that federates national and regional associations (branches) with the objectives of: exchanging knowledge and experience among members in all parts of the world who are contributing to the advancement of various scientific aspects of rabbit production; to promote the extension of knowledge by encouraging teaching, scientific research, practical experimentation, the collection and publication of useful statistics and documents in relation to rabbit production; to promote world rabbit congresses alone or in cooperation with other international bodies; and to cooperate with the FAO and other world organizations interested in rabbit meat, pelt or fur production.

Yahoo! Groups: rabbitvetlist

<http://groups.yahoo.com/group/rabbitvetlist/>

An unmoderated discussion group for clinical discussions on rabbit health. Associated with the British Houserabbit Association (BHRA), membership of this discussion forum is restricted to veterinary professionals and invited laypeople. Hosted by Yahoo Groups.

[Return to Top](#)

[Return to Contents](#)