A Reference Source for the Recognition & Alleviation of Pain & Distress in Animals

Animal Welfare Information Center
United States Department of Agriculture

National Agricultural Library

AWIC Series, 2000-03
October 2000

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Published in cooperation with the Virginia-Maryland Regional College of Veterinary Medicine

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**PREFACE**

The Animal Welfare Information Center was established under the 1985 amendments to the Animal Welfare Act (Sect. 13(e)) and is required to provide specific information to the research community. One of these requirements deals with providing information which would minimize pain and distress to animals used in research.

It is hoped that his publication will be useful to those involved with animal research and that it will provide guidance and information which is useful in further reducing pain and distress in research animals. Science, and humanity, owe a great deal to these animals and they should be provided with conditions as free of pain and distress as possible, both for the welfare and well-being of the animal, and for better scientific results.

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**INTRODUCTION**

One of the requirements of the Animal Welfare Act is that procedures are to be taken to ensure that pain and distress in research animals are minimized. This includes adequate veterinary care and the appropriate use of anesthetics, analgesics and tranquilizing drugs or euthanasia (Sect. 13(a)(3)(A)). In order to minimize pain or distress to an animal one must first be able to recognize when an animal is in, or likely to be in, pain or distress. Steps can then be taken to alleviate that pain or distress so far as allowed by the approved research protocol.

This publication provides a list of published reference sources on the recognition and alleviation of pain and distress in animals. It has been developed to provide a source of information and guidance to those using animals in research so that they may better recognize when an animal is suffering pain or distress, or may be likely to suffer pain or distress, and how that pain or distress may be minimized. This publication is not meant to be a complete resource on this subject but to provide a starting point for those concerned about the welfare and humane care of animals used in research. For additional, and more complete, information and resources we suggest you consult the following web site on the compilation of scientific literature on the assessment of animal welfare:

**Literature on the Assessment of Animal Welfare.**
http://www.vetinfo.demon.nl/aw/flist.html
GENERAL

NAL Call no: Z7994.L3A5
Descriptors: laboratory animals, animal experiments, pain, anesthesia, ethics, diagnosis, treatment, animal welfare.

NAL Call no: HV4708.G85
Descriptors: animal experimentation, animal welfare.

NAL Call no: SF604.R37 no.226
Descriptors: pain in animals.

NAL Call no: 41.8 AU72
Descriptors: pain, pain management, analgesia, guidelines.

Descriptors: Etodolac, pain, rheumatic diseases, therapeutic use.

NAL Call no: 41.8 Au72
Descriptors: animal welfare, pain, assessment, measurement.

NAL Call no: 472 N42
Descriptors: animal experiments, animal welfare.

NAL Call no: 410 B77
Descriptors: animal welfare, pain assessment.

Baumans, V. ; Benson, G.J. ; Flecknell, P. ; Morton, D. ; Short, C., (1994), Detecting & alleviating pain in non-
NAL Call no: QL55.H8
Descriptors: animals, pain, animal welfare, detection, alleviation.

Language: German, Summary in English, French, Italian.
NAL Call no: 41.8 SCH9
Descriptors: pain, analgesics, animals.

NAL Call no: QP351.B45
Descriptors: neurobiology, opiate, motivational mechanisms.

NAL Call no: SF405.5.C36
Descriptors: animals, euthanasia, methodology, pain, animal welfare.

NAL Call no: 41.8 AM3
Descriptors: animals, stress, analgesics.

NAL Call no: SF910 P34A55 1992
Descriptors: animals, pain, drug therapy, analgesics, livestock, laboratory animals, surgical operations, anesthesia.

NAL Call no: 41.8 AM3
Descriptors: animals, stress, feeding behavior, hormones, nervous system, reproduction.

NAL Call no: SF910.P34A55 1992
Descriptors: small animal practice, laboratory animals, local anesthetics, toxicity.

NAL Call no: aQL55.B36
Descriptors: domestic animals, laboratory animals, anesthesia, anesthetics, analgesics, pain.

Language: German.
NAL Call no: SF105.T5 Bd.23
Descriptors: intensive husbandry, abnormal behavior, animal welfare.

NAL Call no: QL85.S63
Descriptors: animal-human relations, scientific research, abuse.

NAL Call no: 41.8 AM3
Descriptors: animals, pain, suppression, neurophysiology.

NAL Call no: SF910.P34A55 1992
Descriptors: animals, pain, immobilization, physiology, literature reviews, tonic immobility, hypnosis.

NAL Call no: QL55.F43 1987
Descriptors: laboratory animals, neonates, pain, animal behavior, physiology.

NAL Call no: 410.9 P94
Descriptors: animal welfare, stress, perception, motivation, adaptation.

NAL Call no: 49 J82
Descriptors: animal cognition, animal production systems.

NAL Call no: QL55.F43 1987
Descriptors: laboratory animals, animal experiments, pain, treatment, analgesics.

NAL Call no: SF910.P34A55 1992
Descriptors: laboratory animals, pain, models, animal experiments, duodenal obstruction, analgesics, dosage, immunochemistry.

Doris, Pete A., (1989), Humane principles & procedures in animal research. Animal research training series, Lubbock, TX: Texas Tech University Health Science Center, c1989, 1 video cassette (30 min).
NAL Call no: videocassette no. 804 and 805
Descriptors: animal welfare, law and legislation (US), laboratory animals, animal experimentation.
Descriptors: animals, pain, measurement, research, guidelines.

Dyson, D.H.; Mathews, K., (1992), Recommendations for the intensive care management in small animals following anaesthesia. Department of Clinical Studies, Ontario Veterinary College, Guelph, Ont. Veterinary & Comparative Orthopaedics & Traumatology, 1992, 5:2, p.66-70, 15 ref. ISSN: 0932-0814. NAL Call no: SF910.5.V4
Descriptors: anaesthesia, postoperative complications, pain, therapy, postoperative care.

Descriptors: pain, sedation, alleviation of pain, sensory receptor.

Descriptors: pain, control, analgesics, drug therapy, opioids, non-steroidal anti-inflammatory agents, application methods, animals.

Fikes, L.L.; Tranquilli, W.J.; Raffe, M.R., (1989), Symposium on pain management. I Understanding pain & analgesic therapy in pets. II Classifying commonly used analgesic agents. III Selecting the right analgesic: Indications & dosage requirements. College of Veterinary Medicine, University, Urbana, IL., Veterinary Medicine, 1989, 84: 7, p. 677-697, 44 ref. ISSN: 8750-7943. NAL Call no: 41.8 M69
Descriptors: animal welfare, dog diseases, cat diseases, anti-inflammatory agents, opioids, anesthesia, burns, pain, young animals, analgesics.

Descriptors: domestic animals, pain, animal welfare, veterinary medicine, animal behavior.

Descriptors: animals, pain, anesthetics, analgesics, treatment.

Descriptors: laboratory animals, pain, animal welfare, analgesics, anti-inflammatory agents.

Descriptors: animals, pain, trauma, animal welfare.

Descriptors: laboratory animals, animal welfare, experimentation, pain, stress, mammals, neurophysiology.

NAL Call no: SF910.P34A55 1992
Descriptors: laboratory animals, pain, opioids, peptides, analgesics, spinal cord receptors, drug effects.

NAL Call no: SF910.P34A55 1992
Descriptors: agonists, antagonists, dosage, morphine, laboratory animals.

NAL Call no: HV4704.A54 1985
Descriptors: animal welfare congress, pain congress.

Language: German with a summary in English.
NAL Call no: 49 T445
Descriptors: pain, animals, behavior, welfare.

NAL Call no: SF911.S45
Descriptors: pain, animals, surgery.

Descriptors: chronic pain, management, analgesic drugs, anti-epileptics.

Language: German with a summary in English.
NAL Call no: 41.8 K67
Descriptors: pain, animals, drugs, behavior.

NAL Call no: SF601.V523
Descriptors: dog diseases, surgery, anti-inflammatory agents, neoplasms, pain, drug therapy.

Descriptors: philosophy and ethics, pain perception in animals, philosophical evaluation.

NAL Call no: 41.8 V641
Descriptors: pain mechanisms, pain control.

Heavner, J.E., (1992), Pain recognition during experimentation & tailoring anesthetic & analgesic administration
NAL Call no: 41.8 Am3
Descriptors: pain, treatment, attitudes, veterinary medicine, medical students, teachers, personnel, analgesics.

NAL Call no: 41.8 Am3
Descriptors: animal welfare, pain, symptoms, treatment, anesthesia.

NAL Call no: QL55.F43 1987
Descriptors: laboratory animals, animal experiments, pain, ethics, animal behavior.

NAL Call no: QL55.P762 1993
Descriptors: laboratory animals, pain, animal welfare, animal experiments.

NAL Call no: SF406.A5
Descriptors: pain, analgesics.

NAL Call no: SF910.P34A35 1992
Descriptors: dogs, domestic animals, ruminants, agonists, adverse effects, andrenergic receptors, yohimbine, phenoybenzamine, propanolol, central nervous system, pain, drug therapy, xylazine.

NAL Call no: QP451.4.I28 1985
Descriptors: animal welfare, pain, animals.

NAL Call no: SF996.5.R43 1992
Descriptors: laboratory animal diseases, pain in animals, laboratory animals, effect of stress on, animal welfare.
NAL Call no: QL750.A6
Descriptors: self recognition, cognitive ability, reviews, philosophy.

NAL Call no: QL55.A1143
Descriptors: adjuvants, immunostimulants, antibodies, biological production, toxicity, adverse effects, pain, granuloma, arthritis, animal welfare, laboratory animals.

NAL Call no: HV4711.A587 1997
Descriptors: animal suffering.

NAL Call no: SF951.V47
Descriptors: anesthetics, local therapeutic use, horse diseases, drug therapy, pain, narcotics.

NAL Call no: QL55.A1143
Descriptors: laboratory animals, man, pain evaluation, behavior.

NAL Call no: 500 N484 v.467
Descriptors: analgesia, stress physiology, central nervous system, pain, opium alkaloids, peptides, animals, nerves, tolerance.

NAL Call no: 41.8 AM3
Descriptors: animals, pain, neurophysiology, perception, receptors.

NAL Call no: QP82.2.58A55
Descriptors: domestic animals, pain, senses, perception, animal behavior, cerebral cortex, receptors, thalamus.

NAL Call no: QP451.4.A54
Descriptors: pain, perception, alleviation.

NAL Call no: SF910.P34A55 1992
Descriptors: animals, horses, laminitis, surgical operations, analgesics, treatment, acupuncture.

ISSN: 0193-1903.
NAL Call no: SF601.C66
Descriptors: pain, analgesia.

NAL Call no: HV4704.A54 1987
Descriptors: animal welfare, pet animals, animal diseases, pain, euthanasia, veterinary services.

Language: German with a summary in English.
NAL Call no: 41.8 D482
Descriptors: nervous system, fright, animal behavior, pain, animal welfare.

NAL Call no: QL55.A1L33
Descriptors: pain, drugs, alleviation.

ISSN: 1062-4805.
NAL Call no: QL55.H8
Descriptors: animals, man, pain, perception.

NAL Call no: SF910.P34A55 1992
Descriptors: laboratory animals, dogs, cats, sheep, research, pharmacokinetics, central nervous system, diazepam, thiopental, pentobarbital, anesthetics, analgesics, methohexital, thiamylal.

NAL Call no: SF910.P34A55 1992
Descriptors: laboratory animals, rat, agonists, pharmacology, pharmacokinetics, veterinary medicine, analgesics, central nervous system, cardiovascular system, alpha adrenergic receptors.

NAL Call no: 41.8 M69
Descriptors: dogs, cats, pain, treatment, non-steroidal anti-inflammatory agents, drug therapy, fentanyl, transdermal application.

NAL Call no: SF957.V47
Descriptors: back pain, analgesics, management.

Descriptors: morphine, analgesia, pain, effects.

Descriptors: hyperalgesia, nervous system diseases, neuropathic pain, cellular mechanism, pain.

NAL Call no: 448.8 L22
Descriptors: pain management, analgesic drug, tolerance.

Mickwitz, G.V., (1984), Pain & pain reactions in animals. [s.l: s.n., 1984?] 10 leaves.
Language: German
NAL Call no: TRANSL 31760
Descriptors: pain, reactions, behavior.

NAL Call no: 41.8 AM3
Descriptors: animals, stress, measurements.

ISSN: 0042-4900.
NAL Call no: 41.8 V641
Descriptors: laboratory animals, animal welfare, pain.

Descriptors: distress effects, refinement, experiments.

NAL Call no: QL1.D48 v.27
Descriptors: animals, adverse effects, recognition.

NAL Call no: QL55.H8
Descriptors: laboratory animals, pain, animal welfare, stress, stress factors, animal behavior.

NAL Call no: HV4701.I49
Descriptors: philosophy and ethics, sensory receptors, pain sensitivity, ethical questions.

NAL Call no: R31.B55
Descriptors: chronic pain, control, pain management programs.

NAL Call no: SF910.T8N4
Descriptors: cancer, pain management.

NAL Call no: SF405.5.C36
Descriptors: laboratory animals, animal welfare, death, pain, experimental design, humane endpoints.

NAL Call no: 41.8 M69
Descriptors: neurology, pain, sensation.

NAL Call no: QL55.A1L23
Descriptors: laboratory animals, animal experiments, pain, animal welfare, measurement, invasive procedures.

NAL Call no: Z7994.L3A5
Descriptors: laboratory animals, pain.

NAL Call no: SF604.P82 no.158
Descriptors: degenerative joint disease, pain, management.

NAL Call no: QL750.A6
Descriptors: cattle, horses, sheep, goats, pigs, llamas, analgesics, pain, responses, anesthesia, agonists, dosage, animal behavior, animal welfare, species differences, conduction, literature reviews.

NAL Call no: RA1190.F8
Descriptors: laboratory animal veterinarians, contributions, experiments.
NAL Call no: QL85.S63
Descriptors: laboratory animals, surgery, analgesics.

NAL Call no: HV4930.P73 1980
Descriptors: vivisection, laboratory animals, animals, treatment of (U.S.), animal welfare, animal experimentation.

Prudden, B., (1992), *Myotherapy--my experiences with stopping cycles of pain (it only hurts when I bark, meow, neigh, moo, baa, oink, squawk...or say ouch!)* *Humane Innovations and Alternatives,* Washington Grove, MD: Psychologists for the Ethical Treatment of Animals, 1992, v. 6, p. 351-353. ISSN: 1062-4805.
NAL Call no: Q55.H8
Descriptors: animals, pain, spasms, muscles, physical therapy.

NAL Call no: SF910.P34A55
Descriptors: animals, pain, models, analgesics, research.

NAL Call no: QL55.F43 1987
Descriptors: laboratory animals, experiments, pain, endorphins.

Language: Dutch with a summary in English.
NAL Call no: 41.8 T431
Descriptors: animals, pain, endorphins.

NAL Call no: QL55.R65
Descriptors: laboratory animals, moral & ethical aspects, animal welfare.

NAL Call no: HV4711.A56
Descriptors: horses, animal behavior, animal welfare, animal research, laboratory animals, pain, castration, suxamethonium.

NAL Call no: 41.8.AM3
Descriptors: animals, pain, bioethics, animal welfare, animal experiments.

NAL Call no: SF910.P34A55 1992
Descriptors: animal experiments, laboratory animals, pain, research, teaching, education.

Language: Dutch with a summary in English.
NAL Call no: 41.8 T431
Descriptors: veterinarians, domestic animals, animal welfare, pain.

NAL Call no: SF601.C66
Descriptors: dogs, cats, analgesics, pain, opium alkaloids, receptors, narcotic antagonists, anti-inflammatory agents, arachidonic acid, modes of action, treatment, dosage.

Descriptors: pain, management.

NAL Call no: SF601.V523
Descriptors: pain, management.

NAL Call no: SF910.P34A55
Descriptors: animal experiments, laboratory animals, pain, detection, UK.

NAL Call no: 41.8.V641
Descriptors: laboratory animals, mammals, pain, animal welfare, guidelines, veterinary practice.

Descriptors: Contraction, emotional factors, hypokinesia, myocardium, psychological effects, neuroses, rats, orthostatic tolerance.

NAL Call no: SF910.P34A55 1992
Descriptors: pain in animals.

NAL Call no: QL750.A6
Descriptors: animals, pain, neurons, animal behavior, post operative care, veterinary practice, animal welfare, analgesics, anesthetics.

NAL Call no: SF910.P34S45 1997
Descriptors: pain in animals congress.

NAL Call no: SF910.P34A56 1992
Descriptors: pain in animals, laboratory animals.

NAL Call no: 41.8 AM3
Descriptors: animals, pain, animal welfare.

NAL Call no: QL55.A1L33
Descriptors: laboratory animals, cage rearing, stress, prevention.

NAL Call no: 41.8 AM3
Descriptors: animals, pain, analgesics, research, immobilization.

NAL Call no: SF910.P34A55 1992
Descriptors: laboratory animals, rats, pain, alpha andrenergic receptors, drugs, testing drug effects, analgesics, yohimbine, dosage, methoxamine.

NAL Call no: SF405.5.A23
Descriptors: laboratory animals, animal experiments, animal welfare, death & dying, assessment, pain, euthanasia.

NAL Call no: 41.8 AM3
Descriptors: pain research, literature, adequate veterinary care.

NAL Call no: QL55.A1L3
Descriptors: laboratory animals, animal welfare, pain.

NAL Call no: SF910.P34A55 1992
Descriptors: animals, pain, measurement, central nervous system, reflexes, analgesics.

NAL Call no: 41.8 T431
Descriptors: sows, calves, intensive livestock farming, pain, endorphins, stress, abnormal behavior.

NAL Call no: 41.8 AM3
Descriptors: animals, pain, receptors, neurophysiology, thalamus, cerebral cortex.

NAL Call no: QP451.4.A54
Descriptors: spinal cord, sensory reception, nervous system & behavior, pain reception & responses.

NAL Call no: SF406.W64 1994
Descriptors: laboratory animals handbook, mammals, animal welfare handbooks.

NAL Call no: 41.8 J8292
Descriptors: pain, small animals, recognition, control.

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**LABORATORY ANIMALS**

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- [Monkeys & Apes](#) / [Non Domestic Animals](#) / [Post Operative Pain](#) / [Rabbits](#) / [Rats](#) / [Rodents](#)

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**GENERAL**

NAL Call no: 41.8 AM3
Descriptors: laboratory animals, pain, stress, adjuvants, monoclonal antibodies, infectious diseases, animal experiments.

NAL Call no: 41.8 R3224

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Descriptors: dogs, cats, pain, treatment, analgesics, opioids.

NAL Call no: 41.8 R3224
Descriptors: dogs, cats, analgesics, dosage, drug effects, anesthesia, pain.

NAL Call no: QL55.A1L3
Descriptors: laboratory animals, pain, analgesics.

ISSN: 0023-6772.
NAL Call no: QL55.A1L3
Descriptors: laboratory animals, local anesthetics, lidocaine, intravenous injection, ointments, local anesthesia.

NAL Call no: SF77.F5
Descriptors: laboratory animals, anaesthesia.

NAL Call no: SF77.F54 1996
Descriptors: laboratory animals, anaesthesia.

NAL Call no: QL55.L274
Descriptors: laboratory animals, animal welfare, anesthesia, analgesics, pain, stress, pharmacokinetics.

NAL Call no: Z7994.L3G5
Descriptors: laboratory animals bibliography, animal experimentation bibliography, pain bibliography, analgesia bibliography, veterinary anesthesia bibliography.

NAL Call no: HV4704.H85 1999
Descriptors: humane endpoints, animals, experiments, biomedical research.

NAL Call no: 41.8 AM3
Descriptors: laboratory animals, pain, stress, animal behavior, animal experiments, restricted feeding.

NAL Call no: SF406.M36 1992
Descriptors: laboratory animals, animal welfare.

NAL Call no: SF601.I4
Descriptors: dogs, spine, pain, spinal cord, radiography, spondylitis, trauma, degeneration, neoplasms, meningitis, drug therapy.

Language: German with a summary in English.
NAL Call no: 41.8-B45
Descriptors: pain, laboratory animals, elimination, control.

NAL Call no: 41.8 AM3
Descriptors: laboratory animals, pain, stress, animal experiments, experimental design, animal husbandry, carcinoma, toxicology.

NAL Call no: HV4735.M67
Descriptors: laboratory animals, animal welfare, animal experimentation.

NAL Call no: 41.8 V641
Descriptors: laboratory animals, animal welfare, pain.

NAL Call no: QL55.A1L33
Descriptors: pain, relief, animal welfare act.

NAL Call no: QL55.N48
Descriptors: laboratory animals, pain, protection, animal experiments.

NAL Call no: QL55.A1I43
Descriptors: laboratory animals, pain, animal welfare.

NAL Call no: SF996.5.R43 1992
Descriptors: pain, distress, recognition, alleviation, laboratory animals.

NAL Call no: QL751.S55
Descriptors: animal behavior, laboratory animals.

NAL Call no: QL55.H36 1994
Descriptors: laboratory animals, animal welfare, pain prevention, medical treatment, euthanasia.

NAL Call no: 410.9 P94
Descriptors: laboratory animals, animal experiments, pain, assessment.

NAL Call no: 410.9 P94
Descriptors: laboratory animals, animal welfare, pain, control.

NAL Call no: QL55.F43 1993
Descriptors: laboratory animals, pain receptors, animal experiments, species differences, experimental surgery, anesthesia, analgesics, animal welfare.

NAL Call no: HV4712.A5
Descriptors: laboratory animals, animal research, pain, stress, students, psychology, attitudes.

NAL Call no: QL55.A1L33
Descriptors: laboratory animals, animal welfare, pain.

NAL Call no: QL55.I5
Descriptors: laboratory animals, animal welfare, pain prevention, anesthesia, analgesics, animal husbandry.

NAL Call no: QL55.A1L3
Descriptors: laboratory animals, animal experiments, animal welfare, pain.

Workshop on minimizing pain & distress in laboratory animals, (1992 Nashville, TN), National Institute of Health, OPRR, Vanderbilt University Medical Center, Meharry Medical College, present a workshop on Minimizing Pain & Distress in Laboratory Animals, Dec. 3-4, 1992, Nashville, TN.
NAL Call no: QL58.W67 1992
Descriptors: laboratory animals congress, animal experimentation congress, pain in animals, analgesics.

Language: Chinese with a summary in English.
NAL Call no: 385 AC86
Descriptors: laser acupuncture, animals, pain.

NAL Call no: 41.8 AU72 and 41.8 R3224
Descriptors: pain, management, nonsteroidal anti-inflammatory analgesics.

NAL Call no: 41.8 R3224
Descriptors: dog diseases, case reports, cornea, eye diseases, keratitis, emergencies.

NAL Call no: SF910.P34F73 1997
Descriptors: pain in animals, dogs, diseases, alternative treatment, horses, diseases, alternative treatment.

Language: Danish
NAL Call no: 41.9 D23
Descriptors: pain management, dogs, cats, Denmark.

NAL Call no: 41.8 R3224
Descriptors: pain management, dogs, cats, nonsteroidal anti-inflammatory analgesics.

NAL Call no: SF601.C66
Descriptors: dogs, cats, pain, nerves, animal morphology, endorphins, analgesics, neurotransmitters.

DOMESTIC FARM ANIMALS

Descriptors: livestock, anesthesia, analgesics, pain.


conditioning.

Language: Italian
Descriptors: hock joint pain, management, diagnosis.

NAL Call no: QL55.A1L37
Descriptors: pain, restraint of animals, stress, handling.

NAL Call no: 41.8 AU72
Descriptors: sheep, pain, intramuscular analgesics.

NAL Call no: SF601.C66
Descriptors: horses, colic, pain management.

NAL Call no: HV4704.A54 1987
Descriptors: animal welfare, livestock, animal diseases, veterinarians, animal housing, pain, disease control.

NAL Call no: HV4704.A77
Descriptors: laboratory animals, pain perception, drug effects, survival, consciousness, animal welfare, neurophysiology.

NAL Call no: HV4704.A77
Descriptors: livestock, pain assessment, locomotion, posture, animal behavior, scales, animal welfare.

NAL Call no: HV4704.A77
Descriptors: animal behavior, pain, assessment, experience, consciousness, learning.

NAL Call no: 49 J82
Descriptors: lambs, calves, pain, surgical operations, tail, castration, autonomic nervous system, behavior, steroids, blood plasma.
NAL Call no: HV4704.A77
Descriptors: laboratory animals, pain assessment, cerebral cortex, anesthesia, stunning, consciousness.

NAL Call no: SF951.E67
Descriptors: anesthesia, pain, horses, management.

NAL Call no: HV4701.A34
Descriptors: domestic animals, euthanasia, animal welfare, pain.

NAL Call no: 49 J82
Descriptors: livestock, animal husbandry, stress response, pain, learning, animal welfare, animal behavior, restraint of animals, animal experiments, transporting of animals.

NAL Call no: QL750.A6
Descriptors: sheep, animal welfare, stress, transport of animals, learning, avoidance conditioning.

NAL Call no: 41.8 C163
Descriptors: beef cattle, heifers, branding, hydrocortisone, pain, legs, pressure, movement, susceptibility, chemical composition, heat tolerance.

NAL Call no: SF911.V43
Descriptors: systemic and local effects, morphine-detomidine, epidural catheterization

Descriptors: horse diseases, drug therapy, digestive system diseases, pain, colic, analgesics.

NAL Call no: QL750.A6
Descriptors: piglets, pain, vocalization, castration, restraint of animals, animal welfare.

White, R.G.; J.A. DeSchazer; C.J. Tressler; G.M. Borcher; S. Davey; A. Waninge; A.M. Parkhurst; M.J. Milanuk & E.T. Clemens, (Feb. 1995), *Vocalizations & physiological response of pigs during castration with or without a
**DOMESTIC FOWL**

NAL Call no: 41.8 R312
Descriptors: anesthetics, local therapeutic use, arthritis physiopathology, bupivacaine therapeutic use, pain, poultry diseases.

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FISH, FROGS & SNAILS

NAL Call no: SF405.5.A3
Descriptors: vertebrates, fishes, amphibia, reptiles, pain, anesthesia, anesthetics.

Descriptors: PISCES, physiological condition, pain, perception potential, sensory receptor, potential perception of pain, review.

NAL Call no: SH1.J6
Descriptors: mechanical stimuli, electric stimuli, behavioral responses, inhibitors, neurophysiology, controlled conditions, Gadus-morhua-marisalbi, Salmo-mykiss, peptides.

NAL Call no: SF405.5.A23
Descriptors: marine animals, anesthetics, anesthesia, pain, efficacy.

NAL Call no: SH177.S75K47 1994
Descriptors: fishes, effects of stress on; fishes physiology, pain, physiological aspects, fish culture, animal welfare.

Language: German
Descriptors: angling, neurophysiology, fish handling, fish physiology, freshwater fish, mechanical stimuli.

Language: German
Descriptors: angling, legal aspects, biological stress, fish physiology, Cyprinuscarpia, Germany.

Language: German
NAL Call no: 41.8 D482
Descriptors: sense functions, behavioral responses, sense organs, fish.

Language: German
NAL Call no: 41.8 T445
Descriptors: fish handling, biological stress, sport fishing, aquaculture techniques, ornamental fish, hygiene, Teleostei.
Snow, P.J.; Plenderleith, M.B.; Wright, L.L., (1993), Quantitative study of primary sensory neurone populations of three species of elasmobranch fish. Cerebral & Sensory Functions Unit, Department of Anatomy Science, University of Queensland, St. Lucia 4072 Australia. Journal of Comparative Neurology, 1993, v. 334, no.1, p. 97-103. ISSN: 0021-9967.
NAL Call no: QP351.J68
Descriptors: dorsal root ganglia, sensory neurons, morphometry, Himantura, Rhinobatus battilum, Carcharhinus melanopterus, neurophysiology, sense organs, ultrastructure, elasmobranch fish.

NAL Call no: SF405.5.A23
Descriptors: rana pipiens, laboratory animals, xylazine, flunixin, analgesics, pain, duration, dosage, injection, animal welfare.

Language: German
NAL Call no: 41.8 D482
Descriptors: government policy, mortality causes, commercial species, fishery technology, fish handling, processing fishery products, Germany.

NAL Call no: 410.9 P94
Descriptors: animal models, psuedomonas aeruginosa, sepsis, surrogate markers, mortality, prediction, weight loss, food intake, water intake, imipenem, tobramycin, ceftazidime, antibiotics.

NAL Call no: QL55.A1L3
Descriptors: mice, biliary calculi, pain, symptoms, animal husbandry, animal housing, diets.

Descriptors: animals, antibodies, behavior, cells-biology, immunosuppression, morphine, pain, mice, interferon, pharmacokinetics.

NAL Call no: QL55.A1L3
Descriptors: mice, stress assessment, locomotion, behavior patterns, nocturnal activity, adjuvants, adverse effects, weight reduction, dosage effects, models.

NAL Call no: QL55.A1L3
Descriptors: rabbits, mice, adverse effects, adjuvants, antigens, pain, lesions, antibody formation, SQ injection, intraperitoneal injection.

NAL Call no: QL55.A1L3
Descriptors: mice, analgesics, animal experiments, water intake, pain, animal welfare, neoplasms, animal behavior, feed intake.

Descriptors: analgesia, low dose x-ray, mice.

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**MONKEYS & APES**

ISSN: 0077-8923
NAL Call no: 500 N484
Descriptors: conflict resolution, distress, alleviation, monkeys, apes.

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NON DOMESTIC ANIMALS

NAL Call no: SF910.P34A55 1992
Descriptors: zoo animals, game animals, drugs, drug effects, dosage, dosage effects, analgesics, physiological functions, immobilization, drug combinations, ketamine, adverse effects.

NAL Call no: SF910.P34A55 1992
Descriptors: domestic animals, wild animals, agonists, xylazine, anesthetics, drug combinations, analgesics, ketamine, yohimbine, 4-aminopyridine, antagonists.

POST OPERATIVE PAIN

NAL Call no: QL55.B36
Descriptors: laboratory animals, surgical operations, animal husbandry, animal welfare, pain, perioperative care, intraoperative care, post operative care.

NAL Call no: 41.8 AM3
Descriptors: animals, pain, analgesics, surgical operations.

NAL Call no: 41.8 R3224
Descriptors: attitudes, concerns, pain management, post operative.

NAL Call no: 41.8 R3224
Descriptors: analgesics, post operative, dogs, cats.

NAL Call no: 448.8 AR291
Descriptors: retrobulbar hemorrhage, eye disease.
NAL Call no: QL55.A1L5
Descriptors: laboratory animals, pain, standards, improvement, analgesics, surgical operations, animal welfare, anesthetics.

NAL Call no: QL55.A1L33
Descriptors: laboratory animals, postoperative care, pain, analgesics.

NAL Call no: QL55.A1L3
Descriptors: dogs, postoperative care, pain, analgesics, duration, blood gases.

NAL Call no: aHV4701.A952
Descriptors: laboratory animals, mammals, surgical operations, pain, analgesics, dosage.

NAL Call no: 41.8 M69
Descriptors: post operative pain, management, dogs, cats.

NAL Call no: SF910.P34A55 1992
Descriptors: animals, postoperative care, surgical operations, drug delivery systems, pain, analgesics, anesthetics.

NAL Call no: SF601.C66
Descriptors: canine, spinal surgery, postoperative management.

NAL Call no: 41.8 V6425
Descriptors: analgesics, drug therapy, animal welfare, pain.

NAL Call no: QL55.A1L3
Descriptors: rats, analgesics, postoperative care.

NAL Call no: SF914.A53 1990
Descriptors: dogs, cats, analgesics.

NAL Call no: 51.8 V641
Descriptors: cats, pain, ovariectomy, hysterectomy, anesthesia, medetomidine, ketamine, acepromazine, thiopental.

NAL Call no: SF910.P34A55 1992
Descriptors: animals, postoperative care, pain, inhaled anesthetics, anesthetics, local anesthetics, opioids, analgesics, agonists.

NAL Call no: aH4701.A952
Descriptors: livestock, postoperative care, medical research, analgesics, pain, animal Welfare.

NAL Call no: QL55.A1L3
Descriptors: medetomidine, pain, alleviation, dogs.

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**RABBITS**

NAL Call no: 410.9 P94
Descriptors: rabbits, analgesics, restraint of animals, immobilization.

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**RATS**

NAL Call no: 41.8 V641
Descriptors: pain management, rat, options.
NAL Call no: QL55.A1L3
Descriptors: rats, hepatomegaly, pain, assessment.

NAL Call no: Film S-1779
Descriptors: pain, adrenal medullary transplants, spinal cord injury.

NAL Call no: 410.9 P94
Descriptors: rats, newborn animals, droperidol, methoxyfluthane, ketamine, pentobarbital, fentanyl, combination, anesthesia, induction, hypothermia, efficacy, safety.

NAL Call no: Film S-1779
Descriptors: alleviation, neuropathic pain, cell grafts.

NAL Call no: QL55.A1L3
Descriptors: rats, local anesthetics, opioids, analgesics, postoperative care, timing, body weight, feed intake, water intake, physical activity, laparotomy, pain.

NAL Call no: QP351.N48
Descriptors: nerve injury, immunoreactivity, adrenal medullary grafts.

NAL Call no: 41.8 V643
Descriptors: pain, surgery, abdomen, analgesics, opioids, food intake, water intake, body weight, locomotion, rats.

NAL Call no: QL55.F43 1993
Descriptors: pain assessment, pain relief, rats.
Descriptors: analgesia, sciatic nerve, ketorolac tromethamine.

NAL Call no: RB127.P34
Descriptors: pain responses, attenuation, adrenal medullary transplants.

NAL Call no: QL55.A1L3
Descriptors: rats euthanasia, carbon dioxide, heart rate, blood pressure, oxygen, animal behavior, death.

NAL Call no: 410.9 P94
Descriptors: rats, male animals, pentobarbitol, fentanyl, droperidol, ketamine, xylazine, diazepam, pain, drug effects.

NAL Call no: RB127.P34
Descriptors: alleviation. allodynia-like behaviors, spinal cord injury.

NAL Call no: QL55.A1L3
Descriptors: rats, blood sampling, pain, veins, animal welfare, body weight, blood volume, hematocrit, feed intake, water intake, erythrocyte count.

RODENTS

NAL Call no: QL55.A1L3
Descriptors: laboratory animals, rodents, lagomorphs, animal welfare, pain measurements, symptoms, law, rabbits.

NAL Call no: QL55.L342
Descriptors: rodents, laboratory animals, animal welfare, pain.

NAL Call no: SF910.P34A55 1992
Descriptors: laboratory animals, pain, rodents, post operative complications, postoperative care, locomotion, anesthetics, water intake, drug effects, surgical operations, food intake, adverse effects.

NAL Call no: QL750.B5
Descriptors: melatonin effects, behavior, mediation.

NAL Call no: QL55.A1L3
Descriptors: mice, rabbits, pain, anti-inflammatory agents, analgesics, dosage, adverse effects.

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