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INTRODUCTION

About the disease:

There are vaccines available for many strains of Newcastle disease, although, it is not unusual for new (exotic) very contagious and virulent disease strains to break out somewhere around the world on a regular basis. Among the various strains of the Newcastle virus, there are various levels of lethality. The most virulent (velogenic) strains can cause rapid onset of disease and kill almost 100% of the infected birds. There are naturally milder forms that are not as deadly (lentogenic). The virus can infect all species of birds--both domesticated and wild bird populations. The impact of the disease even in mild forms is a drastic reduction in the commercial production of eggs and broilers. For more information about the disease and its effects, the reader is referred to the relevant artices on the topic in the online version of the Merck Veterinary Manual (See the World Wide Web links 1-4 below). Newcastle disease is a biosecurity threat to the US poultry industry as stopping the spread of the virus requires a rapid response to stem the spread and limit economic losses due to the disease.

The 2002-2003 epidemic of END in the US:

An outbreak of a virulent form of the disease has broken out in the US in the state of California. A sick chicken from a backyard flock appears to be the means of entry into California poultry flocks. When the bird exhibited signs of illness, it was taken, on September 25, 2002, to a private veterinary practioner in Torrence, CA. The bird was found to have a very pathogenic strain (velogenic) of the exotic Newcastle disease (END). This bird or “index case” is considered to be the carrier of the very infectous and pathogenic virus that spread quickly into backyard poultry then moved from there into poultry production facilities in Southern California. This is the first time since the 1971-73 outbreak of END that the disease has been of epidemic proportions in California. The main methods of transmission of the disease from one location to another seem to have been via bird to bird contact, human activities, insects, rodents, cages, machinery equipment and infected eggs. It then spread to other areas of the state. Since this exotic strain of Newcastle disease was first identified, millions of birds have been sacrificed in California and as of May 2003, it has not been contained by depopulation and quarantine. At the time of publication, commercial flocks and

back yard flocks in seven counties in California have been affected. Additional areas of the state are under quarantine. The disease had spread to adjacent states of Nevada, Arizona but the outbreak there seems to be under control through the use of depopulation and quarantine by government response teams.

An outbreak of the virus had been detected in Texas, in May of 2003. DNA sequencing analysis confirmed that the Texas strain was caused by a separate introduction of the disease and not due by movement from affected areas in California, Nevada or Arizona. Intense surveillance, and early detection in El Paso County, seems to have contained and eliminated the disease in Texas.

It was with the current epidemic in the US and the possibility of such epidemics emerging in other places in the world that this resource was developed. It is not comprehensive as the focus of the document is mainly the US. The bibliographic information highlights the recent research that has been published on the disease. Topics include information about the disease process, susceptible species of birds, genetics, prevention and control measures, vaccination, vaccines, etc. There are also relevant USDA sponsored research and informative and credible websites listed.

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1) http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/203800.htm&word=newcastle%2cdisease
2) http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/170312.htm&word=newcastle%2cdisease
3) http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/201901.htm&word=newcastle%2cdisease
4) http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/201902.htm

ABOUT THIS DOCUMENT

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If the reader is aware of important science-based information that needs to be added to this document, please feel free to contact the author at http://awic.nal.usda.gov/contact-us.

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Artois, M.; Manvell, R.; Fromont, E.; Schweyer, J.B**. Serosurvey for Newcastle disease and avian imfluenza A virus antibodies in great cormorants from France.** *Journal of Wildlife Diseases.* Jan 2002. v. 38 (1) p. 169-171. ISSN: 0090-3558
NAL call no: 41.9 W64B
Descriptors: Phalacrocorax carbo, cormorants, serological surveys, avian influenza virus, Newcastle disease virus.

Capua, I.; Dalla Pozza, M.; Mutinelli, F.; Marangon, S.; Terregino, C**. Newcastle disease outbreaks in Italy during 2000.** *The Veterinary Record.* May 4, 2002. v. 150 (18) p. 565-568. ISSN: 0042-4900
NAL call no: 41.8 V641
Descriptors: poultry, Newcastle disease, Newcastle disease virus, epidemics, clinical aspects, histopathology, epidemiology, pathogenicity, disease susceptibility, geographical distribution, Italy.

Chen, J.P.; Wang, C.H. **Clinical epidemiologic and experimental evidence for the transmission of Newcastle disease virus through eggs.** *Avian Diseases.* Apr/June 2002. v. 46 (2) p. 461-465. ISSN: 0005-2086 Note: Summary in Spanish.
NAL call no: 41.8 Av5
Abstract: Sporadic outbreaks of Newcastle disease (ND) occurred in Taiwan during 1998-2000. In some cases, the disease occurred in broilers less than 2 wk old that originated in a broiler breeder farm, so spread of the ND virus (NDV) from the infected breeder farm to broiler ranches was suspected. The purpose of the present study was to examine the possibility of the transmission of NDV through eggs. Both clinical and experimental evidence were used to prove that this is possible. From epidemiological investigation, the possibility of transmission through eggs was suggested in two separate ND cases from a breeder farm and its progeny because two identical NDVs were isolated from both cases. In order to clarify the possibility of the transmission through eggs, one mean egg lethal dose (ELD50) of NDV was inoculated into the allantoic cavity of 155 9-to-11-day-old specific-pathogen-free (SPF) chicken embryos. Seventy-one hatching chicks from the inoculated embryos were raised for 14 days. The cloacal swabs from those chicks at the ages of 1, 4, and 7 days and the tissues after necropsy at the

ages of 14 days were taken for virus isolation. The same NDV was reisolated from three hatching chicks. This experiment confirms that a few chicken embryos infected in ovo with a low titer of NDV can hatch and contain NDV after hatching, which results in NDV spreading through eggs.
Descriptors: broilers, experimental infections, Newcastle disease virus, ova, disease transmission through eggs, vertical transmission, shedding of virus, cloaca swabs.

Kommers, G.D.; King, D.J.; Seal, B.S.; Carmichael, K.P.; Brown, C.C. **Pathogenesis of six pigeon origin isolates of Newcastle disease virus for domestic chickens.** *Veterinary Pathology*. May 2002. v. 39 (3) p. 353-362. ISSN: 0300-9858
NAL call no: 41.8 P27
Descriptors: pigeons, chickens, Newcastle disease virus, pathogenesis, strains, strain differences, hosts, disease course, paramyxovirus, histopathology, immunohistochemistry, DNA hybridization, messenger RNA, genes, viral proteins, T lymphocytes, B lymphocytes, heart, brain.

Landman, W.J.M.; Post, J.; Boonstra-Blom, A.G.; Buyse, J.; Elbers, A.R.W.; Koch, G**. Effect of an in-ovo infection with a Dutch avian leukosis virus subgroup J isolate on the growth and immunological performance of SPF broiler chickens**. *Avian Pathology*. Feb 2002. v. 31 (1) p. 59-72. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: The effect of an in ovo infection with a Dutch isolate of avian leukosis virus subgroup J (ALV-J) on the growth of specific pathogen free (SPF) broiler chickens was analysed. During this study, possible immune suppressive effects of ALV-J were assessed by measuring delayed-type hypersensitivity with keyhole limpet haemocyanin (KLH), natural killer (NK) cell activity, the production of radicals of nitric oxide (NO) by macrophages, humoral immune response against Newcastle and infectious bursal disease vaccine viruses, and automated total and differential leukocyte counts. In an attempt to elucidate the underlying causal mechanisms of the induced growth retardation, 3,3',5-triiodothyronine (T3) concentrations in serum were measured. Four experiments were conducted. In experiment 1, ALV-J-injected birds were compared with ALV subgroup A (ALV-A)-injected and negative control chickens. In experiment 2, ALV-J-injected birds were only compared with negative controls. Finally, in experiments 3a and 3b, ALV-J-injected chickens were compared with negative controls and a group of chickens in which only 10% of birds had been injected with ALV-J. Birds were injected in ovo at day 7 of incubation with 10(4) median tissue culture infectious dose (TCID50) ALV-J or ALV-A, except in experiment 3a where 10(2) TCID50 ALV-J was injected. Significant growth suppression was found in all 100% of ALV-J-infected groups. The average growth retardation of ALV-J-infected birds compared with negative controls at 6 weeks of age was approximately 8, 11, 2.5 and 6% for the four successive experiments performed. The delayed-type hypersensitivity test against KLH of ALV-J-infected birds showed a tendency towards lower wattle thickness; however, the difference with controls was not significant ($P > 0.05$). The same was true for NK cell activity and NO production by macrophages, although the difference was not significant. The total and differential leukocyte counts performed on blood samples from birds at 3, 4 and 6 weeks of age as well as the humoral immune response against Newcastle and infectious bursal disease vaccine viruses did not show significant differences between treatment groups either. Only the number of basophils were significantly higher ($P = 0.02$) in ALV-J-infected birds at 3 weeks of age. No significant lower T3 levels were found in ALV-J-infected birds in weeks 2 and 3 (experiment 2) and weeks 3 and 5 (experiment 3b); however, at 4 weeks (experiment 2) and 6 weeks (experiment 3b) of age, T3 levels were significantly lower suggesting mild hypothyroidism in these broilers. In conclusion, the present experiments show the occurrence of significant growth retardation in SPF broilers after an ALV-J in ovo infection. The various studies performed to assess the immune competence of ALV-J-infected chickens did not show significant differences in immune responsiveness. The assays on cellular immunity showed a tendency to a lower response in ALV-J-infected birds, but these differences were not statistically significant.
Descriptors: broilers, avian leucosis, avian oncovirus, infections effects on growth, performance, immune system response, hypersensitivity, natural killer cells, nitric oxide, free radicals, vaccines, macrophages, humoral immunity Newcastle disease virus, infectious bursal disease virus, blood chemistry, leukocyte count, triiodothyronine.

Lin, H.; Wang, L.F.; Song, J.L.; Xie, Y.M.; Yang, Q.M. **Effect of dietary supplemental levels of vitamin A on the egg production and immune responses of heat-stressed laying hens.** *Poultry Science.* Apr 2002. v. 81 (4) p. 458-465. ISSN: 0032-5791
NAL call no: 47.8 Am33P
Abstract: Two experiments were conducted to evaluate the effect of vitamin A supplementation of a commercial layer diet on the laying performance and immune function of heat-stressed hens. In Experiment 1, two different levels of vitamin A supplementation (3,000 and 9,000 IU/kg) were used to investigate the laying performance and antibody titer against Newcastle disease virus (NDV) of heat-stressed hens. Results showed that the high level of vitamin A supplementation (9,000 IU/kg) had a beneficial effect on the feed intake and laying rate of heat-stressed hens ($P < 0.05$), compared with the control group (3,000 IU/kg). The antibody titers were not influenced by the level of vitamin A ($P > 0.05$). In Experiment 2, the effect of four levels of vitamin A (3,000, 6,000, 9,000, and 12,000 IU/kg) on the antibody titer to NDV and T lymphocyte proportion was studied. The experimental birds were exposed to a high temperature (31.5 C) 15 d after NDV vaccination (Treatment 1) or immediately (Treatment 2). The results showed that the egg weight was increased ($P < 0.01$) by the high levels of vitamin A supplementation (6,000 and 9,000 IU/kg), but feed intake, laying rate, and body weight loss were not ($P > 0.05$). In Treatment 1, vitamin A had no significant effect on antibody titers against NDV in normal or hot environments but increased ($P < 0.01$) the proportion of alpha-naphthyl acetate esterase (ANAE)-positive cells. Vitamin A supplementation had a significant effect on NDV antibody titer and ANAE-positive cell proportion in Treatment 2 ($P < 0.01$). The results of the present study suggested that vitamin A supplementation in commercial layer diets to layer chickens under heat stress was beneficial to laying performance and immune function.
Descriptors: hens, heat stress, antibody titers, vitamin supplements, antibody formation, feed-intake, laying performance, egg weight and mass, feed conversion, T lymphocytes.

Mase, M.; Imai, K.; Sanada, Y.; Sanada, N.; Yuasa, N.; Imada, T.; Tsukamoto, K.; Yamaguchi, S. **Phylogenetic analysis of Newcastle disease virus genotypes isolated in Japan**. *Journal of Clinical Microbiology.* Oct 2002. v. 40 (10) p. 3826-3830. ISSN: 0095-1137
NAL call no: QR46.J6
Descriptors: nucleotide sequences, genes, viral proteins, phylogenetics, fusion protein, molecular sequence data.

Peroulis-Kourtis, I.; O'Riley, K.; Grix, D.; Condron, R.J.; Ainsworth, C. **Molecular characterisation of Victorian Newcastle disease virus isolates from 1976 to 1999**. *Australian Veterinary Journal.* July 2002. v. 80 (7) p. 422-424. ISSN: 0005-0423
NAL call no: 41.8 Au72
Descriptors: Newcastle disease virus, nucleotide sequences, amino acid sequences, genes, genetic diversity, signal peptide,Victoria, Australia isolate, F gene, HN gene.

Ramanujam, P.; Tan, W.S.; Nathan, S.; Yusoff, K. **Novel peptides that inhibit the propagation of Newcastle disease virus.** *Archives of Virology.* 2002. v. 147 (5) p. 981-993. ISSN: 0304-8608

NAL call no: 448.3 Ar23
Descriptors: bacteriophages, amino acid sequences, binding proteins, envelope glycoproteins.

Saif, Y.M.; Nestor, K.E**. Increased mortality in turkeys selected for increased body weight following vaccination with a live Newcastle disease virus vaccine.** *Avian Diseases.* Apr/June 2002. v. 46 (2) p. 505-508. ISSN: 0005-2086 Note: Summary in Spanish.
NAL call no: 41.8 Av5
Abstract: Candidate male and female breeders from nine genetic lines of turkeys that were reared intermingled, with the sexes housed in different buildings on the same farm, were vaccinated with a live Newcastle disease virus vaccine (B1 type, LaSota) just prior to the commencement of egg production. In 1999, an average mortality for all lines of 5.8% occurred during the 10 days immediately following vaccination and the level of mortality varied among lines. Mortality was, in general, greater in large-bodied lines than in small-bodied lines. Affected birds exhibited gross multiple areas of focal necrosis in the liver and spleen and congestion of the heart and lungs. The percentage mortality occurring following similar vaccination in 2000 averaged 2.6 for the 10 days following vaccination and mortality was greater (P less than or equal to 0.05) in one line (F line) than the other genetic groups and higher in females than in males. Mortality in the F line, selected for increased body weight and known to be susceptible to various diseases, averaged 15.1% for both years. Attempts failed in both years to isolate *Pasteurella multocida* or other bacteria. There was a positive correlation between increased body weight and increased mortality following vaccination with the live LaSota vaccine.
Descriptors: turkeys, liveweight, vaccination, live vaccines, Newcastle disease virus, mortality, genotypes, oviposition, necrosis, spleen, symptoms, histopathology, clinical aspects, heart, lungs.

Santin, E.; Paulillo, A.C.; Maiorka, P.C.; Alessi, A.C.; Krabbe, E.L.; Maiorka, A. **The effects of ochratoxin/aluminosilicate interaction on the tissues and humoral immune response of broilers.** *Avian Pathology.* Feb 2002. v. 31 (1) p. 73-79. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: This study aimed to evaluate the effect of dietary ochratoxin, in the presence or absence of aluminosilicate, on the histology of the bursa of Fabricius, liver and kidneys, and on the humoral immune response of broilers vaccinated against Newcastle disease virus. The exposure of birds to 2 p.p.m. ochratoxin, in the presence or absence of aluminosilicate, reduced their humoral immune response and the number of mitotic cells in the bursa. The relative weight of the livers of the birds exposed to this toxin was increased and, microscopically, there was hepatocyte vacuolation and megalocytosis with accompanying hyperplasia of the biliary epithelium. The kidneys showed hypertrophy of the renal proximal tubular epithelium, with thickening of the glomerular basement membrane. Aluminosilicate did not ameliorate the deleterious effects of the ochratoxin.
Descriptors: broilers, ochratoxins, silicates, interactions, humoral immunity, immune response, histology, bursa Fabricii, liver, kidneys, Newcastle disease virus, vaccination, mitosis, weight, vacuoles.

Shengqing, Y.; Kishida, N.; Ito, H.; Kida, H.; Otsuki, K.; Kawaoka, Y.; Ito, T. **Generation of velogenic Newcastle disease viruses from a nonpathogenic waterfowl isolate by passaging in chickens.** *Virology.* Sept 30, 2002. v. 301 (2) p. 206-211. ISSN: 0042-6822
NAL call no: 448.8 V81
Descriptors: velogenic Newcastle disease virus, virulence, passaging virus through chickens.

Turpin, E.A.; Perkins, L.E.L.; Swayne, D.E**. Experimental infection of turkeys with avian pneumovirus and either Newcastle disease virus or *Escherichia coli.*** *Avian Diseases.* Apr/June 2002. v. 46 (2) p. 412-422. ISSN: 0005-2086 Note: Summary in Spanish
NAL call no: 41.8 Av5
Abstract: Avian pneumoviruses (APVs) are RNA viruses responsible for upper respiratory disease in poultry. Experimental infections are typically less severe than those observed in field cases. Previous studies with APV and *Escherichia coli* suggest this discrepancy is due to secondary agents. Field observations indicate APV infections are more severe with concurrent infection by Newcastle disease virus (NDV). In the current study, we examined the role of lentogenic NDV in the APV disease process. Two-week-old commercial turkey poults were infected with the Colorado strain of APV. Three days later, these poults received an additional inoculation of either NDV or *E. coli*. Dual infection of APV with either NDV or *E. coli* resulted in increased morbidity rates, with poults receiving APV/NDV having the highest morbidity rates and displaying lesions of swollen infraorbital sinuses. These lesions were not present in the single APV, NDV, or *E. coli* groups. These results demonstrate that coinfection with APV and NDV can result in clinical signs and lesions similar to those in field outbreaks of APV.
Descriptors: turkeys, *Escherichia coli*, Paramyxoviridae, Newcastle disease virus, mixed infections, field experimentation, morbidity, outbreaks, symptoms.

Waihenya, R.K.; Mtambo, M.M.A.; Nkwengulila, G**. Evaluation of the efficacy of the crude extract of *Aloe secundiflora* in chickens experimentally infected with Newcastle disease virus.** *Journal of Ethnopharmacology.* Mar 2002. v. 79 (3) p. 299-304. ISSN: 0378-8741
NAL call no: RS160.J6
Descriptors: medicinal plants, veterinary products, experimental infections.

Wilks, C.R**. Molecular diagnosis of Newcastle disease.** *Australian Veterinary Journal.* June 2002. v. 80 (6) p. 352. ISSN: 0005-0423
NAL call no: 41.8 Au72
Descriptors: Newcastle disease, Newcastle disease virus, diagnosis, outbreaks, clinical aspects, vaccination, Victoria.

Wunderwald, C.; Hoop,R.K**. Serological monitoring of 40 Swiss fancy breed poultry flocks.** *Avian Pathology.* Apr 2002. v. 31 (2) p. 157-162. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Rapid serum agglutination, haemagglutination inhibition and enzyme-linked immunosorbent assays were used to screen Swiss fancy breed chicken flocks for antibodies against 12 avian infectious agents. For this purpose, 1002 blood samples from 40 flocks were collected and tested. Ten percent of the samples were positive for *Salmonella gallinarum-pullorum* and 62.5% of the flocks were affected. More than 75% of the flocks had antibodies against *Mycoplasma gallisepticum/Mycoplasma synoviae*, infectious bronchitis, infectious bursal disease, avian encephalomyelitis, infectious chicken anaemia and reoviral arthritis. Low prevalence of antibodies was recorded for *Salmonella enteritidis*, avian influenza, avian leukosis and Newcastle disease (2.0 to 4.0%).
Descriptors: chickens, serological surveys, disease monitoring, hemagglutination inhibition test, ELISA, poultry disease prevalence, incidence.

Yu, M.; Wang, E.; Liu, Y.; Cao, D.; Jin, N.; Zhang, C.W.H.; Bartlam, M.; Rao, Z.; Tien, P.; Gao, G.F. **Six-helix bundle assembly and characterization of heptad repeat regions from the F protein of Newcastle disease virus.** *The Journal of General Virology.* Mar 2002. v. 83 (pt.3) p. 623-629. ISSN: 0022-1317

NAL call no: QR360.A1J6
Abstract: Paramyxoviruses may adopt a similar fusion mechanism to other enveloped viruses, in which an antiparallel six-helix bundle structure is formed post-fusion in the heptad repeat (HR) regions of the envelope fusion protein. In order to understand the fusion mechanism and identify fusion inhibitors of Newcastle disease virus (NDV), a member of the Paramyxoviridae family, we have developed an *E. coli* system that separately expresses the F protein HR1 and HR2 regions as GST fusion proteins. The purified cleaved HR1 and HR2 have subsequently been assembled into a stable six-helix bundle heterotrimer complex. Furthermore, both the GST fusion protein and the cleaved HR2 show virus-cell fusion inhibition activity (IC50 of 1.07-2.93 micromolar). The solubility of the GST-HR2 fusion protein is much higher than that of the corresponding peptide. Hence this provides a plausible method for large-scale production of HR peptides as virus fusion inhibitors.
Descriptors: viral proteins, GST-HR2 fusion protein, F protein, NDV, virus fusion inhibitors.

Yunis, R.; Ben-David, A.; Heller, E.D.; Cahaner, A. **Genetic and phenotypic correlations between antibody responses to *Escherichia coli*, infectious bursa disease virus (IBDV), and Newcastle disease virus (NDV), in broiler lines selected on antibody response to *Escherichia coli*.** *Poultry Science.* Mar 2002. v. 81 (3) p. 302-308. ISSN: 0032-5791
NAL call no: 47.8 Am33P
Abstract: The genetic control of antibody (Ab) response to *Escherichia coli* (EC), infectious bursa disease virus, and Newcastle disease virus and the genetic and phenotypic correlation between these Ab responses, were evaluated under farm conditions in which chicks were simultaneously exposed to these antigens. The experimental population comprised five groups: two lines divergently selected for high (HH) or low (LL) Ab response to EC vaccination; a commercial broiler dam-line (CC), from which HH and LL had been derived; and the HH x CC and LL x CC hybrid groups (HC and LC, respectively). Lines LL and HH expressed similar symmetric divergence to all three antigens. The ranking of the LL, LC, CC, HC, and HH genetic groups according to their mean Ab responses and their very high linear correlation with the LL vs. HH genomic scale clearly indicate the additive nature of the genetic divergence between these lines. Several estimates of correlation were calculated between Ab responses of each pair of antigens and between BW and Ab to each antigen. The high correlation between group means, the near-zero within-group correlation, and the low phenotypic correlation indicate the strongly positive genetic correlation between Ab responses and no correlation with BW. The results of this study suggest that overall immunocompetence of commercial broilers can be improved by selection for high Ab response of young chicks to controlled immunization with a single antigen, without counteracting further selection for high BW.
Descriptors: broilers, genetic variation, genetic correlation, phenotypic correlation, antibody formation, *Escherichia coli*, Newcastle disease virus, infectious bursal disease virus, line differences, crossbred progeny, selection criteria, genetic resistance, disease resistance.

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NAL call no: SF995.6.N4 A37 2001
Descriptors: Newcastle disease, control, developing countries, handbooks, manuals, chickens, vaccine.

Aldous, E.W.; Collins, M.S.; McGoldrick, A.; Alexander, D.J. **Rapid pathotyping of Newcastle disease virus (NDV) using fluorogenic probes in a PCR assay.** *Veterinary Microbiology.* June 6, 2001. v. 80 (3) p. 201-212. ISSN: 0378-1135
NAL call no: SF601.V44
Abstract: Hybridisation of PCR fragments with fluorogenic probes specific for pathotype allowed an estimation of pathogenicity of Newcastle disease virus (NDV) isolates using a modified TaqMan procedure. Six probes were used, designed to recognise nucleotide sequences in the fusion protein gene sequence corresponding to the precursor protein F0 cleavage site of both virulent and avirulent viruses. Forty-three of the 45 isolates tested, including 18 examined in a blind study were pathotyped successfully and rapidly, with close correlation between cleavage site nucleotide sequences, TaqMan results and intracerebral pathogenicity index (ICPI) values. One isolate, which could not be pathotyped by nucleotide sequencing, was shown using the TaqMan system to be a mixture of virulent and avirulent NDV. The results of this study suggest that using this modified TaqMan protocol, the likely virulence of most ND isolates can be determined rapidly and reproducibly.
Descriptors: Newcastle disease virus, pathotypes, polymerase chain reaction, pathogenicity, estimation, nucleotide sequences, precursors, molecular sequence data.

Aldous, E.W.; Alexander, D.J. **Detection and differentiation of Newcastle disease virus (avian paramyxovirus type 1).** *Avian Pathology.* Apr 2001. v. 30 (2) p. 117-128. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Substantial variation in the virulence of Newcastle disease virus (NDV) isolates means that the detection of NDV or evidence of infection is insufficient for an adequate diagnosis, as control measures for avirulent viruses are very different to those for virulent viruses. Diagnosis therefore requires further characterization, at least as to whether an isolate is virulent or avirulent. Conventional detection and differentiation of ND viruses is perceived as slow, laborious and requiring an undesirable use of in vivo techniques. In addition, further characterization is needed to give greater information on origin and spread. This review concentrates on the application of monoclonal antibody and molecular biological approaches. Panels of monoclonal antibodies were a major advance for the characterization of NDV isolates, although confirmation of virulence for poultry still required in vivo testing. As molecular-based techniques become easier and more reliable, they are likely to supersede the use of monoclonal antibodies, especially for characterizing viruses for epidemiological purposes. The attraction of molecular-based techniques is that they may be able to cover all three aspects of Newcastle disease diagnosis (detection of virus, characterization, including inference of virulence, and epidemiology) quickly, accurately and definitively in a single test. A number of approaches based on the reverse transcriptase polymerase chain reaction have been developed, with subsequent analysis of the product by restriction enzyme analysis, probe hybridization and nucleotide sequencing. Although extensive variation among NDVs still poses technical problems, the real and potential advantages of a molecular biological approach to Newcastle disease diagnosis appear to be overwhelming.
Descriptors: Newcastle disease virus, etiology, epidemiology, clinical aspects, diagnosis, pathogenicity, diagnostic techniques.

Alexander, D.J. **Newcastle disease.** *British Poultry Science.* Mar 2001. v. 42 (1) p. 5-22. ISSN: 0007-1668 Note: Paper presented at a meeting of the UK Branch of the World's Poultry Science Association held March 2000, Scarborough.

NAL call no: 47.8 B77
Abstract: 1. In this paper several historical and contemporary aspects of Newcastle disease (ND) are reviewed, with particular reference to the greater understanding which modern techniques have allowed. 2. Virulent ND viruses were generally thought to have emerged in 1926 as a result of transfer from a wild bird host reservoir but there is evidence that the virulent virus may have existed in poultry before 1926. Recent findings suggest that the virulent virus may emerge in poultry as a result of mutations in viruses of low virulence. 3. The history of ND in Great Britain reflects the four known panzootics that have occurred and serves as a model for the impact this disease may have on poultry populations. 4. Attempts to control and eradicate ND are not as straightforward as it may appear; in particular vaccination, while preventing deaths and disease, on challenge may not prevent virus replication and could therefore lead to the virulent virus becoming endemic. 5. Village chickens are extremely important assets in most developing countries, representing a significant source of protein in the form of eggs and meat but endemic ND can cause mortality of up to 60% in village chickens.
Descriptors: poultry, Newcastle disease, Newcastle disease virus, wild birds as reservoir hosts, disease transmission, virulence, mutations, epidemics, disease control, vaccination, viral replication, mortality, symptoms, literature reviews.

Bacon, L.D.; Witter, R.L.; Silva, R.F. **Characterization and experimental reproduction of peripheral neuropathy in White Leghorn chickens.** *Avian Pathology.* Oct 2001. v. 30 (5) p. 487-489. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: A clinical neurological syndrome termed peripheral neuropathy (PN) that resembles Marek's disease (MD) occurred at low frequency in a commercial layer strain for several years. Study of chickens from six field cases showed that the PN syndrome could be distinguished pathologically from MD on the basis of several factors, including onset as early as 6 weeks, presence of B-type but not A-type lesions in peripheral nerves, and absence of visceral lymphomas. Serotype 1 MD virus could not be isolated from blood from any chicken or demonstrated in tissues by histochemistry or polymerase chain reaction assays. Moreover, the syndrome was not prevented by MD vaccination, either in the field or in laboratory trials. PN was induced in 3 to 54% of commercial line chickens inoculated at 1 or 6 days of age with whole blood or buffy coat cells from clinically affected donor chickens. Sonicated cells also induced PN, but plasma was ineffective. Chickens did not develop PN if reared in isolators without cellular transfer or when vaccinated solely against MD. However, PN was observed in 9% of 57 B*2/*19 commercial chickens reared in isolators following vaccination against MD, infectious bursal disease, Newcastle disease and infectious bronchitis, suggesting that common vaccines may predispose chickens to PN. The data confirmed a strong influence of the major histocompatibility complex (B-complex) on both naturally occurring and experimentally induced PN with the B*19 haplotype conferring susceptibility compared with other alleles. It is postulated that PN may represent an autoimmune reaction to nerve tissue that may result from response to a combination of common vaccines. These studies confirmed that PN is distinct from MD, provided criteria for its differential diagnosis, identified strategies for its control, and established a model for its experimental induction.
Descriptors: chickens nervous system diseases, pathogenesis, etiology, peripheral nerves, experimental infection, major histocompatibility complex, differential diagnosis, disease control.

Berinstein, A.; Sellers, H.S.; King, D.J.; Seal, B.S. **Use of a heteroduplex mobility assay to detect differences in the fusion protein cleavage site coding sequence among Newcastle Disease Virus isolates.** *Journal of Clinical Microbiology.* Sept 2001. v. 39 (9) p. 3171-3178. ISSN: 0095-1137
NAL call no: QR46.J6
Descriptors: nucleotide sequences, viral genes, phylogenetics, amino acid sequences.

Cattoli, G.; Manvell, R.J.; Tisato, E.; Banks, J.; Capua, I. **Characterization of Newcastle disease viruses isolated in Italy in 2000.** *Avian Pathology.* Oct 2001. v. 30 (5) p. 465-469. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Thirty-two Newcastle disease virus isolates from the 2000 Italian epidemic were characterized by monoclonal antibody binding pattern and nucleotide sequencing of approximately 400 base pairs of the fusion gene. In addition, the pathogenicity of six of these isolates was assessed by means of the intracerebral pathogenicity test (ICPI). The strains tested exhibited an ICPI ranging from 1.6 to 2.0. On the basis of the monoclonal antibody binding pattern, all isolates could be classified as belonging to group C1. Both monoclonal antibody and genomic analysis revealed a very high degree of homology, indicating a common source of infection. On the basis of the phylogenetic analysis, it appears that the Italian isolates are closely related to the recent isolates from the UK, Scandinavia and South East Europe, thus suggesting the circulation of this viral strain in Europe during the past 5 years.
Descriptors: Newcastle disease virus, characterization, monoclonal antibodies, nucleotide sequences, pathogenicity, phylogenetics.

Cavanagh, D. **Innovation and discovery: the application of nucleic acid-based technology to avian virus detection and characterization**. *Avian Pathology.* Dec 2001. v. 30 (6) p. 581-598. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Polymerase chain reaction (PCR)-based approaches to the detection, differentiation and characterization of avian pathogens continue to be developed and refined. The PCRs, or reverse transcriptase-PCRs, may be general, designed to detect all or most variants of a pathogen, or to be serotype, genotype or pathotype specific. Progress is being made with respect to making nucleic acid approaches more suitable for use in diagnostic laboratories. Robotic workstations are now available for extraction of nucleic acid from many samples in a short time, for routine diagnosis. Following general PCR, the DNA products are commonly analyzed by restriction endonuclease mapping (restriction fragment length polymorphism), using a small number of restriction endonucleases, based on a large body of sequence data. Increasingly, however, nucleotide sequencing is being used to analyze the DNA product, in part due to the expanding use of non-radioactive sequencing methods that are safe and enable high throughout. In this review, I highlight some recent developments with many avian viruses: Newcastle disease virus; circoviruses in canary and pigeon; infectious bursar disease virus (Gumboro disease virus); avian adenoviruses, including Angara disease/infectious hydropericardium virus, haemorrhagic enteritis virus of turkeys, and egg drop syndrome virus; avian herpesviruses, including infectious laryngotracheitis virus, duck plague virus, psittacine herpesvirus (Pacheco's parrot disease virus), Marek's disease virus and herpesvirus of turkeys; avian leukosis virus (associated with lymphoid leukosis or myeloid leukosis, and egg transmission); avian pneumoviruses (turkey rhinotracheitis virus); avian coronaviruses, including infectious bronchitis virus, turkey coronavirus and pheasant coronavirus; astrovirus, in the context of poult enteritis and mortality syndrome, and avian nephritis virus; and avian encephalomyelitis virus, a picornavirus related to hepatitis A virus.
Descriptors: animal viruses, polymerase chain reaction, nucleic acids, detection, characterization, poultry diseases, restriction endonuclease analysis, literature reviews.

Chang, P.C.; Hsieh, M.L.; Shien, J.H.; Graham, D.A.; Lee, M.S.; Shieh, H.K. **Complete nucleotide sequence of avian paramyxovirus type 6 isolated from ducks**. *The Journal of General Virology.* Sept 2001. v. 82 (pt.9) p. 2157-2168. ISSN: 0022-1317
NAL call no: QR360.A1J6
Abstract: There are nine serotypes of avian paramyxovirus (APMV). Only the genome of APMV type 1 (APMV-1), also called Newcastle disease virus (NDV), has been completely sequenced. In this study, the complete nucleotide sequence of an APMV-6 serotype isolated from ducks is reported. The 16236 nt genome encodes eight proteins, nucleocapsid protein (NP), phosphoprotein (P), V protein, matrix protein (M), fusion protein (F), small hydrophobic (SH) protein,

haemagglutinin-neuraminidase (HN) protein and large (L) protein, which are flanked by a 55 nt leader sequence and a 54 nt trailer sequence. Sequence comparison reveals that the protein sequences of APMV-6 are most closely related to those of APMV-1 (NDV) and -2, with sequence identities ranging from 22 to 44%. However, APMV-6 contains a gene that might encode the SH protein, which is absent in APMV-1, but present in the rubulaviruses simian virus type 5 and mumps virus. The presence of an SH gene in APMV-6 might provide a link between the evolution of APMV and rubulaviruses. Phylogenetic analysis demonstrates that APMV-6, -1, -2 (only the F and HN sequences were available for analysis) and -4 (only the HN sequences were available for analysis) all cluster into a single lineage that is distinct from other paramyxoviruses. This result suggests that APMV should constitute a new genus within the subfamily Paramyxovirinae.

Descriptors: nucleotide sequences, genomes, APMV-6 serotype from ducks, viral proteins, nucleotide sequence data, viral evolution, new genus, Paramyxovirinae.

Chen, L.; Colman, P.M.; Cosgrove, L.J.; Lawrence, M.C.; Lawrence, L.J.; Tulloch, P.A.; Gorman, J.J. **Cloning, expression, and crystallization of the fusion protein of Newcastle disease virus.** *Virology.* Nov 25, 2001. v. 290 (2) p. 290-299. ISSN: 0042-6822

NAL call no: 448.8 V81

Descriptors: chemical structure, fusion protein, cloning, crystallization of fusion viral protein.

Clavijo, A.; Robinson, Y.; Lopez, J. **Isolation of Newcastle disease virus and *Salmonella typhimurium* from the brain of double-crested cormorants (*Phalacrocorax auritus*).** *Avian Diseases.* Jan/Mar 2001. v. 45 (1) p. 245-250. ISSN: 0005-2086 Note: Summary in Spanish.

NAL call no: 41.8 Av5

Abstract: Avian paramyxovirus type 1 (Newcastle disease virus) and *Salmonella typhimurium* were isolated from the brain and lung tissues of double-crested cormorants (*Phalacrocorax auritus*) from Lac Canard, Alberta, Canada. More than 100 birds died during this outbreak in 1999. Affected birds presented signs of central nervous system disease characterized by unilateral wing and leg paralysis. Other geographic locations in the provinces of Alberta and Saskatchewan have reported cases of cormorants suffering from diseases with signs compatible with Newcastle disease. The virus isolated in the 1999 outbreak was characterized as mesogenic. These findings suggest that other pathogens, like S. typhimurium, may influence the clinical presentation of disease caused by mesogenic strains of Newcastle disease virus in cormorants.

Descriptors: Phalacrocorax, Newcastle disease virus, *Salmonella typhimurium*, cormorants, brain tissue, pathogen isolation, lungs, symptoms, clinical aspects, lesions, outbreaks, case reports, Alberta, Canada.

Coletti, M.; Del Rossi, E.; Franciosini, M.P.; Passamonti, F.; Tacconi, G.; Marini, C. **Efficacy and safety of an infectious bursal disease virus intermediate vaccine in ovo.** *Avian Diseases.* Oct/Dec 2001. v. 45 (4) p. 1036-1043. ISSN: 0005-2086 Note: Summary in Spanish.

NAL call no: 41.8 Av5

Abstract: The study was divided into two experiments. In the first experiment, the efficacy of in ovo intermediate vaccine against infectious bursal disease virus (IBDV) was determined by challenge at 21 days of age with virulent IBDV in specific-pathogen-free (SPF) and commercial chickens. This vaccine was able to induce active immunity and to protect SPF chickens to challenge; protection was not complete in commercial chickens, as testified by bursal lesions, bursal index after challenge, and vaccine immunoresponse. In order to detect field and vaccinal viruses, immunoperoxidase staining, enzyme-linked immunosorbent assay, capture, and reverse transcriptase-polymerase chain reaction (RT-PCR) were tested; the RT-PCR was more effective at detecting both kind of viruses. In the second experiment, the immunosuppressive effect of in ovo vaccination was determined by evaluating the immunoresponse against Newcastle disease virus (NDV) vaccination effected at 10 days in both SPF and commercial chickens vaccinated in ovo. The in ovo vaccine causes a reduction of NDV immunoresponse, as testified by lowest geometric mean titer in group I (SPF chickens vaccinated against IBDV in ovo and against NDV at 11 days). In commercial chickens, immunoresponse to NDV vaccination was not influenced by in ovo vaccination.

Descriptors: chick embryos, infectious bursal disease virus, inactivated vaccines, safety and efficacy, disease prevention, maternal antibodies, egg hatchability, survival, immunosuppression.

El Tayeb, A.B.; Hanson, R.P. **The interaction between Newcastle disease virus and *Escherichia coli* endotoxin in chickens.** *Avian Diseases.* Apr/June 2001. v. 45 (2) p. 313-320. ISSN: 0005-2086 Note: Spanish summary.

NAL call no: 41.8 Av5

Abstract: The interaction between Newcastle disease virus (NDV) and *Escherichia coli* endotoxin was studied in cell cultures, embryonated chicken eggs, and 8-wk-old chickens. These interactions were evaluated according to the induction of specific or nonspecific resistance in the host system and the virus titer produced in both chicken embryos and chickens. The endotoxin of *E. coli* induced a decrease in the size of the bursa of Fabricius in live chickens. *Escherichia coli* endotoxin given intravenously induced plasma antiviral activity in chickens that was interpreted to be interferon, as detected in a vesicular stomatitis virus plaque reduction assay. Endotoxin failed to produced toxic effects in the chicken embryo fibroblasts (CEFs) or to result in any antiviral effect because no change was noted in the number of NDV plaques formed in CEF cultures. When endotoxin was given 3 days before NDV exposure in chickens, the virus titers were significantly ($P < 0.05$) decreased from a peak of 10(2) to 10(0.18), 10(2.5) to 10(0.18), and 10(2.5) to 0 in the spleens, lungs, and kidneys, respectively, at 72 hr post-NDV inoculation. When endotoxin was given 24 hr after NDV inoculation, the NDV titer significantly ($P < 0.05$) increased from 10(2.0) to 10(3.5), 10(2.5) to 10(6.5), 10(2.5) to 10(4.5), 0 to 10(2.5) in the spleen, lungs, kidneys, and liver, respectively, at 72 hr after NDV inoculation. In chicken sera, hemagglutination inhibition (HI) titer to NDV was significantly ($P < 0.05$) enhanced from 1164 to 3127 when endotoxin was given prior to virus inoculation. However, there was a decrease in HI to NDV from 1164 to 727 without a significant difference in chicken sera when NDV was given prior to endotoxin inoculation.

Descriptors: chickens, Newcastle disease virus, endotoxins, interactions, *Escherichia coli*, chick embryos, cell culture studies, bursa Fabricii, spleen, lungs, kidneys, liver.

Farley, J.M.; Romero, C.H.; Spalding, M.G.; Avery, M.L.; Forrester, D.J. **Newcastle disease virus in double-crested cormorants in Alabama, Florida, and Mississippi.** *Journal of Wildlife Diseases.* Oct 2001. v. 37 (4) p. 808-812. ISSN: 0090-3558

NAL call no: 41.9 W64B

Descriptors: Phalacrocorax auritus, cormorants, serological surveys, disease transmission, Alabama, Florida, Mississippi, wild birds as a disease reservoir.

Fukanoki, S.; Iwakura, T.; Iwaki, S.; Matsumoto, K.; Takeda, R.; Ikeda, K.; Shi, Z.; Mori, H. **Safety and efficacy of water-in-oil-in-water emulsion vaccines containing Newcastle disease virus haemagglutinin-neuraminidase glycoprotein.** *Avian Pathology*. Oct 2001. v. 30 (5) p. 509-516. ISSN: 0307-9457

NAL call no: SF995.A1A9

Abstract: Subunit vaccines containing haemagglutinin-neuraminidase (HN) glycoprotein of Newcastle disease virus (NDV), formulated as water-in-oil-in-water (W/O/W) emulsions, were prepared. First, the suitable constituents of a W/O/W emulsion adjuvant were investigated with polyvalent vaccines using NDV, infectious bronchitis virus and Haemophilus paragallinarum. The W/O/W emulsion adjuvant, composed of the antigen in phosphate-buffered saline (PBS), liquid paraffin, squalene, diglyceryl monooleate, polysorbate 80 and PBS in a 30:25:10:5:2:28 ratio, induced a good antibody response with less adverse local reactions.

HN protein of NDV was expressed by an improved baculovirus expression vector, a hybrid nucleopolyhedrovirus (HyNPV) between Autographa californica NPV and Bombyx mori NPV, and was prepared from silkworm pupae infected with the recombinant baculovirus, HyNPV-HN. Then, the W/O/W emulsion vaccine containing HN protein was prepared using the aforementioned constituents. Chickens showed 100, 100 and 80% protection against challenge exposure to virulent NDV at 4 weeks after vaccination with W/O/W emulsion vaccines containing 30, 6 and 3% of HyHPV-HN-infected pupae, respectively. The vaccines containing HN protein did not induce adverse local reactions at the site of injection. The subunit vaccine for NDV containing HN protein expressed in the recombinant baculovirus-infected pupae, formulated as a W/O/W emulsion vaccine composed of the antigen in PBS, liquid paraffin, squalene, diglyceryl monooleate, polysorbate 80 and PBS in a 30:25:10:5:2:28 ratio, was therefore found to be safe and effective.
Descriptors: Newcastle disease virus, vaccines, vaccination, chickens, safety, efficacy, disease prevention, emulsions, glycoproteins, adjuvants, hemagglutinin-neuraminidase (HN) glycoprotein.

Herczeg, J.; Pascucci, S.; Massi, P.; Luini, M.; Selli, L.; Capua, I.; Lomniczi, B. **A longitudinal study of velogenic Newcastle disease virus genotypes isolated in Italy between 1960 and 2000.** *Avian Pathology.* Apr 2001. v. 30 (2) p. 163-168. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Thirty-six representative velogenic strains of Newcastle disease virus isolated in Italy since 1960 were characterized by restriction site and partial sequence analyses of the fusion protein gene. Viruses belonging to the six known genotypes of Lomniczi et al. were found. Genotype IV, which was most probably the main epizootic group in Europe before the war, was responsible for outbreaks in the 1960s and persisted until the late 1980s in Italy. An epizootic peak in 1972 to 1974 coincided with the appearance of genotype V viruses that were present for more than a decade. Outbreaks in 1992 were caused by genotype VIIa viruses and were part of a contemporaneous epizootic of Far East origin that affected Western European countries. The Newcastle disease epizootic that commenced in Italy in May 2000 was due to a genotype VIIb virus that is indistinguishable from those causing sporadic outbreaks in Great Britain and Northern Europe in the late 1990s. Isolated cases yielded a variant of genotype VI (reference epizootic: Middle East in the late 1960s) and a group VIII virus (enzootic in South Africa).
Descriptors: Newcastle disease virus, genotypes, nucleotide sequences, strain differences, longitudinal studies, outbreaks, Italy.

Herrera, I.; Khan, M.S.R.; Kaleta, E.F.; Muller, H.; Dolz, G.; Neumann, U**. Serological status for *Chlamydophila psittaci,* Newcastle disease virus, avian polyoma virus, and Pacheco disease virus in scarlet macaws (*Ara macao*) kept in captivity in Costa Rica.** *Journal of Veterinary Medicine. Series B.* Dec 2001. v. 48 (10) p. 721-726. ISSN: 0931-1793
NAL call no: 41.8 Z52
Descriptors: Psittaciformes, viral diseases, Newcastle disease virus, bacterial diseases, infections, serology, aviary birds, captive animals, ELISA, antibodies, disease transmission, Costa Rica.

Huang, Z.; Krishnamurthy, S.; Panda, A.; Samal, S.K. **High-level expression of a foreign gene from the most 3'-proximal locus of a recombinant Newcastle disease virus.** *The Journal of General Virology.* July 2001. v. 82 (pt. 7) p. 1729-1736. ISSN: 0022-1317
NAL Call no: QR360.A1J6
Abstract: A previous report showed that insertion of a foreign gene encoding chloramphenicol acetyltransferase (CAT) between the HN and L genes of the full-length cDNA of a virulent Newcastle disease virus (NDV) yielded virus with growth retardation and attenuation. The NDV vector used in that study was pathogenic to chickens; it is therefore not suitable for use as a vaccine vector. In the present study, an avirulent NDV vector was generated and its potential to express CAT protein was evaluated. The CAT gene was under the control of NDV transcriptional start and stop signals and was inserted immediately before the open reading frame of the viral 3'-proximal nucleocapsid protein gene. A recombinant NDV expressing CAT activity at a high level was recovered. The replication and pathogenesis of the CAT-expressing recombinant NDV were not modified significantly. These results indicate the potential utility of an avirulent NDV as a vaccine vector.
Descriptors: live vaccines, avirulant NDV vector, CAT expressing recombinant NDV, CAT protein, gene expression, pathogenicity, chicks, replication, pthogenesis.

Iwamura, T.; Yoneyama, M.; Koizumi, N.; Okabe, Y.; Namiki, H.; Samuel, C.E.; Fujita, T. **PACT, a double-stranded RNA binding protein acts as a positive regulator for Type I interferon gene induced by Newcastle disease virus.** *Biochemical and Biophysical Research Communications.* Mar 30, 2001. v. 282 (2) p. 515-523. ISSN: 0006-291X
NAL call no: 442.8 B5236
Descriptors: virus induced immunity, interferon gene regulation, viral RNA.

Kalorey, D.R.; Kurkure, N.V.; Sakhare, P.S.; Warke, S.; Ali, M. **Effect of growell on performance, organ weight and serum trace element profile of broilers.** *Asian Australasian Journal of Animal Sciences.* May 2001. v. 14 (5) p. 677-679. ISSN: 1011-2367
NAL call no: SF55.A78A7
Descriptors: broilers performance, feed supplements, weight, blood chemistry, trace elements, mineral nutrition, humoral immunity, organs, growth promoters, iron, vaccination, Newcastle disease virus, liveweight, feed conversion efficiency, kidneys, thymus gland, zinc, muscles, copper, manganese, liveweight gain.

Kidd, M.T.; Peebles, E.D.; Whitmarsh, S.K.; Yeatman, J.B.; Wideman, R.F. Jr. **Growth and immunity of broiler chicks as affected by dietary arginine.** *Poultry Science*. Nov 2001. v. 80 (11) p. 1535-1542. ISSN: 0032-5791
NAL call no: 47.8 Am33P
Abstract: A dietary deficiency of Arg may suppress chick immune system functions; however, research evaluating immune function responsiveness of commercial broilers fed dietary Arg levels near NRC (1994) recommendations is sparse. Therefore, three experiments were conducted to evaluate growth and immunity of broilers fed varying Arg levels near NRC (1994) specifications. Because Arg and Lys are similar in structure and are known to compete in intestinal absorption, dietary Lys treatments [near NRC (1994) recommendations] were evaluated to determine if Arg and Lys interact to affect broiler immunity. There were four dietary treatments in Experiment 1 representing a 2 x 2 factorial design of additional Arg (120% of NRC) of additional Lys (120% of NRC) added to a control diet containing 100% of NRC Arg and Lys (six replications per treatment). Experiment 2 contained the following four treatments: the control diet; the control diet plus L-Arg (0.20% Arg of diet); the control diet plus L-Lys HCl (0.20% Lys of diet); and the control diet plus L-Arg-L-Glu (0.10% Arg of diet). Graduations of Arg were fed from 90 to 120% of NRC in 10% increments in Experiment 3. Also, half of the birds were exposed to vaccinations of Newcastle disease virus and infectious bronchitis virus in Experiment 3 to derive a 2 x 4 factorial design. Experiments 1 and 2 were conducted from Days 1 to 18 and Experiment 3 was conducted from Days 1 to 15 in Petersime battery brooders. No interactions occurred between dietary Lys and Arg in Experiment 1. Increasing dietary Arg, but not Lys, from 100 to 120% of the NRC recommendation increased (P < or = 0.05) Day 18 BW gain. Treatment differences in the cutaneous basophil hypersensitivity assay in Experiment 1 did not occur. In Experiment 2, treatment differences in growth responses, lymphoid organ development, and

primary antibody titers to SRBC did not occur. Unvaccinated birds in Experiment 3 fed an Arg-deficient diet had lower (P < or = 0.05) feed conversion in comparison with vaccinated birds fed an Arg-deficient diet. Vaccinated birds had lower (P < or = 0.05) Day 15 BW than unvaccinated birds, but higher (P < or = 0.05) titers to Newcastle disease virus. Increasing dietary Arg in Experiment 3 increased plasma Arg (P < or = 0.05), but did not affect plasma Lys. Although increased dietary Arg improved BW gain in Experiment 1, minimal effects were noted in growth and immune system parameters throughout this study. A dietary Arg level near the NRC (1994) recommendation should support proper immune system functions in healthy chicks.

Descriptors: broiler chicks, arginine, lysine, nutrient nutrient interactions, diets, liveweight gain, antibody formation, delayed type hypersensitivity, feed intake and conversion, bursa Fabricii, thymus gland, spleen, weight, blood picture, vaccination.

King, D.J**. Selection of thermostable Newcastle disease virus progeny from reference and vaccine strains.** *Avian Diseases.* Apr/June 2001. v. 45 (2) p. 512-516. ISSN: 0005-2086 Note: Spanish summary.

NAL call no: 41.8 Av5

Abstract: In a study of low-virulence Newcastle disease virus (NDV) isolates from poultry, 38% of the isolates had a more thermostable hemagglutinin than the lentogenic reference strains B1 and La Sota or live vaccines derived from those strains. Whether those strains with a more thermostable hemagglutinin are truly indigenous or whether they could have originated from vaccines used in the flocks was unknown. Seven monovalent NDV vaccines of B1 or La Sota type and reference B1 and La Sota strains were heat treated at 56 C to select variants more thermostable than the parent virus. Four thermal treatment cycles were completed, and virus propagated from the second and fourth heat treatments was assayed for changes in thermostability and antigenicity. The hemagglutinin thermostability of all vaccine and reference strain variants increased from the initial less than or equal to 10 min to greater than or equal to 120 min after four treatments. Antigenic changes evaluated by hemagglutination inhibition against NDV monoclonal antibodies identified changes in only the heat-treated La Sota strains. The results demonstrate that the field isolates with a more thermostable hemagglutinin could have been derived by selection from the heterogenous NDV populations in vaccine strains and that minor antigenic changes may be a result of that selection.

Descriptors: Newcastle disease virus strains, low-virulence strains, stability, heat treatment, vaccines, antigens, searching for thermal stable variants, La Sota type.

Kommers, G.D.; King, D.J.; Seal, B.S.; Brown, C.C. **Virulence of pigeon-origin Newcastle disease virus isolates for domestic chickens.** *Avian Diseases*. Oct/Dec 2001. v. 45 (4) p. 906-921. ISSN: 0005-2086 Note: Summary in Spanish

NAL call no: 41.8 Av5

Abstract: The virulence of six pigeon-origin isolates of Newcastle disease virus (NDV) was evaluated before and after passage in white leghorn chickens. Four isolates were defined as pigeon paramyxovirus-1 (PPMV-1) and two isolates were classified as avian paramyxovirus-1 (APMV-1) with NDV monoclonal antibodies. The four PPMV-1 isolates were passaged four times in chickens, and the APMV-1 isolates were passaged only once. Infected birds were monitored clinically and euthanatized. Tissues were collected for histopathology, in situ hybridization with a NDV matrix gene digoxigenin-labeled riboprobe, and immunohistochemistry with an anti-peptide antibody to the nucleoprotein. Mean death time, intracerebral pathogenicity index, and intravenous pathogenicity index tests performed before and after passage in chickens demonstrated increased virulence of the passaged PPMV-1 isolates and high virulence of the original isolates of APMV-1. Sequence analysis of the fusion protein cleavage site of all six isolates demonstrated a sequence typical of the virulent pathotype. Although the pathotyping results indicated a virulence increase of all passaged PPMV-1 isolates, clinical disease was limited to depression and some nervous signs in only some of the 4-wk-old specific-pathogen-free white leghorns inoculated intraconjunctivally. However, an increased frequency of clinical signs and some mortality occurred in 2 wk olds inoculated intraconjunctivally with passaged virus. Histologically, prominent lesions in heart and brain were observed in birds among all four groups inoculated with the PPMV-1 isolates. The behavior of the two pigeon-origin APMV-1 isolates when inoculated into chickens was characteristic of velogenic viscerotropic NDVs and included necro-hemorrhagic lesions in the gastrointestinal tract.

Descriptors: chickens, Newcastle disease virus, avian paramyxovirus, pigeons, virulence, inoculum, pathogenesis, clinical aspects, histopathology, nucleotide sequences, amino acid sequences, phylogenetics, lesions, pathotypes.

Landman, W.J.M.; Veldman, K.T.; Mevius, D.J.; van Eck, J.H.H. **Aerosol transmission of arthropathic and amyloidogenic *Enterococcus faecalis*.** *Avian Diseases.* Oct/Dec 2001. v. 45 (4) p. 1014-1023. ISSN: 0005-2086 Note: Summary in Spanish

NAL call no: 41.8 Av5

Abstract: One-day-old brown layer chicks were exposed to an aerosol of an arthropathic and amyloidogenic *Enterococcus faecalis* strain alone or after being subjected to treatment with formaldehyde gas (100-200 ppm). Four-day-old chicks were also treated with the same aerosol but after treatment with a Newcastle disease vaccine virus (NDVV) aerosol or intramuscular injection with methylprednisolon at day 1. The same *E. faecalis* strain was inoculated intramuscularly in day-old chicks as positive control. Bacteremia with time showed that 24 hr after the aerosol the day-old exposed chicks had the highest rate of positive blood cultures (70%-80%). Lower numbers of bacteremic birds at this point in time were found in the chicks treated with *E. faecalis* aerosol at day 4 (3/10 in the methylprednisolon-treated group and 0/10 in the NDVV-treated group) and the *E. faecalis* intramuscular-injected group at day 1 (2/10). Formaldehyde gas treatment did not favor the occurrence of bacteremia. NDVV aerosol exposure or injection with corticosteroids did not favor the occurrence of bacteremia 24 hr after *E. faecalis* aerosol exposure at day 4 either, although 66 days after aerosol, one bird (1/14) treated with NDVV showed bacteremia. A few bacteremic birds were found 10 days after aerosol in the NDVV- and methylprednisolon-treated groups, whereas at 14 days after aerosol, one bacteremic bird was seen in the group subjected to *E. faecalis* aerosol at day 1, indicating the occurrence of chronic bacteremia. In contrast to the *E. faecalis* intramuscular-inoculated birds, no joint pathology was seen in the aerosol-exposed groups in spite of the occurrence of chronic bacteremia.

Descriptors: chicks, *Streptococcus faecalis*, aerosols, formaldehyde, immunosuppression, prednisolone, Newcastle disease virus, chronic bacteremia, disease transmission.

Landman, W.J.M.; van Eck, J.H.H. **Aerosolization of Newcastle disease vaccine virus and *Enterococcus faecalis*.** *Avian Diseases.* July/Sept 2001. v. 45 (3) p. 684-687. ISSN: 0005-2086 Note: Spanish Summary.

NAL call no: 41.8 Av5

Abstract: In order to study the aerosol transmission of arthropathic and amyloidogenic *Enterococcus faecalis* strains, preliminary aerosol experiments were performed. The experiments were carried out in empty isolators to assess the yield and viability of *E. faecalis* and Newcastle disease vaccine virus (NDVV) aerosol particles with time. NDVV was aerosolized because this virus would be used in combination with *E. faecalis* in a subsequent study. Concentrations of about 10(5) colony-forming units (CFU) of *E. faecalis*/m3 of air were still found 30 min after the aerosol application. At 45 min, however, *E. faecalis* concentrations dropped below the detection level. The average *E. faecalis* concentration during the aerosol experiment was estimated at 10(5) CFU/liter. The NDVV aerosol generated an average of 10(4)-10(5) 50% embryo infective dose per liter of air. In these experiments, *E. faecalis* and NDVV aerosols were successfully generated despite considerable initial particle loss. The bacteria and virus uptakes per chick are discussed in case day-old chicks would be exposed to these aerosols.

Descriptors: Newcastle disease virus, *Streptococcus faecalis*, aerosol transmission, aerosolized pathogen experiments, yields, viability, chicks.

Li, Z.; Nestor, K.E.; Saif, Y.M.; Anderson, J.W.; Patterson, R.A. **Effect of selection for increased body weight in turkeys on lymphoid organ weights, phagocytosis, and antibody responses to fowl cholera and Newcastle disease-inactivatted vaccines.** *Poultry Science.* June 2001. v.80 (6) p. 689-694. ISSN: 0032-5791
NAL call no: 47.8 Am33P
Abstract: The influence of selection was studied for increased 16-wk BW in turkeys on in vivo phagocytic activity, antibody responses to vaccines, and weight of the spleen and bursa of Fabricius. A line (F) of turkeys selected long term for increased 16-wk BW and its corresponding randombred control (RBC2) were compared. Phagocytic activity was evaluated by the carbon clearance assay. Antibody responses to inactivated Newcastle disease virus and *Pasteurella multocida* vaccines were examined by ELISA. Body weight and relative weights of spleen and bursa of Fabricius of the two lines were also compared. The F line had lower phagocytic activity than the RBC2 line ($P < 0.05$). In addition, the F line had greater BW, relative weight of spleen, and ratio of spleen to bursa of Fabricius weight ($P < 0.01$) but had a lower relative weight of bursa of Fabricius at 9 wk of age. However, there were no line differences in the antibody responses to Newcastle disease virus or *P. multocida* vaccines at 1, 2, 3, 4, 5, or 12 wk after vaccination. Based on the present results, it is suggested that long-term selection for increased 16-wk BW might have resulted in changes in the immune system, as indicated by changes in the relative weights of the spleen and bursa of Fabricius and phagocytic activity. The decreased phagocytic activity in the F line may be partially responsible for increased susceptibility to specific diseases in this line.
Descriptors: turkeys, spleen, bursa Fabricii, weight, artificial selection, selection criteria, liveweight, phagocytosis, immune system response, inactivated vaccines, Newcastle disease, *Pasteurella multocida*, disease resistance, susceptibility.

Lublin, A.; Mechani, S.; Siman-Tov, Y.; Weisman, Y.; Horowitz, H.I.; Hatzofe, O. **Sudden death of a breaded vulture (*Gypaetus barbatus*) possibly caused by Newcastle disease virus.** *Avian Diseases.* July/Sept 2001. v. 45 (3) p. 741-744. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: An adult female bearded vulture (*Gypaetus barbatus*) in the Tel Aviv University Research Zoo was found dead without previous clinical signs. The predominant pathologic changes were considerable bloody content in the intestines and enlargement of the liver, which had a rubbery consistency with color changes. Microscopic lesions consisted of multifocal histiocytic infiltration in the liver. Newcastle disease virus (NDV) was isolated from a cloacal swab and from the lungs and liver. Intracerebral pathogenicity index of the virus, as estimated in 1-day-old chicks, was repeated three times and had an average value of 1.68, indicating a velogenic strain. Numerous *Clostridium septicum* bacteria were found on the intestinal surface, but bioassays in which they were orally administered into chickens and mice revealed that, even though they were heavily multiplied in the intestines, they were nonpathogenic. It seems that NDV, documented for the first time in a bearded vulture in Israel, was the likely cause of sudden death.
Descriptors: predatory birds, *Gypaetus barbatus*, sudden death, etiology, Newcastle disease virus, *Clostridium septicum*, pathogenicity, vultures, zoo specimen, intestines, liver, lesions, case reports, diagnosis, Israel.

McGinnes, L.W.; Sergel, T.; Chen, H.; Hamo, L.; Schwertz, S.; Li, D.; Morrison, T.G. **Mutational analysis of the membrane proximal heptad repeat of the Newcastle disease virus fusion protein.** *Virology.* Oct 25, 2001. v. 289 (2) p. 343-352.: ISSN: 0042-6822
NAL call no: 448.8 V81
Descriptors: fusion protein structure, viral protein, membranes.

McGinnes, L.; Sergel, T.; Reitter, J.; Morrison, T**. Carbohydrate modifications of the NDV fusion protein heptad repeat domains influence maturation and fusion activity.** *Virology.* May 10, 2001. v. 283 (2) p. 332-342. ISSN: 0042-6822
NAL call no: 448.8 V81
Descriptors: Newcastle disease virus, fusion protein, modifications to heptad repeats, effects on fusion.

Mishra, S.; Kataria, J.M.; Sah, R.L.; Verma, K.C.; Mishra, J.P. **Studies on the pathogenicity of Newcastle disease virus isolates in Guinea fowl.** *Tropical Animal Health and Production.* July 2001. v. 33 (4) p. 313-320. ISSN: 0049-4747
NAL call no: SF601.T7
Descriptors: chickens, guineafowl, pathogenicity of Newcastle disease virus, viral strains, mortality, pathogenesis, disease course, hosts, symptoms, postmortem examinations.

Mo, C W.; Cao, Y.C.; Lim, B.L. **The in vivo and in vitro effects of chicken interferon alpha on infectious bursal disease virus and Newcastle disease virus infection.** *Avian Diseases.* Apr/June 2001. v. 45 (2) p. 389-399. ISSN: 0005-2086 Note: Summary in Spanish.
NAL call no: 41.8 Av5
Abstract: The in vitro and in vivo effects of chicken interferon alpha on infectious bursal disease virus (IBDV) infection were investigated in this study. A cDNA of interferon alpha was first cloned from a Chinese strain chicken Shiqi by reverse transcription-polymerase chain reaction. The deduced amino acid sequence has one amino acid substitution with chicken interferon alpha 1 at residue 65 (N to S) and two amino acid substitutions with chicken interferon alpha 2 at residues 50 (N to S) and 58 (P to L), respectively. A prokaryotic expression system was employed to produce a large quantity of recombinant protein. Recombinant interferon was purified in a one-step process, and an optimal refolding process was devised. About 51% recombinant protein from inclusion bodies was refolded, and the final yield of the recombinant interferon reached 24.66 mg/liter culture. The recombinant interferon suppressed IBDV plaque formation in a dose-dependent manner and ameliorated IBDV and Newcastle disease virus infection in both specific-pathogen-free (SPF) and commercial chickens. The antiviral effect of interferon alpha is more significant in commercial chickens than in SPF chickens, and the route of administration affects the efficacy of interferon therapy. This is the first reported study of the effects of interferon alpha on IBDV infection.
Descriptors: chickens, interferon, recombinant proteins, infectious bursal disease virus, Newcastle disease virus, complementary DNA, cloning, antiviral properties, amino acid sequences, chick embryos, fibroblasts.

Westbury, H**. Newcastle disease virus: An evolving pathogen.** *Avian Pathology.* Feb 2001. v. 30 (1) p. 5-11. ISSN: 0307-9457 Note: Summaries in French, German and Spanish.
NAL call no: SF995.A1A9
Abstract: Australia experienced outbreaks of virulent Newcastle disease (ND) in chickens in the state of New South Wales in the years 1998, 1999 and 2000. The disease had occurred previously in Australia in 1930 and 1932 but the country was free of it until the recent outbreaks. Avirulent strains of Newcastle disease virus (NDV) were detected in 1966 and, during the next two to three decades, strains (so-called lentogenic strains) able to induce mild respiratory disease equivalent to that induced by vaccine strains such as LaSota were also detected. Nucleotide sequence analysis of the genes encoding the haemagglutinin and fusion proteins of Australian isolates of the virus during this time demonstrated that Australian chicken strains of NDV could be differentiated from NDV isolated elsewhere. Analysis in this way demonstrated that NDV isolates causing the recent outbreaks of virulent disease were Australian viruses that were so

closely related to a recognized Australian lentogenic strain, termed the Peat's Ridge strain, that it was considered to be the precursor of the virulent virus. The outbreaks of virulent disease in 1998 and 1999 were controlled by an official "stamping out" eradication campaign. This was subsequently replaced by strategic use of ND vaccines when virulent virus was again detected on some farms that had been restocked following depopulation. The national situation with regard to ND is now being assessed through a structured national survey of ND viruses, particularly to determine the distribution of the precursor strain. No new outbreaks of virulent ND have been recognized since February 2000, although immunization of flocks in areas where the disease was recognized has occurred.
Descriptors: Newcastle disease virus, chickens, outbreaks, Newcastle disease, virulence, genes, nucleotide sequences, disease control, vaccination, Australia.

Yu, L.; Wang, Z.; Jiang, Y.; Chang, L.; Kwang, J. **Characterization of newly emerging Newcastle disease virus isolates from the People's Republic of China and Taiwan.** *Journal of Clinical Microbiology.* Oct 2001. v. 39 (10) p. 3512-3519. ISSN: 0095-1137
NAL call no: QR46.J6
Descriptors: nucleotide sequences, phylogenetics, chickens, pigeons, viral disease strains, molecular sequence data, China, Taiwan.

Yusoff, K.; Tan, W.S. **Newcastle disease virus: macromolecules and opportunities.** *Avian Pathology.* Oct 2001. v. 30 (5) p. 439-455. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Over the past two decades, enormous advances have occurred in the structural and biological characterization of Newcastle disease virus (NDV). As a result, not only the complete sequence of the viral genome has been fully determined, but also a clearer understanding of the viral proteins and their respective roles in the life cycle has been achieved. This article reviews the progress in the molecular biology of NDV with emphasis on the new technologies. It also identifies the fundamental problems that need to be addressed and attempts to predict some research opportunities in NDV that can be realized in the near future for the diagnosis, prevention and treatment of disease(s).
Descriptors: Newcastle disease virus, molecular biology, genomes, viral proteins, viral replication, diagnosis, disease control, vaccination, literature reviews.

Zanetti, F.; Mattiello, R.; Garbino, C.; Kaloghlian, A.; Terrera, M.V.; Boviez, J.; Palma, E.; Carrillo, E.; Berinstein, A. **Biological and molecular characterization of a pigeon paramyxovirus type-1 isolate found in Argentina.** *Avian Diseases.* July/Sept 2001. v. 45 (3) p. 567-571. ISSN: 0005-2086
Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: In this report, we describe the biological and molecular characterization of a paramyxovirus type-1 (PPMV-1) isolate found in wild pigeons in an urban habitat in Buenos Aires, Argentina. Of the nine pigeons captured, three were moribund, and the other six showed diarrhea, ataxia, tremor, torticolis, and wing paralysis. The intracerebral pathogenicity index was 1.29, and the amino acid (aa) sequence at the fusion protein cleavage site was 112GRQKRF117. These characteristics correspond to a virulent Newcastle disease virus isolate. Nevertheless, it was not possible to reproduce the disease in chickens experimentally although the chickens exhibited seroconversion after inoculation. On the other hand, pigeons inoculated with the isolate became sick. These results provide further evidence about the unusual pathogenicity of PPMV-1 for chickens and show once more the need for more biological determinations in these cases to arrive at a final conclusion.
Descriptors: avian paramyxovirus, pigeons, type 1 isolate, characterization, disease symptoms, pathogenicity, seroconversion, experimental infection, amino acid sequences, molecular sequence data, Argentina.

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Alexander, D.J. **Newcastle disease in ostriches (*Struthio camelus*)--a review.** *Avian Pathology.* Apr 2000. v. 29 (2) p. 95-100. ISSN: 0307-9457
NAL call no: SF995.A1A9
Descriptors: ostriches, Newcastle disease, Newcastle disease virus, outbreaks, infections, mortality, symptoms, age differences, disease transmission, morbidity, infection, experimental infections, chickens, vaccines, ELISA, diagnostic techniques, virus neutralization, literature reviews.

Ali, A.; Reynolds, D.L. **A multiplex reverse transcription-polymerase chain reaction assay for Newcastle disease virus and avian pneumovirus (Colorado strain).** *Avian Diseases.* Oct/Dec 2000. v. 44 (4) p. 938-943. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Newcastle disease virus (NDV) and avian pneumovirus (APV) cause Newcastle disease and rhinotracheitis respectively, in turkeys. Both of these viruses infect the respiratory system. A one-tube, multiplex, reverse transcription-polymerase chain reaction (RT-PCR) assay for the detection of both NDV and Colorado strain of APV (APV-Col) was developed and evaluated. The primers, specific for each virus, were designed from the matrix protein gene of APV-Col and the fusion protein gene of NDV to amplify products of 631 and 309 nucleotides, respectively. The multiplex RT-PCR assay, for detecting both viruses simultaneously, was compared with the single-virus RT-PCR assays for its sensitivity and specificity. The specific primers amplified products of predicted size from each virus in the multiplex as well as the single-virus RT-PCR assays. The multiplex RT-PCR assay was determined to be equivalent to the single-virus RT-PCR assays for detecting both NDV and APV-Col. This multiplex RT-PCR assay proved to be a sensitive method for the simultaneous and rapid detection of NDV and APV-Col. This assay has the potential for clinical diagnostic applications.
Descriptors: avian pneumovirus, Newcastle disease virus, reverse transcription polymerase chain reaction assay, diagnostic techniques, detection, rhinotracheitis, respiratory diseases, evaluation.

Ali, A.; Reynolds, D.L. **Characterization of the stunting syndrome agent: Relatedness to known viruses.** *Avian Diseases.* Jan/Mar 2000. v. 44 (1) p. 45-50. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: An enteric disease of young turkeys, referred to as stunting syndrome (SS), causes reduced growth and impaired feed efficiency. A recently isolated virus, stunting syndrome agent, (SSA) has been found to be the etiologic agent of SS. The objective of the present study was to determine relatedness of the SSA with other viral agents. Serologic (viral neutralization and enzyme-linked immunosorbent assay [ELISA]) assays and a reverse transcriptase-polymerase chain reaction (RT-PCR) were used. The antisera against turkey enteric coronavirus (bluecomb agent), bovine coronavirus (BCV), bovine Breda-1 virus, bovine Breda-2 virus, avian infectious bronchitis virus (IBV), avian influenza virus, Newcastle disease virus (NDV), and transmissible gastroenteritis virus (TGEV) of swine were evaluated by dot-immunobinding avidin-biotin-enhanced ELISA and did not react with SSA. The homologous (anti-SSA) antiserum was positive by ELISA. Similarly, anti-SSA antiserum did not react when NDV, IBV, BCV, or TGEV was used as antigen but did react with the homologous (SSA) virus. The

virus neutralization assay was performed by inoculating 24-to-25-day-old turkey embryos via the amniotic route and by assessing the embryo infectivity on the basis of gross intestinal lesions and intestinal maltase activity at 72 hr postinoculation. None of the aforementioned antisera neutralized SSA infectivity in embryos except for the homologous anti-SSA antiserum. A RT-PCR was performed with known primers specific for NDV, IBV, BCV, and TGEV. The known primers failed to amplify SSA genome but amplified their respective viral genomes. We concluded that the SSA was distinct from the viral agents that were evaluated.

Descriptors: viral diseases, growth, feed conversion, viruses, serology, polymerase chain reaction, identification, immune serum, virus neutralization, evaluation, assays, embryos.

Blignaut, A.; Burger, W.P.; Morley, A.J.; Bellstedt, D.U. **Antibody responses to La Sota strain vaccines of Newcastle disease virus in ostriches (*Struthio camelus*) as detected by enzyme-linked immunosorbent assay.** *Avian Diseases.* Apr/June 2000. v. 44 (2) p. 390-398. ISSN: 0005-2086 Note: Spanish summary.

NAL call no: 41.8 Av5

Abstract: Because of the fact that South Africa is a Newcastle disease virus (NDV)-endemic country, major concerns exist that the export of ostrich meat could transmit velogenic strains of this disease. The ability to transmit the virus could be reduced by effective vaccination of South African ostriches. In this study, two vaccination trials were conducted to assess serum antibody production in response to vaccination with La Sota strain NDV vaccines. To this end, a commercially available chicken anti-NDV enzyme-linked immunosorbent assay (ELISA) was modified for the detection of anti-NDV antibodies in ostrich serum. The results obtained with this ELISA were verified by comparison with an indirect ELISA. In the first trial, ostriches were immunized subcutaneously four times with different volumes of an inactivated vaccine and their immune response was determined from 2.5 mo up to the ideal slaughter age of 14 mo. Results indicated that ostriches responded in a dose-dependent manner and gave support for the vaccination schedule currently recommended to South African farmers. In a second trial, immunization by eyedrop with a live La Sota vaccine of 5-wk-old ostriches did not elicit a humoral immune response. The results indicate that it is highly unlikely that ostriches that have been vaccinated according to the recommended vaccination schedule can transmit the virus.

Descriptors: ostriches, Newcastle disease, Newcastle disease virus, vaccination, immune response, ELISA, inactivated vaccines, live vaccines, antibody testing, age differences, L833L810.

Clavijo, A.; Robinson, Y.; Booth, T.; Munroe, F. **Velogenic Newcastle disease in imported caged birds**. *The Canadian Veterinary Journal*. May 2000. v. 41 (5) p. 404-406. ISSN: 0008-5286 Note: French summary.

NAL call no: 41.8 R3224

Descriptors: Psittaciformes, Psittacidae, Cacatuidae, Newcastle disease, Newcastle disease virus, importation, quarantine, virulence, clinical aspects, diagnosis and mortality, Quebec, Netherlands.

Gohm, D.S.; Thur, B.; Hofmann, M.A. **Detection of Newcastle disease virus in organs and faeces of experimentally infected chickens using RT-PCR.** *Avian Pathology.* Apr 2000. v. 29 (2) p. 143-152. ISSN: 0307-9457

NAL call no: SF995.A1A9

Descriptors: chickens, Newcastle disease virus, detection, organs, feces, experimental infections, polymerase chain reaction, diagnostic techniques, evaluation, outbreaks, identification, time, serotypes, pathotypes.

Gutierrez-Ruiz, E.J.; Ramirez-Cruz, G.T.; Gamboa, E.I.C.; Alexander, D.J.; Gough, R.E. **A serological survey for avian infectious bronchitis virus and Newcastle disease virus antibodies in backyard (free-range) village chickens in Mexico.** *Tropical Animal Health and Production.* Dec 2000. v. 32 (6) p. 381-390. ISSN: 0049-4747 Note: Summaries in French and Spanish.

NAL call no: SF601.T7

Descriptors: chickens, serological surveys, infectious bronchitis virus, Newcastle disease virus, antibody formation, free range husbandry, seroprevalence, respiratory diseases, Mexico.

Huang, H.J.; Matsumoto, M**. Nonspecific innate immunity against Escherichia coli infection in chickens induced by vaccine strains of Newcastle disease virus.** *Avian Diseases.* Oct/Dec 2000. v. 44 (4) p. 790-796.: ISSN: 0005-2086 Note: Spanish summary.

NAL call no: 41.8 Av5

Abstract: The objective was to test the hypothesis that vaccine strains of Newcastle disease virus (NDV) induce nonspecific immunity against subsequent infection with *Escherichia coli*. White leghorn chickens at 5 wk of age were vaccinated with a NDV vaccine at various days before challenge exposure with O1:K1 strain of *E. coli* via an intra-air sac route. Immunity was determined on the basis of the viable number of *E. coli* in the spleen 24 hr after the infection. Roakin strain induced significant ($P < 0.05$) immunity against *E. coli* at 4, 6, and 8 days, and La Sota strain at 2, 4, and 8 days, postvaccination. Secondary NDV vaccination administered 14 days later failed to induce immunity against *E. coli* when chickens were infected 1 or 5 days after the vaccination. Significant ($P < 0.05$) suppression of this nonspecific immunity was observed in birds treated with corticosterone, 40 mg/kg in feed, given for three consecutive days immediately prior to the bacterial exposure but not in those treated prior to the period. The results indicate that innate immunity induced by the primary NDV vaccination may significantly suppress the multiplication of *E. coli* in chickens for a period of 2-8 days postvaccination. The NDV-induced immunity was inhibited by corticosterone, which is known to mediate physiological responses to stress.

Descriptors: chickens, *Escherichia coli*, immunity effects, non-specific immunity, Newcastle disease virus, induced resistance, disease resistance, defense mechanisms, vaccination, vaccines, experimental infections, corticosterone, medicated feeds, duration, inhibition.

Ibrahim, I.K.; Shareef, A.M.; Al Joubory, K.M.T. **Ameliorative effects of sodium bentonite on phagocytosis and Newcastle disease antibody formation in broiler chickens during aflatoxicosis.** *Research in Veterinary Science*. Oct 2000. v. 69 (2) p. 119-122. ISSN: 0034-5288

NAL call no: 41.8 R312

Descriptors: broilers, aflatoxicosis, bentonite, dosage, phagocytosis, Newcastle disease, vaccination, antibody formation, immunosuppression.

Kirkland, P.D. **Virulent Newcastle Disease Virus in Australia: in through the 'back door'.** *Australian Veterinary Journal.* May 2000. v. 78 (5) p. 331-333. ISSN: 0005-0423

NAL call no: 41.8 Au72

Descriptors: Newcastle disease virus, virulence, poultry, outbreaks, Australia.

Krishnamurthy, S.; Huang, Z.; Samal, S.K**. Recovery of a virulent strain of Newcastle disease virus from cloned cDNA: expression of a foreign gene results in growth retardation and attenuation.** *Virology.* Dec 5, 2000. v. 278 (1) p. 168-182. ISSN: 0042-6822.

NAL call no: 448.8 V81
Descriptors: complementary DNA, virulence.

Leslie, J. **Newcastle disease: outbreak losses and control policy costs.** *The Veterinary Record.* May 20, 2000. v. 146 (21) p. 603-606. ISSN: 0042-4900
NAL call no: 41.8 V641
Descriptors: poultry industry, Newcastle disease, disease control, estimated costs, outbreaks, losses, vaccination, Northern Ireland.

Ley, E.C.; Morishita, T.Y.; Harr, B.S.; Mohan, R.; Brisker, T. **Serologic survey of slaughter-age ostriches (*Struthio camelus*) for antibodies to selected avian pathogens.** *Avian Diseases.* Oct/Dec 2000. v. 44 (4) p. 989-992. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Serum samples from 163 slaughter-age ostriches (*Struthio camelus*) in Ohio and Indiana were tested for antibodies to avian influenza virus (AIV), Newcastle disease virus (NDV), paramyxovirus (PMV) 2, PMV3, PMV7, infectious bursal disease virus (IBDV), *Bordetella avium, Mycoplasma synoviae, Mycoplasma gallisepticum, Ornithobacterium rhinotracheale, Salmonella pullorum, Salmonella gallinarum*, and *Salmonella typhimurium*. One ostrich had antibodies to AIV H5N9, 57% of the ostriches had antibodies to NDV, four ostriches had antibodies to both NDV and PMV2, and one ostrich had antibodies to NDV, PMV2, PMV3, and PMV7. None of the ostriches had antibodies to IBDV, *B. avium, M. synoviae, M. gallisepticum, O. rhinotracheale, S. pullorum, S. gallinarum*, and *S. typhimurium*. This is the first report of antibodies to avian influenza and PMV7 in ostriches in the United States.
Descriptors: ostriches, pathogens, viruses, bacteria, serological surveys, antibodies, infections, new host records, avian influenzavirus, paramyxovirus, incidence, Newcastle disease virus.

Li, Y.C.; Ledoux, D.R.; Bermudez, A.J.; Fritsche, K.L.; Rottinghaus, G.E**. The individual and combined effects of fumonisin B1 and moniliformin on performance and selected immune parameters in turkey poults.** *Poultry Science*. June 2000. v. 79 (6) p. 871-878. ISSN: 0032-5791
NAL call no: 47.8 Am33P
Descriptors: poults, fumonisins, mycotoxins, synergism, antibody formation Newcastle disease virus, lymphocyte transformation, *Escherichia coli*, bacteremia, blood, bacterial count, feed intake, liveweight gain, feed conversion, thymus gland, bursa Fabricii, spleen, weight, mortality.

Li, Y.C.; Ledoux, D.R.; Bermudez, A.J.; Fritsche, K.L.; Rottinghaus, G.E. **Effects of moniliformin on performance and immune function of broiler chicks.** *Poultry Science.* Jan 2000. v. 79 (1) p. 26-32. ISSN: 0032-5791
NAL call no: 47.8 Am33P
Abstract: Three trials were conducted to evaluate the effect of moniliformin (M) on performance and immune function in chicks. Day-old chicks were randomly assigned to four dietary treatments (0, 50, 75, or 100 mg M/kg diet). In Trial 1, chicks were placed on treatments for 3 wk and were injected intravenously with 4.6 x 10(6) *Escherichia coli* on Day 21. Blood samples were collected at 60, 120, and 180 min after inoculation, and liver, spleen, and lung were collected at 180 min postinjection. Compared with control chicks, chicks fed 75 and 100 mg M/kg diet had higher ($P < 0.05$) numbers of *E. coli* colonies in the circulation, liver, and spleen. In Trial 2, chicks were placed on diets for 4 wk and were injected with 0.5 mL Newcastle disease virus (NDV) vaccine intramuscularly on Weeks 2 and 3 of the experiment. The primary and secondary anti-NDV antibody titers were measured 7 d after each injection. Chicks fed 100 mg M/kg diet had lower ($P < 0.05$) secondary antibody titers than did control chicks. In Trial 3, lymphocyte proliferation in chicks exposed to M in vivo and in vitro was determined. Results of the in vivo study showed that cell proliferation in response to mitogens from control- and M-fed chicks did not differ ($P > 0.05$). For the in vitro study, lymphocyte proliferation decreased linearly ($P < 0.01$) with increased concentrations of M. In all three trials, chicks fed 100 mg M/kg diet had lower ($P < 0.05$) feed intake and weight gain than did control chicks. Data from the current study suggested that M decreased performance and immune response in chicks at the level of 75 mg/kg diet.
Descriptors: chicks, mycotoxins, fusarium, *Escherichia coli*, experimental infections, bacteremia, antibody formation, lymphocyte transformation, feed intake, body weight, feed conversion, dosage.

Mishra, S.; Kataria, J.M.; Verma, K.C.; Sah, R.L. **Response of chickens to infection with Newcastle disease virus isolated from a guinea fowl.** *Tropical Animal Health and Production.* Oct 2000. v. 32 (5) p. 277-284. ISSN: 0049-4747 Note: Summaries in French and Spanish.
NAL call no: SF601.T7
Descriptors: guineafowls, Newcastle disease virus, chickens, pathogenicity, mortality, morbidity, antibody formation, hemagglutination inhibition test, neutralization tests, virus neutralization.

Morales, A.; Valle, V.; Gonzalez, M. **A serological evaluation of a polyvalent vaccine containing NDV, IB, EDS and HPS virus in layer hens.** *Proceedings of ... Western Poultry Disease Conference.* Davis, Calif.: University of California. 2000. (49th) p. 108-109. Note: Meeting held on Mar 5-7, 2000, Sacramento, CA.
NAL call no: SF995.W4
Descriptors: hens, polyvalent vaccines, Newcastle disease virus, infectious bronchitis virus, egg drop syndrome, poultry diseases, hydropericardium syndrome.

Morishita, T.Y.; Aye, P.P.; Ley, E.C.; Harr, B.C**. Survey of pathogens and blood parasites in free-living passerines.** *Avian Diseases.* July/Sept 1999. v. 43 (3) p. 549-552. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: To determine the disease prevalence of free-living passerines, 1709 passerines were sampled from 38 different field sites in Ohio. Choanal and cloacal swabs were collected from each bird and cultured for the presence of *Pasteurella multocida, Salmonella* spp., and *Escherichia coli* by standard microbiologic techniques. In addition, the serum from each bird was analyzed for the presence of antibodies to *Mycoplasma gallisepticum, Mycoplasma synoviae*, Newcastle disease virus, and avian influenza virus. A blood smear was also made to examine for the presence of blood parasites. Results indicated that the isolation of *E. coli* varied with bird species, with the European starling having a higher (21.4%) isolation of *E. coli*. *Salmonella* spp. were also isolated from these free-living passerines. *Pasteurella multocida* was not isolated from any of the sampled passerines. These birds did not have antibodies to *M. gallisepticum, M. synoviae*, Newcastle disease virus, or avian influenza virus. Blood parasites were not detected in any of the birds sampled.
Descriptors: Passeriformes bird diseases, wild birds, disease prevalence, *Pasteurella multocida. Salmonella, Escherichia coli, Mycoplasma gallisepticum, Mycoplasma synoviae*, Newcastle disease virus, avian influenza virus, parasites, Ohio.

Murakawa, Y.; Takase, K.; Sakamoto, K.; Suesoshi, M.; Nagatomo, H. **Characterization of a lentogenic Newcastle disease virus isolated from broiler chickens in Japan.** *Avian Diseases.* July/Sept 2000. v. 44 (3) p. 686-690. ISSN: 0005-2086 Note: Spanish summary.

NAL call no: 41.8 Av5
Abstract: Newcastle disease virus (NDV), named MET95, was isolated from a nonvaccinated broiler flock in Japan in 1995. The MET95 strain was determined to be a lentogenic NDV. The strain has the properties of eluting rapidly at 4C and has low thermostability in hemagglutinating activity with chicken erythrocytes. In these studies, no difference could be found between the MET95 strain and the Hitcher B1 vaccine strain. However, the chickens inoculated with the MET95 strain, as well as chickens that they were in contact with, had a much higher hemagglutination-inhibition antibody response than those inoculated with the B1 strain. Accordingly, the MET95 strain is thought to be a promising candidate as a live ND vaccine strain. In Japan, this is the first report on the isolation of lentogenic NDV from chickens since the paper on the Ishii strain isolated in 1966.
Descriptors: broilers, Newcastle disease virus, characterization, strain differences, pathogenicity, immune response, Japan.

Nanthakumar, T.; Tiwari, A.K.; Kataria, R.S.; Butchaiah, G.; Kataria, J.M.; Goswami, P.P. **Sequence analysis of the cleavage site-encoding region of the fusion protein gene of Newcastle diseae viruses from India and Nepal.** *Avian Pathology*. Dec 2000. v. 29 (6) p. 603-607. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Five field isolates of Newcastle disease virus, including one from a pigeon from the Indian subcontinent, along with three vaccine strains have been characterized by sequence analysis of the fusion protein (F) gene in the region encoding the F2-F1 cleavage site. Based on the amino acid sequence present at the cleavage site and on the percent divergence at nucleotide and amino acid levels, three field isolates could be classified as velogenic and two were of lentogenic pathotypes. The velogenic phenotypes had the sequence RRQK/RRF at the cleavage site, while the lentogenic strains had GRQA/GRL at the corresponding position.
Descriptors: Newcastle disease virus, nucleotide sequences, amino acid sequences, molecular sequence data, viral proteins, pathotypes, characterization, India, Nepal.

Nanthakumar, T.; Kataria, R.S.; Tiwari, A.K.; Butchaiah, G.; Kataria, J.M. **Pathotyping of Newcastle disease viruses by RT-PCR and restriction enzyme analysis.** *Veterinary Research Communications*. May 2000. v. 24 (4) p. 275-286. ISSN: 0165-7380
NAL call no: SF601.V38
Descriptors: Newcastle disease virus, pathotypes, polymerase chain reaction, restriction endonuclease analysis, detection, identification, nucleotide sequences, viral proteins, pathogenicity, vaccines.

Nasser, M.; Lohr, J.E.; Mebratu, G.Y.; Zessin, K.H.; Baumann, M.P.O.; Ademe, Z. **Oral Newcastle disease vaccination trials in Ethiopia.** *Avian Pathology*. Feb 2000. v 29 (1) p. 27-34. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Vaccination experiments were carried out in Ethiopia to study the efficacy of the NDV-I2 vaccine against challenge with an Ethiopian velogenic strain of NDV. In experiment A, which comprised 300 broiler chicks, the efficacy of the ocular/drinking water application of the HB1/La Sota vaccine was compared with the ocular/drinking water and the feed application of the NDV-I2 vaccine on untreated barley and sorghum. The NDV-I2 vaccine applied by eye-drop or drinking-water protected the chickens against challenge as efficiently as combined HB1/La Sota vaccination but untreated barley and sorghum were unsuitable vaccine carriers. The vaccine virus could not be recovered and chickens neither seroconverted nor were they protected. In experiment B, 120 broiler chicks were divided into 6 treatment groups. One group each received NDV-I2 vaccine mixed with untreated barley or sorghum which was applied immediately, or 14 h after mixing and standing at ambient temperature. The fifth group was vaccinated intraocularly and via the drinking water with the NDV-I2 vaccine. The sixth group remained untreated. Experiment B confirmed the results of experiment A. In experiment C, 100 chicks were divided into 5 groups of 20 chickens each. One group each received the NDV-I2 vaccine on parboiled barley or sorghum as vaccine carriers 0 and 6 h after mixing. The last group remained untreated. Parboiled barley given 0 or 6 h and parboiled sorghum given 0 h after mixing with the vaccine led to seroconversion and protection of the chickens. Parboiled sorghum given 6 h after mixing with the vaccine did not. It is concluded that the thermostable NDV-I2 vaccine may be a suitable vaccine for oral application under Ethiopian conditions.
Descriptors: chicks, oral vaccination, vaccines, Newcastle disease virus Newcastle disease, efficacy, disease prevention, drinking water, vaccination, medicated feeds, barley, sorghum, survival, immune response, eye drop vaccination, Ethiopia.

New Zealand. MAF Biosecurity Authority. *Import Risk Analysis: Chicken Meat and Chicken Meat Products: Bernard Matthews Foods Ltd Turkey Meat Preparations from the United Kingdom: Revised Quantitative Risk Assessments on Chicken Meat from the United States: Reassessment of Heat Treatment for Inactivation of Newcastle Disease Virus in Chicken Meat.* Other title: *Chicken Meat and Chicken Meat Products. Bernard Matthews Foods Ltd Turkey Meat Preparations from the United Kingdom. Revised Quantitative Risk Assessments on Chicken Meat from the United States. Reassessment of Heat Treatment for Inactivation of Newcastle Disease Virus in Chicken Meat. Chicken Meat Risk Analysis.* Wellington, N.Z.: Biosecurity Authority, Ministry of Agriculture and Forestry, [2000] 24 leaves: ill.
NAL call no: HD9437.N452 2000
Descriptors: chicken and turkey industry, poultry diseases, Newcastle disease virus, risk analysis, treatment, New Zealand.

Oakeley, R.D. **The limitations of a feed/water based heat-stable vaccine delivery system for Newcastle disease-control strategies for backyard poultry flocks in sub-Saharan Africa. [Erratum: May 1, 2001, v. 49 (3/4), p. 279.].** *Preventive Veterinary Medicine.* Dec 8, 2000. v. 47 (4) p. 271-279. ISSN: 0167-5877
NAL call no: SF601.P7
Descriptors: poultry flocks, feed and water based vaccine delivery, Newcastle disease virus, vaccination, medicated feeds, disease control, outbreaks, extensive production, heat stability, rural communities, Africa south of Sahara.

Peeters, B.P.H.; Gruijthuijsen, Y.K.; Leeuw, O.S. de.; Gielkens, A.L.J. **Genome replication of Newcastle disease virus: Involvement of the rule-of-six.** *Archives of Virology.* 2000. v. 145 (9) p. 1829-1845. ISSN: 0304-8608
NAL call no: 448.3 Ar23
Descriptors: infection, genome analysis, transcription.

Pfitzer, S.; Verwoerd, D.J.; Gerdes, G.H.; Labuschagne, A.E.; Erasmus, A.; Manvell, R.J.; Grund, C. **Newcastle disease and avian influenza A virus in wild waterfowl in South Africa.** *Avian Diseases.* July/Sept 2000. v. 44 (3) p. 655-660. ISSN: 0005-2086 Note: Spanish Summary.
NAL call no: 41.8 Av5

Abstract: In an intensive ostrich farming area in South Africa with a history of ostrich influenza outbreaks, we conducted a survey of avian influenza virus (AIV) and Newcastle disease virus (NDV) in wild aquatic birds. During late autumn and winter 1998, the time of year when outbreaks in ostriches typically start to occur, 262 aquatic birds comprising 14 species were sampled and tested for both virus infections. From eight samples, AIV, serotype H10N9, could be isolated. All isolates were apathogenic as determined by the intravenous pathogenicity index (0.00). Conversely, none of33 sera of these wild birds showed antibodies against H10. However, one bird was found serologically positive for H6 AIV. This AIV serotype was later isolated from ostriches during an avian influenza outbreak in this area. No NDV was isolated although 34 of 46 serum samples contained NDV-specific antibodies. This is the first H10N9 isolate to be reported from Africa. In addition, our data support the notion that wild aquatic birds may function as a reservoir for AIV and NDV in South Africa.
Descriptors: waterfowl, wild birds, Newcastle disease virus, avian influenzavirus, disease surveys, serotypes, pathogenicity, reservoir hosts, South Africa.

Pitt, J.J.; Da Silva, E.; Gorman, J.J. **Determination of the disulfide bond arrangement of Newcastle disease virus hemagglutinin neuraminidase. Correlation with a beta-sheet propeller structural fold predicted for Paramyxoviridae attachment proteins.** *The Journal of Biological Chemistry*. Mar 3, 2000. v. 275 (9) p. 6469-6478. ISSN: 0021-9258
NAL call no: 381 J824
Descriptors: Newcastle disease virus, viral hemagglutinins, sialidase, amino acid sequences, cysteine, cystine, molecular conformation, molecular weight, pseudomolecular weight.

Poston, R.M.; Johnson, B.D.; Hutchins, J.E.; Doelling, V.W.; Reynolds, D.L. **In ovo NDV vaccination in combination with interferon-type I is safe and efficacious.** *Proceedings of ... Western Poultry Disease Conference.* Davis, Calif.: University of California. 2000. (49th) p. 13-17. Note: Meeting held on Mar 5-7, 2000, Sacramento, CA.
NAL call no: SF995.W4
Descriptors: chick, embryos, vaccination, Newcastle disease virus vaccines, interferon.

Reynolds, D.; Akinc, S.; Ali, A**. Passively administered antibodies alleviate stunting syndrome in turkey poults.** *Avian Diseases.* Apr/June 2000. v. 44 (2) p. 439-442. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Stunting syndrome is an enteric disease of young turkeys that results in reduced growth (stunting) of poults and impaired feed efficiency. A virus, which has been termed the stunting syndrome agent (SSA), causes stunting syndrome. In this study passive immunity was evaluated as a method of protecting poults from stunting syndrome. One-day-old poults were injected with either tryptose phosphate broth, an anti-SSA antibody preparation, or an anti-Newcastle disease virus antibody preparation before challenge by placing them into SSA-contaminated isolators or control (nonchallenge) isolators. Poults that received anti-SSA antibodies were significantly heavier ($P < 0.05$) and did not display as severe clinical disease compared to birds that did not receive the anti-SSA antibodies. However, the birds that received anti-SSA antibodies and were challenged were significantly lighter ($P < 0.05$) than birds that were not challenged. The results of this trial demonstrate that the injection of anti-SSA antibodies benefited poults undergoing stunting syndrome. The role of passive immunity, either through breeder hen vaccination or through supplying antibodies to poults artificially (i.e., at the hatchery), may have future applications in alleviating stunting syndrome.
Descriptors: poults, viral diseases, growth disorders, passive immunization, passive immunity, antibodies, immune serum, disease prevention, body weight.

Reynolds, D.L.; Maraqa, A.D. **Protective immunity against Newcastle disease: the role of cell-mediated immunity.** *Avian Diseases.* Jan/Mar 2000. v. 44 (1) p. 145-154. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: The role of cell-mediated immunity (CMI) in protection of birds from Newcastle disease was investigated by two different strategies in which only Newcastle disease virus (NDV)-specific CMI was conveyed without neutralizing antibodies. In the first strategy, selected 3-wk-old specific-pathogen-free (SPF) birds were vaccinated with either live NDV (LNDV), ultraviolet-inactivated NDV (UVNDV), sodium dodecyl sulfate-treated NDV (SDSNDV), or phosphate-buffered saline (PBS) (negative control) by the subcutaneous route. Birds were booster vaccinated 2 wk later and challenged with the velogenic Texas GB strain of NDV 1 wk after booster. All vaccinated birds had specific CMI responses to NDV as measured by a blastogenesis microassay. NDV neutralizing (VN) and hemagglutination inhibition (HI) antibody responses were detected in birds vaccinated with LNDV and UVNDV. However, birds vaccinated with SDSNDV developed antibodies that were detected by western blot analysis but not by the VN or HI test. Protection from challenge was observed only in those birds that had VN or HI antibody response. That is, birds with demonstrable CMI and VN or HI antibody response were protected, whereas birds with demonstrable CMI but no VN or HI antibody response were not protected. In the second strategy, birds from SPF embryos were treated in ovo with cyclophosphamide (CY) to deplete immune cells. The birds were monitored and, at 2 wk of age, were selected for the presence of T-cell activity and the absence of B-cell activity. Birds that had a significant T-cell response, but not a B-cell response, were vaccinated with either LNDV, UVNDV, or PBS at 3 wk of age along with the corresponding CY-untreated control birds. The birds were booster vaccinated at 5 wk of age and were challenged with Texas GB strain of NDV at 6 wk of age. All birds vaccinated with LNDV or UVNDV had a specific CMI response to NDV, VN or HI NDV antibodies were detected in all CY-nontreated vaccinated birds and some of the CY-treated vaccinated birds that were found to have regenerated their B-cell function at 1 wk postbooster. The challenge results clearly revealed that CY-treated birds that had NDV-specific CMI and VN or HI antibody responses to LNDV or UVNDV were protected, as were the CY-nontreated vaccinated birds. However, birds that had NDV-specific CMI response but did not have VN or HI antibodies were not protected from challenge. The results from both strategies indicate that specific CMI to NDV by itself is not protective against virulent NDV challenge. The presence of VN or HI antibodies is necessary in providing protection from Newcastle disease.
Descriptors: Newcastle disease, chickens, immunity, neutralizing antibodies, vaccination, live vaccines, inactivated vaccines, experimental infections, bioassays, immune response, embryos, virulence, antibodies, hemagglutinins.

Reynolds, D.L.; Maraqa, A.D. **Protective immunity against Newcastle disease: the role of antibodies specific to Newcastle disease virus polypeptides.** *Avian Diseases.* Jan/Mar 2000. v. 44 (1) p. 138-144. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Studies were performed to determine if passive immunization with hyperimmune sera generated to specific Newcastle disease virus (NDV) proteins conferred protection against virus challenge. Six groups of 3-wk-old chickens were passively immunized with antiserum against either hemagglutinin-neuraminidase/fusion, (HN/F) protein, nucleoprotein/phosphoprotein (NP/P), Matrix (M) protein, a mixture of all NDV proteins (ALL), intact ultraviolet-inactivated NDV (UVNDV), or negative sera. Blood samples were collected 2 days postimmunization, and the birds were challenged with Texas GB strain of NDV. Antibody titers were detected from those recipient birds that had received the antisera against the HN7F, ALL, or UVNDV by a hemagglutination inhibition test, an enzyme-linked immunosorbent assay (ELISA), and a virus neutralization test. Antibodies were detected only by the ELISA from the birds that

had received antisera against NP/P and M protein. Antibody titers in the recipient birds dropped by two dilutions (log2) after 2 days postinjection. Birds passively immunized with antisera against HN/F, ALL, and UVNDV were protected from challenge, whereas chickens passively immunized with antisera against NP/P and M protein and specific-pathogen-free sera developed clinical signs of Newcastle disease. The challenge virus was recovered from the tracheas of all passively immunized groups. The presence of neutralizing antibodies to NDV provided protection from clinical disease but was unable to prevent virus shedding from the trachea.
Descriptors: Newcastle disease, Newcastle disease virus, polypeptides, antibodies, immunity, immune serum, viral proteins, blood chemistry, experimental infections, passive immunization, virus shedding, symptoms, morbidity, mortality.

Reynolds, D. **Newcastle disease: protection and immunity.** *Proceedings of ... Western Poultry Disease Conference.* Davis, Calif.: University of California. 2000. (49th) p. 1-5. Note: Meeting held on Mar 5-7, 2000, Sacramento, CA.
NAL call no: SF995.W4
Descriptors: Newcastle disease virus, vaccines, vaccination, immune response.

Roy, P.; Venugopalan, A.T.; Koteeswaran, A**. Antigenetically unusual Newcastle disease virus from racing pigeons in India.** *Tropical Animal Health and Production.* June 2000. v. 32 (3) p. 183-188. ISSN: 0049-4747
NAL call no: SF601.T7
Descriptors: racing pigeons, Newcastle disease virus, outbreaks, vaccination, live vaccines, hemagglutination inhibition test, hemagglutination tests, pathogenicity, acute course, monoclonal antibodies, immunity, chickens, India.

Roy, P.; Venugopalan, A.T.; Manvell, R. **Characterization of Newcastle disease viruses isolated from chickens and ducks in Tamilnadu, India.** *Veterinary Research Communications*. Mar 2000. v. 24 (2) p. 135-142. ISSN: 0165-7380
NAL call no: SF601.V38
Descriptors: chickens, ducks, Newcastle disease, Newcastle disease virus, outbreaks, strains, strain differences, identification, mortality, pathogenicity, hemagglutinins, erythrocytes, monoclonal antibodies, binding, serotypes, serology, vaccines, vaccination, epidemics, Tamilnadu.

Roy, P.; Venugopalan, A.T. **Passive haemagglutination test in the serology of Newcastle disease virus.** *Tropical Animal Health and Production*. Feb 2000. v. 32 (1) p. 19-22. ISSN: 0049-4747
NAL call no: SF601.T7
Descriptors: chickens, Newcastle disease virus, live vaccines, hemagglutination tests, vaccination, antibody formation, hemagglutination inhibition test.

Slacum, G.; Hein, R.; Lynch, P. **Observations with a novel Newcastle disease strain, C2.** *Proceedings of ... Western Poultry Disease Conference.* Davis, Calif.: University of California. 2000. (49th) p. 17-19. Note: Meeting held on Mar 5-7, 2000, Sacramento, CA.
NAL call no: SF995.W4
Descriptors: Newcastle disease virus, vaccine development, live vaccines.

Swain, B.K.; Johri, T.S.; Majumdar, S**. Effect of supplementation of vitamin E, selenium and their different combinations on the performance and immune response of broilers.** *British Poultry Science.* July 2000. v. 41 (3) p. 287-292. ISSN: 0007-1668
NAL call no: 47.8 B77
Abstract: 1. The effect of dietary vitamin E, selenium (Se) and their different combinations on body weight gain, food consumption, food conversion efficiency, leukocyte migration inhibition and antibody production was determined in broilers. 2. Chicks were fed on maize-soya bean based diets with concentrations of supplemental vitamin E varying from 0 to 300 IU/kg and selenium concentrations varying from 0 to 1 mg/kg either alone or in combination from 1 to 42 d of age. 3. The chicks were immunised for Newcastle Disease Virus (NDV) vaccine at 21 d. Per cent leukocyte migration inhibition (LMI) was studied on 42 d. Antibodies to NDV in serum were determined at 10 and 21 d post immunisation (PI). 4. Chicks receiving Se, 1 mg/kg and vitamin E 300 IU/kg had significantly higher cellular immune responses in terms of per cent LMI. 5. Maximum body weight gain and best efficiency of food utilisation were obtained in chicks fed diets containing 0.50 mg/kg Se and 300 IU/kg vitamin E. 6. Significantly higher antibody titres (HI and ELISA) at 10 d PI were attributed to 0.06 mg/kg and 150 IU/kg Se and vitamin E, respectively. 7. These data suggest that optimum growth and immune response may be achieved at supplemental level of Se of 0.06 mg/kg and vitamin E at 150 IU/kg. The vitamin E level is higher than that recommended by NRC (1984, 1994).
Descriptors: broilers, vitamin supplements, vitamin E acetate, mineral supplements, selenium, feed intake, liveweight gain, feed conversion, broiler performance, maize, soybean oilmeal, antibody formation, vaccination, humoral immunity, cell mediated immunity, nutrient-nutrient interactions, leukocyte migration inhibition test.

Takimoto, T.; Taylor, G.L.; Crennell,-S.J.; Scroggs, R.A.; Portner, A. **Crystallization of Newcastle disease virus hemagglutinin-neuraminidase glycoprotein.** *Virology.* Apr 25, 2000. v. 270 (1) p. 208-214. ISSN: 0042-6822
NAL call no: 448.8 V81
Descriptors: viral glycoprotein crystallization, Newcastle disease virus.

Turner, S.P.; Ewen, M.; Rooke, J.A.; Edwards, S.A. **The effect of space allowance on performance, aggression and immune competence of growing pigs housed on straw deep-litter at different group sizes.** *Livestock Production Science.* Sept 2000. v. 66 (1) p. 47-55. ISSN: 0301-6226
NAL call no: SF1.L5
Descriptors: pigs, performance, aggressive behavior, immune competence, space requirements, pig housing, deep litter housing, livestock numbers, liveweight gain, efficiency, lesions, immune response, Newcastle disease virus, growth rate.

Wambura, P.N.; Kapaga, A.M.; Hyera, J.M.K**. Experimental trials with a thermostable Newcastle disease virus (strain I2) in commercial and village chickens in Tanzania.** *Preventive Veterinary Medicine.* Jan 20, 2000. v. 43 (3) p. 75-83. ISSN: 0167-5877
NAL call no: SF601.P7
Descriptors: chickens, Newcastle disease virus, vaccination, live vaccines, virulence, immune response, oral administration, application methods, survival, medicated feeds, drinking water, heat stability, Tanzania.

Ward, M.D.W.; Fuller, F.J.; Mehrotra, Y.; De Buysscher, E.V. **Nucleotide sequence and vaccinia expression of the nucleoprotein of a highly virulent, neurotropic strain of Newcastle Disease virus.** *Avian Diseases.* Jan/Mar 2000. v. 44 (1) p. 34-44. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: The nucleoprotein (NP) of Newcastle disease virus (NDV) was selected to study the relative importance of an internal structural protein in the avian immune response. The NP gene of the virulent, neurotropic NDV Texas GB (TGB) strain was cloned and sequenced. Nucleotide sequence data for the NP gene allowed comparison of the deduced amino acid sequences for the NP genes of NDV-TGB and the avirulent duck isolate NDV-D26. These comparisons demonstrated an 89% nucleotide sequence homology and a 97% homology between the deduced amino acid sequences. The NDV-TGB NP expressed in recombinant vaccinia virus (rVAC) was electrophoretically and immunologically identical to the wild-type NDV-TGB. Although inoculation of chickens with the recombinant vaccinia virus expressing the NDV NP gene elicited anti-NDV antibodies in higher titers than in birds inoculated with live LaSota NDV, this strong anti-NDV response did not protect against lethal challenge with NDV-TGB.
Descriptors: Newcastle disease virus, nucleotide sequences, virulence, gene expression, nucleoproteins, strains, immune response, amino acid sequences, electrophoresis, recombinant proteins, experimental infection, vaccination, mortality.
Molecular sequence data: genbank/af144730.

Yunis, R.; Ben-David, A.; Heller, E.D.; Cahaner, A. **Immunocompetence and viability under commercial conditions of broiler groups differing in growth rate and in antibody response to *Escherichia coli* vaccine.** *Poultry Science.* Savoy, IL: Poultry Science Association, Inc. June 2000. v. 79 (6) p. 810-816. ISSN: 0032-5791
NAL call no: 47.8 Am33P
Descriptors: broilers, line differences, selection criteria, antibody formation, selection responses, broiler lines, crossbreds, liveweight gain, Newcastle disease virus, *Escherichia coli*, mortality, disease resistance, infectious diseases, poultry farming.

Zdzisinska, B.; Filar, J.; Paduch, R.; Kaczor, J.; Lokaj, I.; Kandefer-Szerszen, M. **The influence of ketone bodies and glucose on interferon, tumor necrosis factor production and NO release in bovine aorta endothelial cells**. *Veterinary Immunology and Immunopathology.* May 23, 2000. v. 74 (3/4) p. 237-247. ISSN: 0165-2427
NAL call no: SF757.2.V38
Descriptors: cattle aorta, endothelium, ketone bodies, glucose, interferon, tumor necrosis factor, biosynthesis, nitrous oxide, cell cultures, acetoacetic acid, acetone, lipopolysaccharides, Newcastle disease virus, nitrite.

Zulkifli, I.; Che-Norma, M.T.; Israf, D.A.; Omar, A.R. **The effect of early age feed restriction on subsequent response to high environmental temperatures in female broiler chickens.** *Poultry Science.* Oct 2000. v.79 (10) p. 1401-1407. ISSN: 0032-5791
NAL call no: 47.8 Am33P
Abstract: This study was conducted to determine whether early age feed restriction improves heat tolerance in female broiler chickens. Chicks were brooded for 3 wk and then maintained at 24 +/- 1 C. On Day 0, chicks were assigned to one of four feeding regimens; each regimen was applied to four cages of chicks. The feeding regimens were 1) ad libitum feeding (ALF); 2) 40% feed restriction at 4, 5, and 6 d of age (F40); 3) 60% feed restriction at 4, 5, and 6 d of age (F60); and (4) 80% feed restriction at 4, 5, and 6 d of age (F80). From 35 to 41 d of age, all birds were exposed to 38 +/- 1 C for 2 h/d. Serum concentrations of glucose were elevated by the heat challenge, but were not affected by the feeding regimen. The heat treatment resulted in hypocholesteremia among ALF and F80 chicks, whereas the concentrations increased and remained constant in the F60 and F40 birds, respectively. Subjecting chicks to F60 improved growth and survivability and reduced heterophil to lymphocyte ratios (H/L) in response to the heat treatment as compared with the ALF and F80 regimens. The survivability rate and H/L of F40 chicks were similar to those attained by chicks on other regimens. Newcastle disease antibody titer of ALF birds declined with duration of heat treatment. It is concluded that the F60 regimen is beneficial for alleviating, at least in part, the detrimental effects of heat stress in female broiler chickens.
Descriptors: broilers, restricted feeding, heat tolerance, environmental temperature, timing, age differences, unrestricted feeding, blood picture, lymphocytes, feed intake, feed conversion, mortality, blood serum, cholesterol, antibody formation, stress response, body weight, heterophil:lymphocyte ratio.

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Ahlers, C.; Huttner, K.; Pfeiffer, D. **Comparison between a live and an inactivated vaccine against Newcastle disease in village chickens. A field study in northern Malawi.** *Tropical Animal Health and Production.* June 1999. v. 31 (3) p. 167-174. ISSN: 0049-4747
NAL call no: SF601.T7
Descriptors: chickens, Newcastle disease, vaccination, inactivated vaccines, live vaccines, intramuscular injection, antibody formation, application methods, Malawi, eye drop application.

Alexander, D.J.; Banks, J.; Collins, M.S.; Manvell, R.J.; Frost, K.M.; Speidel, E.C.; Aldous, E.W. **Antigenic and genetic characterisation of Newcastle disease viruses isolated from outbreaks in domestic fowl and turkeys in Great Britain during 1997.** *The Veterinary Record*. Oct 9, 1999. v. 145 (15) p. 417-421. ISSN: 0042-4900
NAL call no: 41.8 V641
Descriptors: chickens, turkeys, Newcastle disease virus, Newcastle disease, outbreaks, characterization, antigens, phylogenetics, Great Britain, Scandinavia, Northern Ireland.

Alexander, D.J.; Manvell, R.J.; Banks, J.; Collins, M.S.; Parsons, G.; Cox, B.; Frost, K.M.; Speidel, E.C.; Ashman, S.; Aldous, E.W. **Experimental assessment of the pathogenicity of the Newcastle disease viruses from outbreaks in Great Britain in 1997 for chickens and turkeys, and the protection afforded by vaccination.** *Avian Pathology*. Oct 1999. v. 28 (5) p. 501-511. ISSN: 0307-9457
NAL call no: SF995.A1A9

Abstract: The Newcastle disease virus isolated from healthy turkeys in outbreak GB 97/6 was used to challenge 4-week-old turkeys and chickens, which were either not vaccinated or had received a single dose of Hitchner B1 live vaccine 14 days earlier, by one of the intramuscular, intranasal or contact routes. Similar experiments were done in 38-day-old turkeys and chickens using virus isolated from severely sick chickens in outbreak GB 97/1. All vaccinated chickens showed low but measurable immune responses 14 days after vaccination, but only three of the turkeys had de-tectable antibodies. No vaccinated turkey or chicken showed any clinical sign after challenge with either virus. The virus from healthy turkeys in outbreak GB 97/6 induced clinical signs in 12/30 unvaccinated turkeys after challenge and 7/30 died. In unvaccinated chickens, challenge with this virus produced clinical signs in 25/30 birds and 21/30 died. In challenge experiments with the virus from outbreak GB 97/1 in chickens, 3/30 unvaccinated turkeys showed clinical signs and all three subsequently died. In contrast, 30/30 unvaccinated chickens challenged with this virus showed clinical signs and died. Vaccination did not prevent infection and excretion of either challenge virus. However, when compared with unvaccinated birds, vaccination reduced significantly the length of time virus was excreted and the overall proportion of swabs that were positive.
Descriptors: chickens, turkeys, Newcastle disease virus, pathogenicity, outbreaks, vaccination, live vaccines, intramuscular injection, application methods, immune response, antibodies, clinical aspects, symptoms, species differences, Great Britain.

Bensink, Z.; Spradbrow, P. **Newcastle disease virus strain I2--a prospective thermostable vaccine for use in developing countries.** *Veterinary Microbiology*. Aug 16, 1999. v. 68 (1/2) p. 131-139. ISSN: 0378-1135 Note: In the special issue: *Veterinary Virology in Australia* / edited by G.E. Wilcox. Paper presented at a conference held September 24-26, 1998, Melbourne.
NAL call no: SF601.V44
Descriptors: Newcastle disease virus strains, vaccines, heat stability, evaluation, virulence, application methods, oral administration, antibodies, vaccination.

Berinstein, A.; Seal, B.S.; Zanetti, F.; Kaloghlian, A.; Segade, G.; Carrillo, E. **Newcastle disease virus surveillance in Argentina: use of reverse transcription-polymerase chain reaction and sequencing for molecular typification.** *Avian Diseases.* Oct/Dec 1999. v. 43 (4) p. 792-797. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Newcastle disease virus (NDV) remains a major pathogen of poultry where highly virulent strains require reporting to the Office of International Epizootes. NDV is a paramyxovirus existing as different strains classified on the basis of severity of the disease they cause. The present study was conducted in Argentina to determine the prevalence of highly virulent velogenic NDV strains in commercial poultry farms. Tracheal and cloacal swabs from 693 flocks, representing 14% of the broiler production, were collected and pooled. A pool amplified twice in embryonated eggs presented a limited hemagglutination titer. We performed reverse transcription coupled to polymerase chain reaction to amplify fusion and matrix protein gene sequences of the isolate and the strain Trenque Lauquen, isolated in Argentina during an outbreak in 1970-71 and previously characterized as velogenic viscerotropic by biological methods. The amino acid sequences were deduced from nucleotide sequences of the amplification products and the pathotype predicted according to the sequences obtained. From the samples analysed, we found only one type of NDV, being the isolate identified as lentogenic NDV. This strain is probably the one used in vaccination of flocks where that sample was obtained. These data have allowed us to consider a velogenic NDV-free status in Argentina's commercial poultry.
Descriptors: chickens, Newcastle disease virus, disease surveys, reverse transcription, polymerase chain reaction, molecular sequence data, nucleotide sequences, amino acid sequences, pathotypes phylogenetics, Argentina.

Brown, C.; King, D.J.; Seal, B. **Detection of a macrophage-specific antigen and the production of interferon gamma in chickens infected with Newcastle disease virus.** *Avian Diseases*. Oct/Dec 1999. v. 43 (4) p. 696-703. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Formalin-fixed, paraffin-embedded spleen and intestinal tissues were harvested at 2 days postinfection from 4-wk-old white rock chickens infected with five different strains of Newcastle disease virus (NDV). These tissues were examined for the presence of macrophage antigen expression, virus replication, and interferon gamma (IFNgamma) production. The five strains represented all three NDV pathotypes. Viral replication and IFNgamma, as determined by riboprobe in situ hybridization, were detected only in those chickens infected with velogenic viscerotropic NDV (VVNDV) strains. Macrophage antigen expression, an indicator of macrophage activation, was determined by immunohistochemistry with a macrophage-specific antibody, CVI-ChNL-68.1. Presence of macrophage antigen was most prominent in VVNDV-infected chickens. The distribution of this antigen within tissues was far more diffuse than the staining for viral mRNA. The presence of IFNgamma mRNA was detected in the spleen and intestinal lymphoid tissue of VVNDV-infected chickens. There was also increased macrophage antigen expression in the mesogen-infected birds, but it was less dramatic than in tissues from VVNDV-infected chickens. One of two lentogen-infected birds had evidence of increased macrophage antigen expression only in the spleen.
Descriptors: chickens, Newcastle disease virus, interferon, macrophage activation, antigens, macrophages, pathotypes, viral replication, messenger RNA.

Brown, C.C.; King, D.J.; Seal, B.S. **Comparison of pathology-based techniques for detection of viscerotropic velogenic Newcastle disease virus in chickens.** *Journal of Comparative Pathology*. May 1999. v. 120 (4) p. 383-389. ISSN: 0021-9975
NAL call no: 41.8 J82
Descriptors: chickens, Newcastle disease virus, detection, viral proteins, immunohistochemistry, diagnostic techniques, spleen, cecum, eyelids, bursa Fabricii, small intestine, riboprobe in situ hybridization.

Brown, C.; King, D.J.; Seal, B.S. **Pathogenesis of Newcastle disease in chickens experimentally infected with viruses of different virulence.** *Veterinary Pathology*. Mar 1999. v. 36 (2) p. 125-132. ISSN: 0300-9858
NAL call no: 41.8 P27
Descriptors: chickens, Newcastle disease virus, virulence, pathotypes, pathogenesis, experimental infections, histopathology, nucleic acids, viral replication.

Crespo, R.; Shivaprasad, H.L.; Woolcock, P.R.; Nordhousen, R.; Chin, R.P**. Macroscopic and microscopic pathology of an exotic Newcastle disease outbreak.** *Proceedings of ... Western Poultry Disease Conference.* Davis, Calif.: University of California. 1999. (48) p. 108-109. Note: Meeting held on April 24-27, 1999, Vancouver, Canada.
NAL call no: SF995.W4
Descriptors: chickens, Newcastle disease virus, California.

Crespo, R.; Shivaprasad, H.L.; Woolcock, P.R.; Chin, R.P.; Davidson -York, D.; Tarbell, R. **Exotic Newcastle disease in a game chicken flock.** *Avian Diseases.* Apr/June 1999. v. 43 (2) p. 349-355. ISSN: 0005-2086 Note: Spanish summary.

NAL call no: 41.8 Av5
Abstract: A sudden increase in mortality, preceded by a short history of respiratory signs and diarrhea, occurred in a backyard flock of 48 game chickens in the Central Valley of California. Necropsy findings included severe generalized linear hemorrhages and/or ulcers in the digestive tract, larynx, and trachea. Histology revealed severe multifocal hemorrhages and necrosis in the mucosa of the respiratory and digestive tracts, vasculitis, and necrosis of lymphoid tissue. The birds were serologically negative to Newcastle disease virus; this was consistent with an acute infection. The avian paramyxovirus type 1 isolated was characterized as velogenic viscerotropic Newcastle disease virus. A thorough epidemiologic investigation was carried out, and no other premises were found to have birds with clinical signs or evidence of exposure. The entire outbreak was limited to the original backyard flock and resolved within 14 days of the onset of clinical signs.
Descriptors: chickens, Newcastle disease, Newcastle disease virus, flocks, clinical aspects, spread, outbreaks, case reports, California.

Deng, R.; Wang, Z.; Mahon, P.J.; Marinello, M.; Mirza, A.; Iorio, R.M. **Mutations in the Newcastle disease virus hemagglutinin-neuraminidase protein that interfere with its ability to interact with the homologous F protein in the promotion of fusion.** *Virology.* Jan 5, 1999. v. 253 (1) p. 43-54. ISSN: 0042-6822
NAL call no: 448.8 V81
Descriptors: Newcastle disease virus, fusion protein, fusion process, genetic mutation.

Empel, P. van; Vrijenhoek, M.; Goovaerts, D.; van den Bosch, H. **Immunohistochemical and serological investigation of experimental *Ornithobacterium rhinotracheale* infection in chickens.** *Avian Pathology.* Apr 1999. v. 28 (2) p. 187-193.: ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Immunohistochemical techniques were used to prove that *Ornithobacterium rhinotracheale* was the causative agent of lesions in the air sacs and lungs in chickens, but only after infection with Newcastle Disease virus (NDV). At first, the bacteria attached to the epithelium of the air sacs. Subsequently, they infiltrated the air sacs, and caused thickening of the air sacs, the formation of oedematous and granulomatous tissue, and accumulation of macrophages. The infection peaked at 5 to 9 days, after which recovery was seen. In the lungs, some areas with bronchially-associated lymphoid tissue were affected. The other organs investigated were shown not to be affected. In the absence of NDV infection, aerosol exposure of chickens to *O. rhinotracheale* only resulted in minimal and temporary microscopic air sac lesions. No *O. rhinotracheale* cells or fragments could be detected at any time point later than 2 days post-exposure. In spite of the absence of visible lesions, chickens exposed to *O. rhinotracheale* without prior NDV infection reacted serologically. The duration and the titre of this immune response was indistinguishable from that obtained in chickens exposed after NDV infection. Thus, infection with *O. rhinotracheale* appears to be restricted to the respiratory tract, with lesions only evident in birds previously infected with NDV, even though a strong serological response can be established in the absence of prior viral infection.
Descriptors: chickens, *Ornithobacterium rhinotracheale*, experimental infections, disease course, immunohistochemistry, serology, air sacs, lungs.

Foster, H.A.; Chitukuro, H.R.; Tuppa, E.; Mwanjala, T.; Kusila, C. **Thermostable newcastle disease vaccines in Tanzania.** *Veterinary Microbiology.* Aug 16, 1999. v. 68 (1/2) p. 127-130. ISSN: 0378-1135 Note: In the special issue: *Veterinary Virology in Australia* / edited by G.E. Wilcox. Paper presented at a conference held September 24-26, 1998, Melbourne.
NAL call no: SF601.V44
Descriptors: Newcastle disease virus, vaccines, heat stability, evaluation, villages, eyes, application methods, medicated feeds, disease prevention, Tanzania.

Gagic, M.; St. Hill, C.A.; Sharma, J.M**. In ovo vaccination of specific-pathogen-free chickens with vaccines containing multiple agents.** *Avian Diseases.* Apr/June 1999. v. 43 (2) p. 293-301. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: We used in ovo technology to protect chickens against multiple diseases by inoculating vaccines containing mixtures of live viral agents. A single in ovo injection of a vaccine containing serotypes 1, 2, and 3 of Marek's disease virus (MDV), a vaccine strain of serotype 1 infectious bursal disease virus (IBDV), and recombinant fowl pox vaccine with HN and F genes of Newcastle disease virus (rFP-NDV) induced protection against virulent MDV, IBDV, Newcastle disease virus, and fowl poxvirus. The multiple-agent vaccine induced specific antibodies against the viral agents present in the mixture and did not adversely affect the survival of hatched chickens. Inoculation of a vaccine containing serotypes 1, 2, and 3 of MDV and IBDV did not affect hatchability of eggs, although the addition of rFP-NDV to the mixture reduced hatchability by 23%-26%. In ovo vaccination with a vaccine containing MDV and IBDV vaccine viruses did not exacerbate the inhibitory effect of individual viral agents on humoral and cellular immune competence.
Descriptors: chickens, vaccination, eggs, live vaccines, combined vaccines, antibody formation, disease prevention, egg hatchability, immune competence, Marek's disease virus, infectious bursal disease virus, Newcastle disease virus.

Glaser, L.C.; Barker, I.K.; Weseloh, D.V.C.; Ludwig, J.; Windingstad, R.M.; Key, D.W.; Bollinger, T.K. **The 1992 epizootic of Newcastle disease in double-crested cormorants in North America.** *Journal of Wildlife Diseases.* Apr 1999. v. 35 (2) p. 319-330. ISSN: 0090-3558
NAL call no: 41.9 W64B
Descriptors: Phalacrocorax auritus, cormorants, wild bird disease, epidemiology, Newcastle disease virus, North America.

Gohm, D.S.; Thur, B.; Audige, L.; Hofmann, M.A. **A survey of Newcastle disease in Swiss laying-hen flocks using serological testing and simulation modelling.** *Preventive Veterinary Medicine.* Feb 15, 1999. v. 38 (4) p. 277-288. ISSN: 0167-5877
NAL call no: SF601.P7
Descriptors: hens, Newcastle disease, Newcastle disease virus, surveys, simulation models, mathematical models, serological surveys, vaccination, outbreaks, infections, detection, ELISA, disease prevalence, clinical aspects, symptoms, asymptomatic infections, computer techniques, Switzerland.

Graham, D.A.; German, A.; Abernethy, D.; McCullough, S.J.; Manvell, R.J.; Alexander, D.J. **Isolation of ortho- and paramyxoviruses from wild birds in Northern Ireland during the 1997 Newcastle disease epizootic.** *The Veterinary Record.* July 3, 1999. v. 145 (1) p. 20-21. ISSN: 0042-4900
NAL call no: 41.8 V641
Descriptors: wild birds, waterfowl, Orthomyxoviridae, paramyxovirus, isolation, outbreaks, Newcastle disease, Northern Ireland.

Granzow, H.; Weiland, F.; Mundt, E.; Kollner, B.; Werner, O. **Intranuclear inclusions in cells infected with Newcastle Disease Virus.** *Journal of Veterinary Medicine. Series B.* Aug 1999. v. 46 (6) p. 411-421. ISSN: 0931-1793
NAL call no: 41.8 Z52
Descriptors: cell cultures, Newcastle disease virus, infections, symptoms, nuclei, clinical aspects, cytoplasm, cell ultrastructure, coat proteins,

immunocytochemistry, viral proteins.

Haddad, E.E.; Whitfill, C.E.; Avakian, A.P.; Clark, F.D.; Van Zant, P.D.; Link, D.B.; Wakenell, P.S. **In ovo vaccination with a novel Newcastle disease vaccine in SPF and broiler embryos; evaluation of safety and efficacy.** *Proceedings of ... Western Poultry Disease Conference.* Davis, Calif.: University of California. 1999. (48) p. 117. Note: Meeting held on April 24-27, 1999, Vancouver, Canada
NAL call no: SF995.W4
Descriptors: chick embryos, ovo vaccination, Newcastle disease virus.

Hansson, E.; Young, J.G.; Hooper, P.T.; Della-Porta, A.J. **Virulence and transmissibility of some Australian and exotic strains of Newcastle disease virus used in some vaccines**. *Australian Veterinary Journal.* Jan 1999. v. 77 (1) p. 51-53. ISSN: 0005-0423
NAL call no: 41.8 Au72
Descriptors: Newcastle disease virus, vaccines, virulence, strain differences, spread by aerosols, disease transmission, tracheitis, seroconversion, Australia.

Harrison, A.; Girshick, T**. The use of western blotting in epidemiologic studies of common virus diseases.** *Proceedings of ... Western Poultry Disease Conference*. Davis, Calif.: University of California. 1999. (48) p. 117-118. Note: Meeting held on April 24-27, 1999, Vancouver, Canada.
NAL call no: SF995.W4
Descriptors: avian influenzavirus, Newcastle disease virus, infectious bronchitis virus, western blotting technique.

Heckert, R.A.; Nagy, E. **Evaluation of the hemagglutination-inhibition assay using a baculovirus-expressed hemagglutinin-neuraminidase protein for detection of Newcastle disease virus antibodies.** *Journal of Veterinary Diagnostic Investigation.* Jan 1999. v. 11 (1) p. 99-102. ISSN: 1040-6387
NAL call no: SF774.J68
Descriptors: Newcastle disease virus, antibody testing, hemagglutination inhibition test, recombinant antigens.

Herczeg, J.; Wehmann, E.; Bragg, R.R.; Travassos-Dias, P.M.; Hadjiev, G.; Werner, O.; Lomniczi, B. **Two novel genetic groups (VIIb and VIII) responsible for recent Newcastle disease outbreaks in southern Africa, one (VIIb) of which reached southern Europe.** *Archives of Virology*. 1999. v. 144 (11) p. 2087-2099. ISSN: 0304-8608
NAL call no: 448.3 Ar23
Descriptors: Newcastle disease virus, genetic distance, strain differences, amino acid sequences, animal testing alternatives, restriction fragment length polymorphism, phylogenetics, South Africa. Mozambique, Bulgaria, Turkey.
Genetic sequence data: genbank/af136762. genbank/af136763. genbank/af136764. genbank/af136765. genbank/af136766. genbank/af136767. genbank/af136768. genbank/af136769. genbank/af136770. genbank/af136771. genbank/af136772. genbank/af136773. genbank/af136774. genbank/af136775. genbank/af136776. genbank/af136777. genbank/af136778. genbank/af136779. genbank/af136780. genbank/af136781. genbank/af136782. genbank/af136783. genbank/af136784. genbank/af136785. genbank/af136786.

Hooper, P.T.; Russell, G.M.; Morrow, C.J.; Segal, Y. **Lentogenic newcastle disease virus and respiratory disease in Australian broiler chickens.** *Australian Veterinary Journal*. Jan 1999. v. 77 (1) p. 53-54. ISSN: 0005-0423
NAL call no: 41.8 Au72
Descriptors: broilers, Newcastle disease virus, tracheitis, histopathology, Australia.

Hooper, P.T.; Hansson, E.; Young, J.G.; Russell, G.M.; Della Porta, A.J. **Lesions in the upper respiratory tract in chickens experimentally infected with Newcastle disease viruses isolated in Australia.** *Australian Veterinary Journal*. Jan 1999. v. 77 (1) p. 50-51. ISSN: 0005-0423
NAL call no: 41.8 Au72
Descriptors: chickens, Newcastle disease virus, lesions, respiratory system, experimental infections, pathogenicity, viral antigens, avirulence, Australia.

Jorgensen, P.H.; Handberg, K.J.; Ahrens, P.; Hansen, H.C.; Manvell, R.J.; Alexander, D.J. **An outbreak of Newcastle disease in free-living pheasants (*Phasianus colchicus*).** *Journal of Veterinary Medicine. Series B.* Aug 1999. v. 46 (6) p. 381-387. ISSN: 0931-1793
NAL call no: 41.8 Z52
Descriptors: pheasants, Newcastle disease, Newcastle disease virus, outbreaks, epidemiology, mortality, epidemics, pathogenicity, disease transmission, strain differences, virulence, amino acid sequences, polymerase chain reaction, identification, Denmark.

Juang, Y.T.; Au, W.C.; Lowther, W.; Hiscott, J.; Pitha, P.M. **Lipopolysaccharide inhibits virus-mediated induction of interferon genes by disruption of nuclear transport of interferon regulatory factors 3 and 7.** *The Journal of Biological Chemistry*. June 18, 1999. v. 274 (25) p. 18060-18066. ISSN: 0021-9258
NAL call no: 381 J824
Descriptors: mice, macrophages, cell lines, Newcastle disease virus, stimulation, interferon, interleukin-6, gene expression, messenger RNA, transcription, transcription factors, phosphorylation, protein transport, nuclei, inhibition, lipopolysaccharides.

Kim, I.J.; Gagic, M.; Sharma, J.M. **Recovery of antibody-producing ability and lymphocyte repopulation of bursal follicles in chickens exposed to infectious bursal disease virus.** *Avian Diseases*. July/Sept 1999. v. 43 (3) p. 401-413. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: We studied the long-term effect of infectious bursal disease virus (IBDV) in chickens. Specifically, the restoration of virus-induced bursal lesions and the duration of humoral immunodeficiency were examined. One-week-old specific-pathogen-free chickens were intraocularly inoculated with an intermediate vaccine strain (IBDV-Vac) or a virulent strain (IM-IBDV). At intervals postinoculation (PI), chickens were examined for histopathologic lesions. At 1, 3, 5, 10, or 15 wk PI, the chickens were injected with a mixture of antigens, and primary antibody responses were examined at 10 days postimmunization. Initially, the virus caused extensive necrosis of bursal B lymphocytes. This lesion was accompanied by an infiltration of T lymphocytes. With time, the necrotic lesion in the bursa was resolved. The follicles became partly repopulated with B lymphocytes. The repopulation occurred faster in the chickens exposed to IBDV-Vac than in the chickens exposed to IM-IBDV. By 7 wk PI, 40% and 80% of bursal follicles in IM-IBDV- and IBDV-Vac-inoculated chickens, respectively, were repopulated with immunoglobulin M+ B lymphocytes. Both IBDV-Vac and IM-caused suppression of the primary antibody response to antigens. However, the antibody responses of the chickens exposed to either of the two IBDV strains used were compromised only during the first 6 wk of virus exposure. Subsequently, the antibody response returned to near normal levels.

Descriptors: chickens, infectious bursal disease virus, antibody formation, humoral immunity, lymphocytes, bursa Fabricii, lesions, viral immunosuppression, duration, tetanus toxoid, Newcastle disease virus, *Brucella abortus*, vaccination.

King, D.J. **A comparison of the onset of protection induced by Newcastle disease virus strain B1 and a fowl poxvirus recombinant Newcastle disease vaccine to a viscerotropic velogenic Newcastle disease virus challenge.** *Avian Diseases*. Oct/Dec 1999. v. 43 (4) p. 745-755. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Four-week-old specific-pathogen-free white rock chickens were immunized with either a commercial recombinant fowl poxvirus-vectored Newcastle disease vaccine (FP-N) expressing the hemagglutinin-neuraminidase and fusion protein genes of Newcastle disease virus (NDV) strain B1 or live NDV B1. Vaccinates and controls were challenged by eyedrop and intranasal (E/I) route with a viscerotropic velogenic NDV at 14 days postvaccination to determine the time of clearance of challenge virus. In a subsequent experiment, chickens were challenged at 3, 6, or 10 days postvaccination to determine the onset of immunity. Chickens that received a recommended field dose (1x) or a 0.01 x dose of FP-N subcutaneously (SC) and were seropositive by hemagglutination-inhibition test at 14 days postvaccination cleared the challenge virus by 14 days postchallenge. Clinical Newcastle disease and high challenge virus titers in tissues were seen only in seronegative FP-N 0.01 x dose vaccinates and controls. In a comparison of vaccination with FP-N (1x, 10(4.9) median tissue culture infective dose) SC, B1 (10(6) median egg infective dose [EID(50)]) SC, or B1 (10(6) EID(50)) E/I, chickens vaccinated at 6 or 10 days before challenge with all vaccines were protected against clinical disease, but only those vaccinated with B1 E/I 10 days before challenge were protected against infection with the challenge virus. Vaccination at 3 days before challenge with B1 E/I provided early protection, but severe nervous signs developed later and reduced overall protection to 60%, whereas disease in chickens vaccinated with B1 SC and FP-N SC 3 days before challenge was similar to the challenge controls.
Descriptors: chickens, Newcastle disease virus, fowl pox virus, recombinant vaccines, live vaccines, vaccination, subcutaneous injection, disease prevention, immunity, seroconversion.

Kuiken, T.; Wobeser, G.; Leighton, F.A.; Haines, D.M.; Chelack, B.; Bogdan, J.; Hassard, L.; Heckert, R.A.; Riva, J**. Pathology of Newcastle disease in double-crested cormorants from Saskatchewan, with comparison of diagnostic methods.** *Journal of Wildlife Diseases.* Jan 1999. v. 35 (1) p. 8-23. ISSN: 0090-3558
NAL call no: 41.9 W64B
Descriptors: Phalacrocorax auritus, cormorants, histopathology, central nervous system, diagnostic tests, comparison study.

Lee, J. **Newcastle disease: protecting poultry farmers on two fronts.** *Agricultural Research*. Oct 1999. v. 47 (10) p. 16-17.: ISSN: 0002-161X
NAL call no: 1.98 Ag84
Descriptors: poultry protection, Newcastle disease, Newcastle disease virus, protective measures.

Leeuw, O. de,; Peeters, B. **Complete nucleotide sequence of Newcastle disease virus: evidence for the existence of a new genus within the subfamily Paramyxovirinae.** *The Journal of General Virology.* Jan 1999. v. 80 (pt.1) p. 131-136. ISSN: 0022-1317
NAL call no: QR360.A1J6
Abstract: We have completely sequenced the genome of Newcastle disease virus (NDV) vaccine strain LaSota. The sequences of the 3'- and 5'-terminal ends of the RNA genome were determined by sequencing cDNA fragments generated by rapid amplification of cDNA ends. The entire genomic sequence, which was established by sequencing cDNA fragments generated by high-fidelity RT-PCR, consists of 15 186 nt. Comparison of the 5'-terminal sequence of NDV LaSota with the 5'-terminal sequences of ten members of the Paramyxovirinae showed that NDV LaSota has an unusually long 5' untranscribed region. Comparison of the entire genomic sequences showed that NDV is only distantly related to the other members of the genus Rubulavirus, to which NDV has been assigned. In this paper we present data which suggest that NDV should not be classified in the genus Rubulavirus, but instead should be considered as a member of a new genus within the subfamily Paromyxovirinae.
Descriptors: nucleotide sequences, chemotaxonomy, new genus, taxonomic status, taxonomic revisions, Paromyxovirinae.
Molecular sequence data: genbank/af077761.

Li, Y.C.; Ledoux, D.R.; Bermudez, A.J.; Fritsche, K.L.; Rottinghaus, G.E. **Effects of fumonisin B1 on selected immune responses in broiler chicks.** *Poultry Science.* Sept 1999. v. 78 (9) p. 1275-1282. ISSN: 0032-5791
NAL call no: 47.8 Am33P
Abstract: Three experiments were conducted to evaluate immune responses in chicks fed fumonisin B(1) (FB(1)). Day-old male chicks were randomly allotted to dietary treatments: 0, 50, 100, or 200 mg FB(1)/kg diet. In Experiment 1, chicks were fed diets for 3 wk and were injected intravenously with 4.6 x 10(6) *Escherichia coli* on Day 21. Blood samples were collected at 60, 120, and 180 min postinjection, and liver, spleen, and lung were collected after 180 min. Chicks fed 200 mg FB(1)/ kg diet had significantly higher numbers of bacterial colonies in blood, spleen, and liver ($P < 0.05$) than control chicks. In Experiment 2, chicks were placed on the diets for 4 wk and were injected with 0.5 mL inactivated Newcastle Disease virus vaccine on Weeks 2 and 3 of the experiment, and primary and secondary antibody titers were measured 7 d after each injection. The secondary antibody response in chicks fed 200 mg FB(1)/kg diet was significantly lower ($P < 0.05$) than that of control chicks. In Experiment 3, lymphocyte proliferation in chicks exposed to FB(1) in vivo or in vitro was determined. Results of the in vivo study showed that cell proliferation in response to mitogens was lower ($P < 0.05$) in chicks fed 200 mg FB(1)/kg diet than in control chicks. For the in vitro study, cell proliferation was lower ($P < 0.05$) when cells were exposed to greater than or equal to 2.5 micrograms FB(1)/mL. Data of the current study suggested that FB(1) is immunosuppressive in chicks when present in the ration at 200 mg FB(1)/kg diet.
Descriptors: broiler chicks, fumonisins, dosage, *Escherichia coli*, experimental infections, immune response, vaccination, inactivated vaccines, Newcastle disease virus, antibody formation, lymphocyte transformation, infection, immunosuppressive agents, liver, spleen, lungs, mitogens, responses.

Maas, R.A.; Oei, H.L.; Venema-Kemper, S.; Koch, G.; Bongers, J. **Dose-response effects of inactivated Newcastle disease vaccines: influence of serologic assay, time after vaccination, and type of chickens.** *Avian Diseases.* Oct/Dec 1999. v. 43 (4) p. 670-677. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Knowledge of the dose-response relation of inactivated vaccines and of the factors that influence this relation is essential for the evaluation of existing vaccine potency assays and the development of new potency assays that are based on the antigen content of the inactivated vaccines. We quantified the relation between vaccine dose, serologic response, and clinical protection after vaccination for three different inactivated Newcastle disease (ND) vaccines. Qualitatively, similar dose-response curves were obtained for the three vaccines when either the serologic response or the clinical protection of specific-pathogen-free (SPF) chickens was plotted against the different vaccine doses applied. However, the vaccines differed quantitatively: doses of vaccines that induced similar antibody titers or clinical protection differed 2-8-fold. In contrast with the narrow range of antibody titers induced by a full vaccine dose, a very broad range of titers was obtained after dilution of the vaccines. At least 95% of the SPF chickens with detectable antibody in the serum were protected against a challenge with virulent Herts ND virus. The relation between the dosage of two different ND vaccines and the serum antibody titers remained markedly constant between 3 and 18 wk

after vaccination. Vaccination of broilers instead of layers with a dilution series of inactivated ND vaccine resulted in significantly lower antibody levels and less clinical protection against virulent challenge. In conclusion, despite quantitative differences, we found comparable dose-response relations for the three inactivated ND vaccines studied.
Descriptors: chickens, Newcastle disease virus, inactivated vaccines, strains, vaccination, dosage, potency, immune response, disease prevention.

Makkay, A.M.; Krell, P.J.; Nagy, E. **Antibody detection-based differential ELISA for NDV-infected or vaccinated chickens versus NDV HN-subunit vaccinated chickens.** *Veterinary Microbiology.* Apr 19, 1999. v. 66 (3) p. 209-222. ISSN: 0378-1135
NAL call no: SF601.V44
Descriptors: chickens, Newcastle disease virus, ELISA, antibodies, detection, infections, vaccination, vaccines, diagnosis, coat proteins, amino acid sequences.

Mtambo, M.M.A.; Mushi, E.J.; Kinabo, L.D.B.; Maeda-Machang'u, A.; Mwamengele, G.L.M.; Yongolo, M.G.S.; Temu, R.P.C. **Evaluation of the efficacy of the crude extracts of *Capsicum frutescens, Citrus limon* and *Opuntia vulgaris* against Newcastle disease in domestic fowl in Tanzania.** *Journal of Ethnopharmacology.* Dec 15, 1999. v. 68 (1/3) p. 55-61. ISSN: 0378-8741
NAL call no: RS160.J6
Descriptors: herbal treatment for Newcastle disease, domestic fowl, pepper, lemon, *Opuntia* cactus, Tanzania.

Muller, T.; Hlinak, A.; Muhle, R.U.; Kramer, M.; Liebherr, H.; Ziedler, K.; Pfeiffer, D.U. **A descriptive analysis of the potential association between migration patterns of bean and white-fronted geese and the occurrence of Newcastle disease outbreaks in domestic birds.** *Avian Diseases.* Apr/June 1999. v. 43 (2) p. 315-319. ISSN: 0005-2086
NAL call no: 41.8 Av5
Abstract: The sightings and migration patterns of 65 bean (*Anser fabalis*) and 65 white-fronted geese (*Anser albifrons*) are reported. In the past, these geese were serologically screened for the occurrence of Newcastle disease virus (NDV) and other avian viral diseases by Hlinak et al. Of the 130 birds originally tagged and serologically screened in 1991, 53 birds were resighted between 1991 and 1996. Most of the sightings were reported from main wintering and resting sites in Germany and The Netherlands. It is noteworthy that 19 of the 53 birds sighted had serologic evidence that they had been exposed to NDV before the time of marking in 1991. Although the origin of these infections in bean geese and white-fronted geese is still unknown, the sightings reported in this study indicate that, once infected, wild geese may be involved in the dissemination and spread of avian viral diseases, specifically Newcastle disease. The migration patterns of the wild geese provided further evidence that the main resting and wintering areas of migratory waterfowl are likely to be important for the inter- and intraspecies transmission of avian diseases, thereby representing risk areas for the poultry industry.
Descriptors: geese, Newcastle disease virus, migration, outbreaks, spread, disease transmission, Germany, Netherlands, *Anser fabalis, Anser albifrons*.

Nara, P.L. **The status and role of vaccines in the U.S. food animal industry: implications for biological terrorism.** *Annals of The New York Academy of Sciences v. 894. Food and Agricultural Security Guarding Against Natural Threats and Terrorist Attacks Affecting Health, National Food Supplies, and Agricultural Economics*. New York: New York Academy of Sciences. 1999. p. 206-217. ISBN: 1573312304. Note: Paper presented at the "International Conference on Food and Agricultural Security," September 28-30, 1998, in Washington, D.C.
NAL call no: 500 N484 v. 894
Descriptors: meat and livestock industry, vaccines, biological warfare, terrorism, disease prevention, disease control, avian influenzavirus, Newcastle disease virus, foot and mouth disease, aphthovirus, rinderpest virus, African swine fever virus, swine fever virus, USA.

Peeters, B.P.H.; de Leeuw, O.S.; Koch, G.; Gielkens, A.L.J. **Rescue of Newcastle disease virus from cloned cDNA: evidence that cleavability of the fusion protein is a major determinant for virulence.** *Journal of Virology.* June 1999. v. 73 (6) p. 5001-5009. ISSN: 0022-538X
NAL call no: QR360.J6
Descriptors: complementary DNA, cloning, pathogenicity, chickens.

Rautenschlein, S.; Sharma, J.M. **Response of turkeys to simultaneous vaccination with hemorrhagic enteritis and Newcastle disease virus.** *Avian Diseases.* Apr/June 1999. v. 43 (2) p. 286-292. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: The effects of single and combined vaccination of turkeys against hemorrhagic enteritis virus (HEV) and Newcastle disease virus (NDV) were investigated. Dual vaccination of turkeys with NDV-B1 and HEVp30 or marble spleen disease virus (MSDV) enhanced white mottling of the spleens and the apoptosis rate in spleen cells ($P < 0.05$). In addition, simultaneously vaccinated turkeys had fewer HEV-infected spleen cells at 4 days postvaccination than turkeys given HEVp30 or MSDV alone. The anti-HEV antibody response was significantly reduced at 14 days postvaccination ($P < 0.05$), whereas the anti-NDV antibody response was enhanced ($P < 0.05$) in turkeys vaccinated with HEVp30 + NDV-Bl. Further, the effect of dual vaccination on macrophage function was studied. Spleen cells from NDV-B1-vaccinated turkeys were primed to produce nitric oxide (NO) after stimulation in vitro with lipopolysaccharide. Spleen cells from HEVp30- or MSDV-vaccinated turkeys did not produce NO after in vitro stimulation. In dual-vaccinated turkeys, the priming effect of NDV-B1 was reduced in comparison with single-inoculated birds. *Descriptors:* turkeys, vaccination, combined vaccines, vaccines, hemorrhagic enteritis virus, Newcastle disease virus, lesions, viral replication, antibody formation, macrophage activation.

Reynolds, D.L.; Maraqa, A.D. **A rapid virus neutralization assay for Newcastle disease virus with the swine testicular continuous cell line.** *Avian Diseases.* July/Sept 1999. v. 43 (3) p. 564-571.: ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Five continuous cell lines, swine testicular (ST), human rectal tumor (HRT 18), fetal rhesus monkey kidney (MA104), bovine turbinate (BT), and quail tracheal (QT35), were evaluated and compared with chicken embryo fibroblasts (CEFs) for their ability to propagate B1 or Texas GB strains of Newcastle disease virus (NDV). The NDV Texas GB strain replicated in all the continuous cell lines used in this study. Only the ST and QT35 cells produced a cytopathic effect (CPE) similar to that produced in CEFs. However, the ST cell line remained attached while displaying CPE, whereas infected QT35 cells detached, as did the CEFs. The B1 strain of NDV replicated in ST cells, MA104 cells, and CEFs but with less CPE as compared with the Texas GB strain. Pretreatment with trypsin did not enhance CPE with either NDV strain at the level tested. Sera evaluated for neutralizing antibody titers to NDV were significantly higher in titer when the ST cell line was used and compared with CEFs. A high correlation was found between the microscopic examination and the tetrazolium dye (MTT) microassay methods for determining the viral neutralization endpoint, thus suggesting the ST cell line and MTT microassay could be used as an alternative to CEFs and microscopic examination for evaluating neutralizing antibodies titers to NDV.
Descriptors: Newcastle disease virus, virus neutralization, rapid methods, cell lines, testes, viral replication.

Reynolds, D.L.; Maraqa, A.D. **A technique for inducing B-cell ablation in chickens by in ovo injection of cyclophosphamide.** *Avian Diseases*. July/Sept 1999. v. 43 (3) p. 367-375. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: The effect of cyclophosphamide (CY) treatment in ovo on avian B and T cells was studied. CY was injected in ovo on the 16th, 17th, and 18th days of incubation. Blood samples were collected periodically from CY-treated and nontreated birds after hatch and were used to measure blood lymphocyte responses to the T-cell and B-cell mitogens, concanavalin A and lipopolysaccharide (LPS), respectively. Additionally, flow cytometric analysis was used to determine the presence of B and T cells in peripheral blood, and birds were vaccinated with Newcastle disease virus (NDV) antigen at 3 wk of age and booster vaccinated at 5 wk of age CY treatment reduced hatchability by 35%-40%, increased mortality by 3%-5% within the first 2 wk of life, and induced a significant retardation in body weight gains. At 2 wk of age, approximately 50% of CY-treated birds were devoid of B-cell mitogenic responsiveness while demonstrating significant T-cell mitogenic responsiveness. However, B-cell responses were observed at 4 and 6 wk from a small percentage of birds that were originally T-cell responsive and B-cell nonresponsive at 2 wk of age. Flow cytometric analysis of peripheral blood lymphocytes revealed that CY-treated birds had significantly less B cells (or were devoid of B cells) than the corresponding nontreated control birds. However, no significant difference in the T-cell percentage was observed between CY-treated and nontreated birds. CY-treated birds did not produce detectable antibodies specific for NDV during the first and second weeks postvaccination, as demonstrated by hemagglutination inhibition assay. However, antibodies were detected in some CY-treated birds 10 days postbooster. Those antibody-positive birds were found to be the same birds that had subsequently responded to the LPS mitogen on the blastogenesis microassay. This study indicates the importance of monitoring the B- and T-cell responses in CY-treated birds to identify those birds in which B-cell regeneration may have occurred.
Descriptors: chick embryos, T lymphocytes, B lymphocytes, ablation, cyclophosphamide injection, concanavalin A, lipopolysaccharides, hatching, blood, flow cytometry, Newcastle disease virus, lymphocyte transformation, vaccination, antibody formation, liveweight gain, mortality.

Romer-Oberdorfer, A.; Mundt, E.; Mebatsion, T.; Buchholz, U.J.; Mettenleiter, T.C. **Generation of recombinant lentogenic Newcastle disease virus from cDNA.** *The Journal of General Virology*. Nov 1999. v. 80 (pt.11) p. 2987-2995. ISSN: 0022-1317
NAL call no: QR360.A1J6
Abstract: Recombinant lentogenic Newcastle disease virus (NDV) of the vaccine strain Clone-30 was reproducibly generated after simultaneous expression of antigenome-sense NDV RNA and NDV nucleoprotein, phosphoprotein and RNA-dependent RNA polymerase from plasmids transfected into cells stably expressing T7 RNA polymerase. For this purpose, the genome of Clone-30, comprising 15186 nt, was cloned and sequenced prior to assembly into a full-length cDNA clone under control of a T7 RNA polymerase promoter. Recombinant virus was amplified by inoculation of transfection supernatant into the allantoic cavity of embryonated specific-pathogen-free (SPF) chicken eggs. Two marker restriction sites comprising a total of five nucleotide changes artificially introduced into noncoding regions were present in the progeny virus. The recombinant NDV was indistinguishable from the parental wild-type virus with respect to its growth characteristics in cell culture and in embryonated eggs. Moreover, an intracerebral pathogenicity index of 0.29 was obtained for both viruses as determined by intracerebral inoculation of day-old SPF chickens, proving that the recombinant NDV is a faithful copy of the parental vaccine strain of NDV.
Descriptors: complementary DNA, nucleotide sequences, recombination.
Molecular sequence data: genbank/y18898.

Salle, C.T.P.; Soares, R.B.; Ce, M.C.; Silva, A.B.; Moraes, H.L.S.; Nascimento, V.P.; Guahyba, A.S**. Immune response assessment in turkey breeders vaccinated against Newcastle disease using mathematical models.** *Proceedings of ... Western Poultry Disease Conference.* Davis, Calif.: University of California. 1999. (48) p. 129. Note: Meeting held on April 24-27, 1999. Vancouver, Canada.
NAL call no: SF995.W4
Descriptors: turkeys, vaccination, Newcastle disease virus, immune response.

Samina, I.; Khinich, Y.; Gutter, B.; Michael, A.; Peleg, B.A. **Day-old vaccination with live-in-oil vaccines: Newcastle disease (ND) and infectious bursal disease (IBD) in chicks and ND in turkey poults.** *Avian Pathology*. Feb 1999. v. 28 (1) p. 73-78. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: One-day-old broiler chicks were vaccinated with live Newcastle disease (ND) vaccine incorporated in oil alone or in killed-in-oil ND vaccine. Incorporation of live vaccine in oil emulsions was carried out just prior to vaccination. Live-in-oil ND vaccine containing 10(6.0) median embryo lethal doses (ELD50/dose induced the same protection following challenge and the same level of antibody at 42 days post-vaccination as did commercial killed-in-oil ND vaccine containing about 250 times as much antigen (10(8.4) ELD50/dose). Incorporation of live ND vaccine in killed-in-oil vaccine contributed markedly to protection rates and antibody levels, as compared to those obtained following vaccination with killed-in-oil vaccine only. One-day-old turkey poults also showed the advantage of incorporation of live ND vaccine in killed-in-oil vaccine when challenged 3 months post-vaccination. One-day-old broiler chicks, vaccinated with live ND and infectious bursar disease vaccine (IBD) incorporated in killed-in-oil combined ND + IBD vaccine, showed better protection against challenge with IBDV and higher antibody levels to NDV as compared to vaccination with killed-in-oil vaccine alone.
Descriptors: poults, chicks, live vaccines, inactivated vaccines, combined vaccines, vaccination, Newcastle disease virus, infectious bursal disease virus, disease prevention.

San Roman, K.; Villar, E.; Munoz-Barroso, I. **Acidic pH enhancement of the fusion of Newcastle disease virus with cultured cells.** *Virology*. Aug 1, 1999. v. 260 (2) p. 329-341. ISSN: 0042-6822
NAL call no: 448.8 V81
Descriptors: in vitro methods, acidity, fusion of cells and virus.

Scanlon, D.B.; Corino, G.L.; Shiell, B.J.; Della-Porta, A.J.; Manvell, R.J.; Alexander, D.J.; Hodder, A.N.; Gorman, J.J. **Pathotyping isolates of Newcastle disease virus using antipeptide antibodies to pathotype-specific regions of their fusion and hemagglutinin-neuraminidase proteins.** *Archives of Virology*. 1999. v. 144 (1) p. 55-72. ISSN: 0304-8608
NAL call no: 448.3 Ar23
Descriptors: virulence, pathotypes, amino acid sequences, immune serum.

Schelling, E.; Thur, B.; Griot, C.; Audige, L**. Epidemiological study of Newcastle disease in backyard poultry and wild bird populations in Switzerland.** *Avian Pathology*. June 1999. v. 28 (3) p. 263-272. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Blood samples and cloacal swabs from poultry were collected in 107 small chicken flocks and 62 pure-bred poultry flocks to determine their status regarding Newcastle disease virus (NDV) infection. A questionnaire emphasizing potential contacts of poultry with wild birds and management practices associated with NDV infection was completed for each flock. Additionally, 1576 wild bird carcasses of 115 different bird species were collected from hunters

and taxidermists. Poultry sera and tissue fluids of wild birds were tested for NDV antibodies using a blocking ELISA. Cloacal swabs were subjected to reverse transcription polymerase chain reaction (RT-PCR) for NDV genome detection. In-herd NDV seroprevalences between 5 and 29% were found in one small chicken flock, as well as in four pure-bred poultry flocks. NDV antibody positive wild birds were found in 10.2% of all wild birds examined. Highest proportions (i.e. > 15%) of positive birds per species were found among sparrowhawks, kites, tawny owls, eagle owls, barn owls, cuckoos, swifts, cormorants and grebes. No NDV genome was detected in cloacal swabs. This study suggests that buying eggs or poultry abroad and exchanging poultry within the country were factors, more important than wild birds, to explain the higher NDV seropositivity in pure-bred poultry flocks.
Descriptors: chickens, ducks, geese, wild birds, Newcastle disease, Newcastle disease virus, epidemiology, flocks, inbred lines, seroprevalence, risk factors, animal husbandry, Switzerland.

Scott, P.C.; Westbury, H.; Reece, R.; Arzey, G**. Review of Newcastle disease virus in Australia.** *Proceedings of ... Western Poultry Disease Conference.* Davis, Calif.: University of California. 1999. (48) p. 94-95. Note: Meeting held on April 24-27, 1999, Vancouver, Canada.
NAL call no: SF995.W4
Descriptors: chickens, Newcastle disease virus, Australia.

Shivaprasad, H.L.; Rupiper, D.; Woolcock, P.R.; Woods, L. **An outbreak of Newcastle disease in exotic pheasants and doves.** *Proceedings of ... Western Poultry Disease Conference.* Davis, Calif.: University of California. 1999. (48) p. 43. Note: Meeting held on April 24-27, 1999, Vancouver, Canada.
NAL call no: SF995.W4
Descriptors: pheasants, doves, Columbidae, Newcastle disease virus.

Stone-Hulslander, J.; Morrison, T.G. **Mutational analysis of heptad repeats in the membrane-proximal region of newcastle disease virus HN protein.** *Journal of Virology.* May 1999. v. 73 (5) p. 3630-3637. ISSN: 0022-538X
NAL call no: QR360.J6
Descriptors: viral hemagglutinins, sialidase, mutants, targeted mutagenesis.

Thiagarajan, D.; Ram, G.C.; Bansal, M.P. **Optimum conditions for in vitro chicken IL-2 production and its in vivo role in Newcastle disease vaccinated chickens.** *Veterinary Immunology and Immunopathology.* Jan 4, 1999. v. 67 (1) p. 79-91. ISSN: 0165-2427
NAL call no: SF757.2.V38
Abstract: Optimum conditions for in vitro chicken interleukin-2 (IL-2) production were studied. IL-2 containing culture supernatants were generated by mitogen stimulation of splenic mononuclear cells (SMC) and the samples were tested on 72 h Concanavalin A (ConA) blasts for their proliferative ability. 3H-thymidine incorporation was used as a measurement of proliferation. Higher stimulation indices and thus maximal IL-2 production were obtained with the following culture conditions: 5 x 10(6) cells ml-1 cultured for 24 h in the presence of 10 micrograms ml-1 ConA in serum free Iscove's modified Dulbecco medium. The molecule responsible for IL-2 activity was found to have a molecular weight of 14000 as estimated by size exclusion chromatography. SMC obtained from chickens inoculated with Newcastle disease virus were used to study the immunomodulatory role of IL-2. The lymphocyte transformation test was used as an in vitro correlate of cell mediated immunity in these chickens. The mitogen responses of cells obtained from virus inoculated and control chickens were similar on the basis of stimulation indices. Antigen specific lymphocyte proliferation was demonstrated using SMC obtained from virus inoculated chickens. Uptake of exogenous IL-2 by 72 h ConA blasts was of similar magnitude in both virus inoculated and control chickens indicating that uptake of IL-2 by T lymphocytes was normal in Newcastle disease virus inoculated chickens.
Descriptors: chickens, Newcastle disease, Newcastle disease virus, vaccination, interleukin-2, cell cultures, monocytes, spleen cells, mitogens, concanavalin A, cell division, protein synthesis, molecular weight, immunostimulation, lymphocyte transformation.

Verwoerd, D.J.; Olivier, A.; Gummow, B.; Gerdes, G.H.; Williams, R. **Experimental infection of vaccinated slaughter ostriches in a natural, open-air feedlot facility with virulent Newcastle disease virus.** *Avian Diseases.* July/Sept 1999. v. 43 (3) p. 442-452. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: The presence of virulent Newcastle disease virus (NDV) since the 1993-94 epidemic in southern Africa holds major implications for the export of ostrich products from this region. A challenge experiment with this field strain was conducted in open-air feedlot facilities under strict biosecurity measures. The experiment was designed to follow vaccination and preslaughter quarantine regulations currently enforced in South African export ostrich facilities in order to determine the viremia period and immune response under these specific circumstances. One hundred forty-three slaughter ostriches were allocated into three test groups, according to the time period between pretrial vaccination and challenge (1-2 mo, 2-4 mo, 4-6 mo), and an unchallenged control group. All birds in the test groups were challenged by oral, tracheal, and ocular routes with a field isolate of NDV. They were slaughtered over the next 4 wk on nine separate occasions and bled on 12 occasions. Virus isolation was attempted from seven sets of pooled samples from each bird to determine the viremia period and the serum antibody concentrations were measured by hemagglutination inhibition (HI) and enzyme-linked immunosorbent assay (ELISA) methods to establish an immune response curve. NDV could be back-isolated only up to day 9 postinfection and from only six ostriches with poor immune response titers and corresponding to a rise in antibody levels above an indirect ELISA optical density reading of 0.33. Virus could be recovered only from brain and respiratory tract tissue. The HI test was less sensitive than the ELISA. Immune response curves did not differ significantly between the groups and peaked on day 14 postinfection. From these data, ELISA titers would appear to be a good indicator of the probability that an ostrich will be clinically infected after velogenic NDV challenge. These results also suggest that the current vaccination schedule enforced by the South African Veterinary Authorities results in protective immunity in up to 95% of slaughter ostriches from export approved facilities. The standard 30-day preslaughter quarantine period introduced as part of Crimean-Congo hemorrhagic fever virus control measures also appears sufficient to encompass the determined NDV viremia period of 9-11 days in slaughter ostriches.
Descriptors: ostriches, Newcastle disease virus, experimental infections, feedlots, vaccination, quarantine, viremia, immune response, South Africa.

Wang, Z.Y.; Iorio, R.M. **Amino acid substitutions in a conserved region in the stalk of the Newcastle disease virus HN glycoprotein spike impair its neuraminidase activity in the globular domain.** *The Journal of General Virology.* Mar 1999. v. 80 (pt. 3) p. 749-753. ISSN: 0022-1317
NAL call no: QR360.A1J6
Abstract: The ectodomain of the paramyxovirus haemagglutinin-neuraminidase (HN) glycoprotein spike can be divided into two regions: a membrane-proximal, stalk-like structure and a terminal globular domain. The latter contains all the antibody recognition sites of the protein, as well as its receptor recognition and neuraminidase (NA) active sites. These two activities of the protein can be separated by monoclonal antibody functional inhibition studies and mutations in the globular domain. Herein, we show that mutation of several conserved residues in the stalk of the Newcastle disease virus HN protein markedly decrease its NA activity without a significant effect on receptor recognition. Thus, mutations in the stalk, distant from the NA active site in the globular domain, can also separate attachment and NA. These results add to an increasing body of evidence that the NA activity of this protein is dependent on an intact stalk structure.
Descriptors: viral hemagglutinins, sialidase, ectodomain, viral protein, mutations, NA activity.

Ward, M.D.; Fuller, F.J.; Mehrotra, J.; De-Buysscher, E.V. **The nucleoprotein of Newcastle disease virus: the avian immune response to rNP of NDV is not different from the response to rNP of avian influenza virus.** *Proceedings of ... Western Poultry Disease Conference.* Davis, Calif.: University of California. 1999. (48) p. 141. Note: Meeting held on April 24-27, 1999. Vancouver, Canada.
NAL call no: SF995.W4
Descriptors: Newcastle disease virus, nucleoproteins, chickens, immune responses.

Ward, M.D.; Suyemoto, M.; Qureshi, M.A.; Weinstock, D.; De-Buysscher, E.V**. Experimental DNA-vaccination against Newcastle Disease Virus (NDV): transient expression vectors expressing the nucleoprotein (NP)-, or haemagglutinin neuraminidase (HN)-gene.** *Proceedings of ... Western Poultry Disease Conference.* Davis, Calif.: University of California. 1999. (48) p. 54-55. Note: Meeting held on April 24-27, 1999, Vancouver, Canada.
NAL call no: SF995.W4
Descriptors: chickens, vaccination, Newcastle disease, plasmid vectors, genes.

Watson, S.A. **The changing biological warfare threat: anti-crop and anti-animal agents.** *Annals of the New York Academy of Sciences v. 894. Food and Agricultural Security Guarding Against Natural Threats and Terrorist Attacks Affecting Health, National Food Supplies, and Agricultural Economics*. New York: New York Academy of Sciences, 1999. 1999. p. 159-163. ISBN: 1573312304. Note: Paper presented at the "International Conference on Food and Agricultural Security," September 28-30, 1998, in Washington, D.C.
NAL call no: 500 N484 v. 894
Descriptors: biological warfare, terrorism, plant diseases, animal diseases, plant viruses, animal viruses, bacterial diseases, mycoses, fungal diseases, meat and livestock industry, poultry industry, Newcastle disease virus, USA.

Wehmann, E.; Herczeg, J.; Tanyi, J.; Nagy, E.; Lomniczi, B. **Lentogenic field isolates of Newcastle disease virus isolated in Canada and Hungary are identical with the vaccine type used in the region.** *Avian Pathology*. Feb 1999. v. 28 (1) p. 6-12. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Lentogenic field isolates of Newcastle disease virus were examined by restriction enzyme analysis of RT-PCR products generated from the matrix protein gene that discriminates between strains LaSota and B-1, the two most widely used lentogenic vaccine viruses. Isolates were derived from regions where, exclusively or predominantly, only one type of vaccine was employed. Viruses collected in Hungary for two decades were exclusively of LaSota-type while the Canadian collection predominantly included B-1, which corresponded to the vaccine types used in the regions. Isolation of vaccine type lentogenic viruses from unvaccinated flocks supports the occurrence of area spread of these lentogenic viruses.
Descriptors: Newcastle disease virus strains, vaccines, spread, restriction endonuclease analysis, polymerase chain reaction, Canada, Hungary, apathogenic strains.

Wu, H.Y.; Chiou, S.H.; Shien, J.H.; Chang, P.C.; Shieh, H.K. **Detection of proteins and nucleic acids of Newcastle disease virus in *Eimeria acervulina*.** *Avian Pathology.* Oct 1999. v. 28 (5) p. 441-445. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Ten-day-old specific pathogen free (SPF) chickens were inoculated simultaneously with *Eimeria acervulina* and Newcastle disease virus (NDV). By employing immunofluorescent staining and in situ hybridization techniques, we detected NDV proteins and nucleic acids in different life stages of *E. acervulina*. However, no NDV particle was found within E. acervulina by electron microscopy. Oocysts from *E. acervulina* that contained NDV proteins and nucleic acids could elicit antibodies against NDV after repeated inoculation into SPF chickens. Moreover, the proportion of oocysts from chickens infected with *E. acervulina* and NDV which could be induced to sporulate in vitro was lower than those from chickens infected with *E. acervulina* alone. These results indicate that nucleic acids and proteins of NDV can exist within *E. acervulina*, and stimulate an immune response against NDV in chickens, and that NDV may also interfere with the sporulation of oocysts.
Descriptors: chickens, *Eimeria acervulina*, Newcastle disease virus, viral proteins, nucleic acids, detection, interactions, oocysts, sporulation, experimental infections.

Yang, C.Y.; Shieh, H.K.; Lin, Y.L.; Chang, P.C**. Newcastle disease virus isolated from recent outbreaks in Taiwan phylogenetically related to viruses (genotype VII) from recent outbreaks in western Europe.** *Avian Diseases*. Jan/Mar 1999. v. 43 (1) p. 125-130. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Three major outbreaks of Newcastle disease (ND) occurred in Taiwan in the last three decades (in 1969, 1984, and 1995). Newcastle disease vines (NDVs) isolated in the three outbreaks, together with those isolated in 1998, were sequenced between nucleotides 47 and 435 of the fission gene. A phylogenetic tree based on sequences obtained showed that the NDV isolated in 1969 was similar to the genotype III viruses. In contrast, all isolates in 1984 and seven of the eight isolates in 1995, together with all isolates in 1998, fell into the genotype VII. These results suggest that the 1969 outbreak of ND in Taiwan was caused by the genotype III virus, whereas the 1984 and 1995 outbreaks were caused by the genotype VII viruses. To date, the genotype VII viruses have caused many outbreaks in east Asia and western Europe. We suspect that these outbreaks have constituted the fourth panzootic of ND, which is distinct from the third panzootic caused by the "pigeon PMV-1 viruses. NDV isolated in Taiwan in 1984 was the earliest isolation of the genotype VII virus.
Descriptors: Newcastle disease virus, outbreaks, phylogenetics, genotypes, nucleotide sequences, strain differences, epidemiology, identification, genes, amino acid sequences, Europe, Taiwan.
Molecular sequence data: genbank/af083959. genbank/af083960. genbank/af083961. genbank/af083962. genbank/af083963. genbank/af083964. genbank/af083965. genbank/af083966. genbank/af083967. genbank/af083968. genbank/af083969. genbank/af083970. genbank/af083971. genbank/af083972. genbank/af083973. genbank/af083974.

Yonash, N.; Kaiser, M.G.; Heller, E.D.; Cahaner, A.; Lamont, S.J. **Major histocompatibility complex (MHC) related cDNA probes associated with antibody response in meat-type chickens.** *Animal Genetics.* Apr 1999. v. 30 (2) p. 92-101. ISSN: 0268-9146
NAL call no: QP98.A1A5
Abstract: The major histocompatibility complex (MHC) region was examined as a set of candidate genes for association between DNA markers and antibody response. Intercross F2 families of chickens were generated from a cross between high (HC) and low (LC) *Escherichia coli*; antibody lines. Restriction fragment length polymorphism (RFLP) analysis was conducted by using three MHC-related cDNA probes: chicken MHC class IV (B-G), chicken MHC class I (B-F), and human MHC-linked Tap2. Association between RFLP bands and three antibody response traits (*E. coli*, sheep red blood cells and Newcastle disease virus) were determined by two methods: by statistically analyzing each band separately and also by analyzing all bands obtained from the three probes by using multiple regression analysis to account for the multiple comparisons. The MHC class IV probe was the highest in polymorphisms but had the lowest number of bands

associated with antibody response. The MHC class I probe yielded 15 polymorphic bands of which four exhibited association with antibody response traits. The Tap2 probe yielded 20 different RFLP bands of which five were associated with antibody production. Some Tap2 bands were associated with multiple antibody response traits. The multiband analysis of the three probes' bands revealed more significant effects than the analysis of each band separately. This study illustrates the efficacy of using multiple MHC region probes as candidate markers for quantitative trait loci (QTLs) controlling antibody response in chickens.
Descriptors: broilers, major histocompatibility complex, complementary DNA, immune response, genes, genetic markers *Escherichia coli*, antibodies, restriction fragment length polymorphism, sheep, erythrocytes, Newcastle disease virus, quantitative traits, loci, crosses

Young, J.K.; Li, D.; Abramowitz, M.C.; Morrison, T.G. **Interaction of peptides with sequences from the Newcastle disease virus fusion protein heptad repeat regions.** *Journal of Virology*. July 1999. v. 73 (7) p. 5945-5956. ISSN: 0022-538X
NAL call no: QR360.J6
Descriptors: amino acid sequences, binding sites, heptad repeat regions.

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The Association. **Welfare aspects of broiler breeder production.** *The Veterinary Record*. Aug 22, 1998. v. 143 (8) p. 209-212. ISSN: 0042-4900
NAL call no: 41.8 V641
Descriptors: broilers, chicks, turkeys, Newcastle disease, Newcastle disease virus, outbreaks, pathogenicity, epidemiology, clinical aspects, spread, Great Britain.

Azzam, A.H.; Gabal, M.A. **Aflatoxin and immunity in layer hens.** *Avian Pathology*. Dec 1998. v. 27 (6) p. 570-577. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: A study was conducted on the impact of aflatoxin in the feed on the prophylactic immunization of layer hens against Newcastle disease, infectious bronchitis, infectious bursal disease and fowl cholera. Four-hundred-and-eighty 18-week-old white leghorn chickens were used. Different groups of hens were vaccinated, as per commercial recommendations, with a commercial inactivated triple vaccine against Newcastle disease, infectious bronchitis, and infectious bursal disease. A killed polyvalent bacterin was used for fowl cholera. Aflatoxin was fed for 22 weeks at a daily dose of 200 parts/10(9)/hen. Aflatoxin significantly reduced antibody titres, resulted in a decrease of egg weight, a decrease in egg production and an increase of mortality rate in challenged hens. Aflatoxin was detected in eggs at levels far above the permissible concentration.
Descriptors: hens, aflatoxins, feeds, antibody formation, inactivated vaccines, vaccination, prophylaxis, Newcastle disease virus, infectious bronchitis virus, infectious bursal disease virus, fowl diseases, egg weight, egg production, mortality, fowl cholera.

Bailey, T.A.; Wernery, U.; Zachariah, R.; Samour, J.H.; Naldo, J.L.; Howlett, J.C. **Maternal transfer of paramyxovirus type 1 antibodies and antibody response to a live Newcastle disease vaccine in kori bustards.** *Journal of Wildlife Diseases.* July 1998. v. 34 (3) p. 472-478. ISSN: 0090-3558
NAL call no: 41.9 W64B
Descriptors: Guiformes, maternal immunity, Ardeotis kori, bustard birds.

Collins, M.S.; Franklin, S.; Strong, I.; Meulemans, G.; Alexander, D.J. **Antigenic and phylogenetic studies on a variant Newcastle disease virus using anti-fusion protein monoclonal antibodies and partial sequencing of the fusion protein gene.** *Avian Pathology.* Feb 1998. v. 27 (1) p. 90-96. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: A virulent Newcastle disease virus (NDV) isolate, 34/90, reported to show considerable antigenic diversity from more classical strains of NDV, including vaccine strains, was evaluated phylogenetically and for the presence of neutralizing epitopes on the fusion protein. Comparison of a 309 nucleotide sequence of the fusion protein gene of 34/90 with other viruses confirmed the diversity of this virus, placing it in a discrete fifth genetic lineage with an avirulent virus isolated from waterfowl and genetically quite distant from other strains and isolates. The virus-neutralizing mAbs used in the present study were directed against at least seven distinct epitopes on the fusion protein. Of these seven, five are shared by 34/90 and the live vaccine virus Hitchner B1 and these plus an additional epitope are shared by 34/90 and strain Ulster 2C, which is used in inactivated vaccines. Two potential distinct epitopes were also shared by these three viruses. The results suggest that despite the detected antigenic and genetic variation of 34/90, it is unlikely that mutants which fail to be neutralized by antibodies induced by conventional vaccines would arise readily.
Descriptors: Newcastle disease virus, epitopes, phylogenetics, antigenic variation, genetic variation, envelope glycoproteins, nucleotide sequences.

Coskun, B.; Inal, F.; Celik, I.; Erganis, O.; Tiftik, A.M.; Kurtoglu, F.; Kuyucuoglu, Y.; Ok,U. **Effects of dietary levels of vitamin A on the egg yield and immune responses of laying hens.** *Poultry Science.* Apr 1998. v. 77 (4) p. 542-546. ISSN: 0032-5791
NAL call no: 47.8 Am33P
Abstract: This research, which was designed and carried out as two consecutive experiments, investigated the effects of four different levels (0, 4,000, 12,000, and 24,000 IU/kg) of vitamin A supplementation on egg yield, plasma vitamin A levels, and immune responses of laying hens. Transmission of maternal immunity to their descendants was also studied. In the first experiment, egg yield, blood vitamin A levels, and various parameters of the immune system such as T lymphocyte levels in the peripheral blood, plasma cell counts in the spleen, and antibody titers against Newcastle Disease Virus (NDV) in the sera were investigated for a 1-yr period. A total of 864 Hisex-brown laying hens were used in this experiment. The chicks were reared as commercial flocks until the 18th wk of age. No significant differences occurred among the parameters of the different diet groups. In the second experiment, maternal immunity was assessed in the chickens, supplied by hatching the eggs from hens in the first experiment. Maternal immunity was assayed by using the parameters as in Experiment 1. For this purpose, both blood and tissue samples were taken on the 2nd, 7th, and 10th d posthatch. Vitamin A supplementation had no significant effects on maternally, derived antibody titers or histologic structure of the lymphoid organs.
Descriptors: hens, retinol, dosage, vitamin supplements, T lymphocytes, blood serum, age differences, feed intake, egg production, egg weight, feed conversion, antibody formation, mortality.

Czifra, G.; Meszaros, J.; Horvath, E.; Moving, V.; Engstrom, B.E. **Detection of NDV-specific antibodies and the level of protection provided by a single vaccination in young chickens.** *Avian Pathology*. Dec 1998. v. 27 (6) p. 562-565. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Fourteen groups of young commercial chickens were immunized once with a live NDV vaccine using different vaccine doses and routes of vaccination

in five experiments. Three to six weeks later, small groups were selected from each flock. Sera were tested by the haemagglutination-inhibition test and a monoclonal antibody blocking ELISA, and the birds were challenged with a virulent NDV strain. Degree of protection was dose-dependent in those groups where the vaccine was administered orally at 3 weeks of age. Aerosol and eye drop vaccinations performed in day-old chicks provided full protection at 5 or 6 weeks of age. There was a good agreement between the two serological methods and positive results in any of the tests were reliable forecasts of protection.
Descriptors: chickens, Newcastle disease virus, antibody testing, vaccination, live vaccines, disease prevention, ELISA, hemagglutination, hemagglutination inhibition test, antibody formation.

Ewing, M.L.; Cookson, K.C.; Phillips, R.A.; Turner, K.R.; Kleven, S.H. **Experimental infection and transmissibility of Mycoplasma synoviae with delayed serologic response in chickens.** *Avian Diseases.* Apr/June 1998. v. 42 (2) p. 230-238. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Fifteen mycoplasma-free chickens were contact exposed to five chickens that had been experimentally infected with one of three different strains (two field strains and one laboratory strain) of Mycoplasma synoviae (MS). Culture and polymerase chain reaction (PCR) were positive by 3 days postinoculation (PI) in the experimentally infected birds. Lateral transmission was found by 7-14 days postexposure. Positive serum plate agglutination (SPA) results were detected 3-4 wk after positive culture and/or PCR in individual birds. By 42 days PI, all the birds in the groups exposed to field strain K1858 or K3344 had become infected as determined by culture and PCR, whereas only half of the birds in the group exposed to laboratory strain WUV1853 had become infected. Because of the unanticipated lack of seroconversion to hemagglutination inhibition (HI) and enzyme-linked immunosorbent assay (ELISA) in infected chickens, the study was extended. Each group was split into two groups of 10 birds each, one of which was vaccinated with a live B1/LaSota Newcastle disease (ND) vaccine virus to determine if a viral respiratory challenge might incite a stronger antibody response to the mycoplasma injection. All the birds were tested for seroconversion 14 and 21 days later. Of the birds vaccinated for ND, a slightly greater number were MS positive by SPA than the nonvaccinated birds. This effect was not present 21 days after vaccination, and there was no significant difference in the MS HI results from these groups, suggesting that the viral respiratory infection had little direct impact on seroconversion. The virulent field strain (K3344) elicited a stronger MS antibody response than the other strains. All results from the MS ELISA were negative in all groups through 9 wk. Positive results from PCR analysis correlated well with culture results, whereas serologic tests did not detect MS infection for several weeks. Monitoring programs solely dependent on seroconversion may be inadequate for diagnosis and control of mycoplasma infections.
Descriptors: chickens, ycoplasma synoviae, disease transmission, experimental infection, experimental infections, serology, strain differences, diagnosis, detection, seroconversion, vaccination, immune response, monitoring, polymerase chain reaction.

Falcone, E.; Vignolo, E.; Di Trani, L.; Puzelli, S.; Tollis, M. **Comparative evaluation of in vitro and in vivo assays for the detection of avian infectious bronchitis virus as a contaminant of live poultry vaccines.** *Alternatives to Laboratory Animals: ATLA.* Sept/Oct 1998. v. 26 (5) p. 629-634. ISSN: 0261-1929
NAL call no: Z7994.L3A5
Abstract: A reverse transcriptase polymerase chain reaction (RT-PCR) assay specific for identifying avian infectious bronchitis virus (IBV) in poultry vaccines, and the serological response to IBV induced by the inoculation of chicks with a Newcastle disease vaccine spiked with the Massachusetts strain of IBV, were compared for their ability to detect IBV as a contaminant of avian vaccines. The sensitivity of the IBV-RT-PCR assay provided results which were at least equivalent to the biological effect produced by the inoculation of chicks, allowing this assay to be considered a valid alternative to animal testing in the quality control of avian immunologicals. This procedure can easily be adapted to detect a number of contaminants for which the in vivo test still represents the only available method of detection.
Descriptors: infectious bronchitis virus, live vaccines, polymerase chain reaction, chicks, animal testing alternatives.

Folitse, R.; Halvorson, D.A.; Sivanandan, V**. Efficacy of combined killed-in-oil emulsion and live Newcastle disease vaccines in chickens.** *Avian Diseases.* Jan/Mar 1998. v. 42 (1) p. 173-178. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Following the introduction of routine vaccination regimes with different types of Newcastle disease (ND) vaccines, the incidence of velogenic viscerotropic Newcastle disease (VVND) in commercial poultry worldwide has declined dramatically. Unfortunately, these vaccination regimes are not feasible in free-range and backyard systems of poultry production practiced in many developing countries. In this study, we sought to develop a single vaccination regime in chickens with ND vaccines to elicit a long-lasting high level of ND virus (NDV) antibodies adequate to protect chickens against ND. The level of antibody response, as measured by the hemagglutination-inhibition (HI) test, and the degree of protection against the virulent strain of NDV were studied in chickens immunized with different vaccines. The vaccines used were: killed-in-oil emulsion (subcutaneous; s.c.) plus live virus (oculanasal; o.n.), given concurrently; experimental vaccine (s.c.) plus live virus (o.n.), given concurrently; killed-in-oil (s.c.); experimental vaccine prepared by homogenizing commercial live vaccine and oil emulsion (s.c.); and live virus (o.n.). The results obtained in this study indicate that concurrent administration of oil emulsion and live NDV vaccines induced the best antibody response, but there was no significant difference in protection among the vaccinated groups.
Descriptors: chickens, Newcastle disease, live vaccines, inactivated vaccines, efficacy, protection, vaccination, incidence, antibodies, serology.

Folitse, R.; Halvorson, D.A.; Sivanandan, V**. A dot immunoblotting assay (dot blot ELISA) for early detection of Newcastle disease antibodies in chickens.** *Avian Diseases.* Jan/Mar 1998. v. 42 (1) p. 14-19. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: An enzyme-linked immunosorbent assay using nitrocellulose blotting membrane (dot blot ELISA) was developed for the detection of antibodies against Newcastle disease virus (NDV) in chickens. In this method, a nitrocellulose blotting membrane was used as the solid phase carrier. NDV antigens were directly bound onto the nitrocellulose membrane that was set into a dot blot microfiltration apparatus. Efficiency of the assay was evaluated using known positive and negative NDV sera obtained from chickens. The ability of the assay to detect antibodies 2 days earlier than the standard hemagglutination-inhibition (HI) test was demonstrated on sera collected from chickens experimentally infected with NDV, La Sota strain.
Descriptors: chickens, Newcastle disease, Newcastle disease virus, antibodies, ELISA, detection, antigens, efficiency, serology, experimental infections, early diagnosis, antibody testing.

Friedman, A.; Bartov, I.; Sklan, D. **Humoral immune response impairment following excess vitamin E nutrition in the chick and turkey.** *Poultry Science.* July 1998. v. 77 (7) p. 956-962. ISSN: 0032-5791
NAL call no: 47.8 Am33P
Abstract: The effect of high dietary intakes of vitamin E on antibody production was investigated in chicks and turkeys. Chicks were fed four diets with 0, 10, 30, and 150 mg/kg added vitamin E and turkeys were fed three diets with 0, 50, and 150 mg/kg added vitamin E. Antibodies produced in response to naturally occurring *Escherichia coli* and to Newcastle disease virus and turkey pox vaccines were determined. In chicks, antibody production in response to *E. coli* and Newcastle disease was affected by vitamin E nutrition: significantly higher responses were measured in chicks that received 0 and 10 mg/kg added vitamin E, whereas in chicks receiving 30 and 150 mg/kg, antibody production was significantly lower. In turkeys, concentrations of circulating antibodies to Newcastle

disease virus and to turkey pox were also influenced by dietary vitamin E: antibody titers to Newcastle disease and turkey pox vaccines were highest in groups receiving 0 mg/kg added vitamin E, whereas titer in groups receiving 150 mg/kg were significantly lower. Responses of groups receiving 50 mg/kg added vitamin E were slightly lower than groups receiving 0 mg/kg, though not significantly so in most cases. These results indicate that humoral immune responses are directly affected by vitamin E, and that excessive vitamin E intake has a detrimental effect on antibody production in chickens and turkeys.
Descriptors: chicks, poults, alpha tocopherol, dosage, vaccination, Newcastle disease virus, turkey pox virus, liveweight gain, feed conversion, antibody formation, immune competence, nutrient excesses.

Gabal, M.A.; Azzam, A.H. **Interaction of aflatoxin in the feed and immunization against selected infectious diseases in poultry. II. Effect on one-day-old layer chicks simultaneously vaccinated against Newcastle disease, infectious bronchitis and infectious bursal disease.** *Avian Pathology*. June 1998. v. 27 (3) p. 290-295. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: A study was conducted to assess the effects of aflatoxin contaminated feed on the immunoresponse of one-day old layer chicks to attenuated live virus vaccines for Newcastle disease (ND), infectious bronchitis (IB) and infectious bursal disease (IBD). Concurrent exposure of chickens to 200 parts per billion (ppb) aflatoxin in feed and vaccination against ND, IB and IBD resulted in lack of adequate protection against subsequent experimental challenge, as assessed by antibody responses compared to chickens fed aflatoxin-free ration. The mortalities were higher in chickens fed 200 ppb of aflatoxin than in chickens fed on aflatoxin-free ration.
Descriptors: chicks, aflatoxins, feeds, vaccination, live vaccines, Newcastle disease, infectious bronchitis virus, avian infectious bursitis, antibody formation, mortality.

Hilgers, L.A.T.; Nicolas, I.; Lejeune, G.; Dewil, E.; Boon, B. **Effect of various adjuvants on secondary imune response in chickens.** *Veterinary Immunology and Immunopathology*. Nov 24, 1998. v. 66 (2) p. 159-171.: ISSN: 0165-2427
NAL call no: SF757.2.V38
Abstract: Stimulatory effects of several types of adjuvants on secondary antibody response to inactivated Newcastle disease virus (iNDV) were examined in chickens. For this purpose, animals were primed with iNDV, without adjuvant resulting in a low but significant antibody response, boosted with iNDV plus adjuvant 3 weeks later, and analysed for specific antibody titres in serum 3 weeks after the booster. Water-in-mineral oil emulsion (W/O) caused significant increase in antibody titres measured in an indirect enzyme-linked immunosorbent (ELISA), haemagglutination inhibition (HI) and virus neutralisation (VN) assay. The adjuvants tested included three oil-in-water emulsions (i.e. mineral oil-in-water, sulpholipo(SL)-Ficoll400/squalane-in-water and sulpholipo-cyclodextrin/squalane-in-water), three negatively-charged polymers with high molecular weight (i.e.polyacrylate, polystyrenesulphonate and sulpho(S)-Ficoll400) and two surface-active agents (i.e. dimethyldioctadecylammonium bromide (DDA) and Quil A). These adjuvants enhanced significantly the secondary immune response but none reached the titre obtained with W/O. Combinations of adjuvants with distinct physicochemical properties, i.e. polyacrylate and DDA revealed only slight, beneficial effects. We concluded the various types of adjuvants tested can stimulate secondary immune responses in primed animals but that W/O is superior.
Descriptors: chickens, Newcastle disease virus, adjuvants, inactivated vaccines, immune response, stimulation, evaluation, ELISA, hemagglutination inhibition test, virus neutralization.

Jorgensen, P.H.; Herczeg, J.; Lomniczi, B.; Manvell, R.J.; Holm,-E.; Alexander, D.J. **Isolation and characterization of avian paramyxovirus type 1 (Newcastle disease) viruses from a flock of ostriches (*Struthio camelus*) and emus (Dromaius novaehollandiae) in Europe with inconsistent serology.** *Avian Pathology.* Aug 1998. v. 27 (4) p. 352-358. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: During a 95-day study period in 1995 in Denmark, 18 ostriches in a flock of 77 ostriches and four emus held in quarantine died. Clinical and pathological observations did not indicate the presence of transmissible infectious disease in the flock. Management failures and indoor housing were believed to have contributed significantly to the number of deaths. Samples from 17 of the dead ostriches were examined virologically. Three isolates of avian paramyxovirus serotype 1 (APMV-1) were obtained from intestines and intestinal contents of dead ostriches submitted for laboratory investigations. In ICPI tests in day-old chicks values for the three APMV-1 isolates were in the range 1.63-1.69. Characterization by means of mouse monoclonal antibodies and by restriction site analysis revealed that the three isolates were indistinguishable and similar to APMV-1 viruses present in a simultaneous epizootic of Newcastle disease in back yard poultry in Denmark. Blood samples were taken from all live birds in the flock after 25 and 95 days of quarantine and all were negative for antibodies to APMV-1 in haemagglutination inhibition tests. All samples taken after 95 days of quarantine were also negative for antibodies to APMV-1 in serum neutralization tests performed in chicken embryo cells. Blood samples taken after 95 days of quarantine were tested in a commercial ELISA for antibodies to APMV-1. In this test 35% of the samples were positive, 35% were border line and 30% were negative.
Descriptors: ostriches, emus, Newcastle disease virus, isolation, characterization, pathogenicity, structural genes, restriction endonuclease analysis, serotypes, serology, immunodiagnosis, monoclonal antibodies, blood serum, hemagglutination inhibition test, virus neutralization tests, ELISA, F-gene, Denmark.

Kencana, Gst. Ayu Yuniati. **Kajian sifat imunosupresif berbagai vaksin gumboro pada respon primer vaksin penyakit Newcastle pada ayam pedaging.** *Laporan Penelitian.* Denpasar: Universitas Udayana, 1998. x, 13 leaves: ill. Note: In Indonesian with an English summary.
NAL call no: QR189.5.N48-K35 1998
Descriptors: Newcastle disease vaccine, Newcastle disease virus, broilers, Indonesia.

King, D.J.; Seal, B.S. **Biological and molecular characterization of Newcastle disease virus (NDV) field isolates with comparisons to reference NDV strains.** *Avian Diseases.* July/Sept 1998. v. 42 (3) p. 507-516. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Fifty-seven Newcastle disease virus (NDV) isolates from chickens, turkeys, a rhea, a parrot, and an anhinga were pathotyped and characterized by monoclonal antibody (mAb) inhibition profile, elution rate, and hemagglutinin thermostability. Nucleotide sequence analysis of portions of the fusion protein and matrix protein genes of the parrot isolate was done for comparison with prior sequence analysis of the anhinga isolate and NDV reference strains. Seven of the 43 chicken isolates were recovered from flocks in Canada. The remaining isolates, including 11 from turkeys, were isolated in the United States. All isolates except that of the anhinga were of low virulence by mean death time in embryos, intracerebral pathogenicity index, and/or intravenous pathogenicity index procedures and were classified as lentogens. The anhinga isolate was more virulent than the other strains and was pathotyped as a mesogen. However, nucleotide sequence analysis of the anhinga isolate had revealed a homology with the virulent cormorant isolates of 1992 rather than the classical U.S. mesogens characterized by the Roakin strain. Variability was evident among the lentogenic isolates. Two isolates from turkeys had mAb profiles that differed from B1 and La Sota reference and vaccine strains, and 38% (21/56) of the isolates had more thermostable hemagglutinins than those reference strains. There was no evidence that any of the isolates from poultry were more virulent than the lentogenic pathotype.

Descriptors: chickens, turkeys, rheas, parrots, wild birds, Newcastle disease virus, strain differences, host range, monoclonal antibodies, pathotypes, hemagglutinins, nucleotide sequences, viral proteins, virulence, embryos, pathogenicity.

Koch, G.; Czifra, G.; Engstrom, B.E. **Detection of Newcastle disease virus-specific antibodies in ostrich sera by three serological methods.** *The Veterinary Record: Journal of the British Veterinary Association.* July 4, 1998. v. 143 (1) p. 10-12. ISSN: 0042-4900
NAL call no: 41.8 V641
Descriptors: ostriches, Newcastle disease virus, antibody testing, blood serum, virus neutralization, hemagglutination inhibition test, ELISA, accuracy.

Krishnamurthy, S.; Samal, S.K**. Nucleotide sequences of the trailer, nucleocapsid protein gene and intergenic regions of Newcastle disease virus strain Beaudette C and completion of the entire genome sequence.** *The Journal of General Virology*. Oct 1998. v. 79 (pt. 10) p. 2419-2424. ISSN: 0022-1317
NAL call no: QR360.A1J6
Abstract: The nucleotide sequences of the nucleocapsid protein (NP) gene, the intergenic regions in the nucleocapsid protein (NP)-phosphoprotein (P), P-matrix protein (M) and M-fusion glycoprotein gene junctions and the trailer region of a virulent Newcastle disease virus (NDV) strain Beaudette C were determined. The NP gene is 1747 nt long and encodes a protein of 489 amino acids. Each of the intergenic sequences determined is 1 nt long and, including the previously published intergenic sequences, the gene junction sequences varied in length from 1-47 nt and lacked any sequence identity. The 5' trailer region is 113 nt in length. Comparison of the sequences of the terminal leader and trailer regions of Beaudette C strain with those of nonvirulent strain B1 showed a high level of conservation, indicating the likelihood of these elements not being a factor in virulence. Together with previously published data, this report completes the sequence of the 15186 nt genomic RNA of NDV strain Beaudette C.
Descriptors: nucleotide sequences, intergenic DNA, Newcastle disease virus genes, proteins,
Molecular sequence data: genbank/af064091.

Kuiken, T.; Heckert, R.A.; Riva, J.; Leighton, F.A.; Wobeser, G. **Excretion of pathogenic Newcastle disease virus by double-crested cormorants (Phalacrocorax auritus) in absence of mortality of clinical signs of disease.** *Avian Pathology.* Dec 1998. v. 27 (6) p. 541-546. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Pathogenic Newcastle disease virus (NDV) caused several epidemics of Newcastle disease in double-crested cormorants (Phalacrocorax auritus) in recent years. Eleven 16-week-old cormorants were infected with, or exposed to, pathogenic NDV from one of these epidemics and monitored for 70 days. No birds died, four birds had transient ataxia between 12 and 27 days post-infection (d.p.i.), and one bird had neuronal necrosis and non-suppurative encephalitis characteristic for Newcastle disease. The mean haemagglutination inhibiting antibody titre to NDV peaked at 1:630, 21 d.p.i., and decreased to 1:56 70 d.p.i. Duration of NDV excretion from the cloaca was 15 +/- 6.2 d.p.i., with a maximum of 28 d.p.i. The absence of mortality in these birds may have been due to age-related resistance. The excretion of NDV by cormorants in the absence of mortality or clinical signs of disease suggests that the cormorant population could maintain pathogenic NDV through serial infection of susceptible birds. The greatest risk of NDV transmission from cormorants to poultry probably is during autumn migration, through contact with infected birds, excreta or contaminated water.
Descriptors: Phalacrocorax, cormorants, Newcastle disease virus, excretion, experimental infections, morbidity, mortality, immune response, asymptomatic infections, disease resistance.

Kuiken, T.; Leighton, F.A.; Wobeser, G.; Danesik, K.L.; Riva, J.; Heckert, R.A. **An epidemic of Newcastle disease in double-crested cormorants from Saskatchewan.** *Journal of Wildlife Diseases.* July 1998. v. 34 (3) p. 457-471. ISSN: 0090-3558
NAL call no: 41.9 W64B
Descriptors: Phalacrocorax auritus, cormorants, epidemiology, Saskatchewan, Canada.

Li, Z.; Sergel, T.; Razvi, E.; Morrison, T. **Effect of cleavage mutants on syncytium formation directed by the wild-type fusion protein of Newcastle disease virus.** *Journal of Virology.* May 1998. v. 72 (5) p. 3789-3795. ISSN: 0022-538X
NAL call no: QR360.J6
Descriptors: wild type viral fusion protein, Newcastle disease virus, syncytium formation.

Lomniczi, B.; Wehmann, E.; Herczeg, J.; Ballagi-Pordany, A.; Kaleta, E.F.; Werner, O.; Meulemans, G.; Jorgensen, P.H.; Mante, A.P.; Gielkens, A.L.J. **Newcastle disease outbreaks in recent years in Western Europe were caused by an Old (VI) and a novel genotype (VII).** *Archives of Virology*. 1998. v. 143 (1) p. 49-64. ISSN: 0304-8608
NAL call no: 448.3 Ar23
Descriptors: restriction fragment length polymorphism, strain differences.

Losio, M.N.; Lodetti, E.; Alborali, L.; Tosi, G.; Buonavoglia, C**. A study on the long-term immunity induced by La Sota strain of Newcastle disease virus grown in a BS/BEK cell line of bovine embryo kidney origin.** *Avian Pathology*. Feb 1998. v. 27 (1) p. 28-32. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: Twenty-day-old susceptible chickens were divided into three groups; two were vaccinated with inactivated, water in oil emulsified La Sota strain of Newcastle disease virus (NDV) obtained from a bovine embryo kidney (BS/BEK) cell line and from chicken embryos, respectively. The third unvaccinated group represented the control. At 30-day intervals subgroups were exposed to the Herts 33 virulent NDV strain. Serological and clinical findings showed no appreciable difference in the immunogenicity of the antigen from either culture systems and no significant differences could be observed in its ability to protect against ND challenge.
Descriptors: chickens, Newcastle disease virus, inactivated vaccines vaccination, antibody formation, viral antigens, cell lines, kidneys, chick embryos, disease prevention Newcastle disease,
bovine embryo kidney cell line.

Maas, R.A.; Oei, H.L.; Kemper, S.; Koch, G.; Visser, L. **The use of homologous virus in the haemagglutination-inhibition assay after vaccination with Newcastle disease virus strain La Sota or Clone30 leads to an over estimation of protective serum antibody titres.** *Avian Pathology*. Dec 1998. v. 27 (6) p. 625-631. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: We evaluated the influence of the use of the Newcastle disease virus (NDV)-strains Ulster and La Sota in the haemagglutination inhibition (HI) assay for the measurement of antibody titres after NDV vaccination. The use of the homologous La Sota antigen in the HI assay after Clone30 and La Sota vaccination of SPF-chickens, resulted in significantly higher titres than the use of the heterologous Ulster virus. The mean difference was 1.4 on a log2 scale (2.6-fold). A

significant difference was also found in virus neutralization (VN) assays. The virus strain in the HI or VN test did not influence the resulting titres after Ulster vaccination. When HI antibody titres after vaccination were related to VN titres measured with virulent Herts NDV or to survival after virulent challenge, it was found that the use of La Sota antigen in the HI assay after vaccination with Clone30 or La Sota resulted in an overestimation of protective serum antibody titres. Also in commercially derived White Leghorns vaccinated with Clone30, significantly higher HI titres were obtained when La Sota antigen was used in the HI test. Our data have direct implications for potency testing of inactivated vaccines as the European Pharmacopeia does not prescribe the antigen to be used in the HI test.
Descriptors: chickens, Newcastle disease virus, vaccination, inactivated vaccines, strain differences, hemagglutination inhibition test, potency, antibody formation, survival.

Meulemans, G.; Roels, S.; van den Berg, T.P.; Godfroid, J.; Decaesstecker, M. **Acute pancreatitis in chickens due to non-virulent Newcastle disease virus.** *The Veterinary Record.* Sept 12, 1998. v. 143 (11) p. 300-303. ISSN: 0042-4900
NAL call no: 41.8 V641
Descriptors: broilers, pancreatitis, Newcastle disease virus, histopathology, lesions, pathogenicity experimental infections.

Nanda, I.; Sick, C.; Munster, U.; Kaspers, B.; Schartl, M.; Staeheli, P.; Schmid, M. **Sex chromosome linkage of chicken and duck type I interferon genes: further evidence of evolutionary conservation of the Z chromosome in birds.** *Chromosoma.* 1998. v. 107 (3) p. 204-210. ISSN: 0009-5915
NAL call no: 442.8 C46
Abstract: Type I interferons (IFNs) are a family of proteins that are predominantly expressed in response to viral infection. Two serologically distinct forms of type I IFN, designated ChIFN1 and ChIFN2, have recently been recognized in the chicken. ChIFN1 is encoded by a cluster of ten or more intronless genes, whereas ChIFN2, whose primary sequence is 57% identical, is encoded by a single intronless gene. By fluorescence in situ hybridization we now demonstrate that the genes for ChIFN1 and ChIFN2 are all located on the short arm of the chicken Z chromosome. This assignment was confirmed by results that showed that DNA from male (ZZ) chickens yielded approximately twofold stronger Southern blot signals with ChIFN1 and ChIFN2 hybridization probes than DNA from females (ZW). Attempts to determine differences in IFN production between male and female chickens failed owing to a high degree of variation in virus-induced IFN expression between individuals of both sexes. Sex linkage of IFN genes was also observed in domestic ducks: fluorescence in situ hybridization of duck metaphase chromosomes with a duck type I IFN probe was confined to the terminal region of the long arm of the Z chromosome. Thus, in contrast to mammals, which have their IFN genes on autosomes, birds have the type I IFN genes on the sex chromosome.
Descriptors: DNA hybridization, molecular mapping, Newcastle disease virus.

Oberdorder, A.; Werner, O. **Newcastle disease virus: detection and characterization by PCR of recent German isolates differing in pathogenicity.** *Avian Pathology*. June 1998. v. 27 (3) p. 237-243. ISSN: 0307-9457
NAL call no: SF995.A1A9
Abstract: The fusion (F) protein plays an important role in determining the virulence of Newcastle disease virus (NDV) strains. A reverse transcriptase-polymerase chain reaction (RT-PCR) is described which amplifies a 362 bp fragment encompassing the region of the F protein most important for pathogenicity. A specific PCR product was obtained independent of strain, pathogenicity and host of origin. Sequencing of the region specifying the F protein cleavage site confirmed the correlation between deduced amino acid sequence and pathogenicity. Oligonucleotides corresponding to the sequence of the pathospecific region were designed for recent German NDV isolates and labelled with digoxigenin. Hybridization of PCR fragments of different isolates with pathotype-specific oligonucleotides allowed an estimation of the pathogenicity of most isolates. Results were in good agreement with experimentally determined ICPI values.
Descriptors: Newcastle disease virus, polymerase chain reaction, detection, characterization, pathogenicity, viral proteins, pathotypes, nucleotide sequences, amino acid sequences, DNA, hybridization, fusion protein.

Phillips, R.J.; Samson, A.C.R.; Emmerson, P.T. **Nucleotide sequence of the 5'-terminus of Newcastle disease virus and assembly of the complete genomic sequence: agreement with the "rule of six".** *Archives of Virology.* 1998. v. 143 (10) p. 1993-2002.: ISSN: 0304-8608
NAL call no: 448.3 Ar23
Descriptors: nucleotide sequences, strain differences, regulatory sequences
Molecular sequence data: genbank/aj225127. genbank/aj225128. genbank/aj225129.

Raghavan, V.S.; Kumanan, K.; Thirumurugan, G.; Nachimuthu, K. **Comparison of various diagnostic methods in characterizing Newcastle disease virus isolates from Desi chickens.** *Tropical Animal Health and Production.* Oct 1998. v. 30 (5) p. 287-293. ISSN: 0049-4747
NAL call no: SF601.T7
Descriptors: Desi chickens, Newcastle disease virus, strain differences, virulence, cytopathogenicity, native livestock, DNA probes, hemagglutination, rapid methods, laboratory methods, Tamilnadu.

Ragland, W.L.; Mazija, H.; Cvelic-Cabrilo, V.; Savic, V.; Novak, R.; Pogacnik, M. **Immune suppression of commercial broilers in Croatia, Slovenia, and Bosnia and Herzegovina from 1981 to 1991.** *Avian Pathology*. Apr 1998. v. 27 (2) p. 200-204. ISSN: 0307-9457 Note: Summaries in French, German and Spanish.
NAL call no: SF995.A1A9
Abstract: A continuous decline in immune responses to Newcastle disease (ND) vaccine was observed in commercial broiler flocks in Croatia, Slovenia, and Bosnia and Herzegovina beginning in 1982. Floating mean haemagglutination inhibition (HI) titres declined from log2 4 in 1983 to a low of log2 2.4 in 1986, then were log2 2.9 in 1990. Several causes of the decline were discounted, leaving mycotoxins in feed and infection with chicken anaemia virus (CAV) as the two most likely causes. Mycotoxins in feed could not be evaluated retrospectively, but archival tissues were available from Croatia and Slovenia. Tissue sections were examined by in situ hybridization for CAV. Whereas only one chicken from early in the decade was infected, all but one of the chickens from late in the decade were. The increase in CAV detection correlated inversely with ND HI titres. Whereas this correlation does not establish cause and effect, CAV cannot be eliminated as a contributory cause of immune suppression.
Descriptors: broilers, viral immunosuppression, chicken anemia virus, avian infectious bursitis, mycotoxins, Croatia, Slovenia, Bosnia Hercegovina.

Ross, L.J.N. **Recombinant vaccines against Marek's disease.** *Avian Pathology*. Apr 1998. v. 27 (suppl.1) p. S65-S73. ISSN: 0307-9457 Note: In the supplement: *Trends in Avian Tumour Virology* / edited by B.M. Freeman. Proceedings of a symposium held Oct. 22-23, 1997.
NAL call no: SF995.A1A9
Abstract: Novel approaches to vaccination against very virulent (vv) strains of Marek's disease virus (MDV) are discussed. Fowlpox virus (FPV) and herpesvirus of turkeys (HVT) recombinants expressing MDV antigens have been constructed. It has been shown that glycoprotein B of MDV serotype 1 (gB1) is an effective

immunogen which is particularly important for conferring protective immunity in genetically susceptible chickens. However, maternal antibodies against MDV diminished the efficacy of vaccination with recombinant FPV-gB1. HVT recombinants expressing antigens of MDV and Newcastle disease virus have been constructed and have been shown to be effective in preventing Marek's disease as well as systemic Newcastle disease. Maternal antibodies against MDV and Newcastle disease virus did not affect significantly the efficacy of vaccination with cell-associated HVT recombinants. The potential of retroviral insertion mutagenesis and other means of delivering MDV antigens for immunization are discussed.
Descriptors: Marek's disease, Marek's disease virus, recombinant vaccines development, vaccination, efficacy of disease prevention, maternal antibodies, turkey herpesvirus, Newcastle disease virus, infectious bursal disease virus, literature reviews.

Roy, P.; Venugopalan, A.T.; Selvarangam, R.; Ramaswamy, V. **Velogenic Newcastle disease virus in captive wild birds.** *Tropical Animal Health and Production.* Oct 1998. v. 30 (5) p. 299-303. ISSN: 0049-4747
NAL call no: SF601.T7
Descriptors: captive wild birds, Newcastle disease virus, asymptomatic infections, chick embryos, mortality, virulence, strain differences, Columbiformes, Psittaciformes, monoclonal antibodies, Passeriformes, Phasianidae, India.

Roy, P.; Venugopalan, A.T.; Manvell, R. **Isolation of Newcastle disease virus from an Indian house crow.** *Tropical Animal Health and Production.* Edinburgh, Scotland: Edinburgh University Press. June 1998. v. 30 (3) p. 177-178. ISSN: 0049-4747
NAL call no: SF601.T7
Descriptors: Corvus splendens, Newcastle disease, serotypes, disease transmission, case reports, Tamilnadu.

Roy, P.; Venugopalan, A.T. **Virulence of Newcastle disease vaccine virus(es) in the field.** *Tropical Animal Health and Production.* Feb 1998. v. 30 (1) p. 41-44. ISSN: 0049-4747
NAL call no: SF601.T7
Descriptors: chickens, Newcastle disease, live vaccines, cross reaction, monoclonal antibodies, virulence, outbreaks, Tamil Nadu.

Roy, P.; Venugopalan, A.T**. Potentiation of immune response of live lentogenic Newcastle disease vaccine using adjuvant.** *Tropical Animal Health and Production.* Feb 1998. v. 30 (1) p. 37-39. ISSN: 0049-4747
NAL call no: SF601.T7
Descriptors: chicks vaccination, live vaccines, Newcastle disease virus, age differences, maternal antibodies, adjuvants, antibody formation.

Roy, P.; Koteeswaran, A.; Sridevi, P.; Venugopalan, A.T. **Comparison of Newcastle disease vaccines by serology using serum, tears and feather pulp samples.** *Tropical Animal Health and Production*. Feb 1998. v. 30 (1) p. 31-35. ISSN: 0049-4747
NAL call no: SF601.T7
Descriptors: chickens, Newcastle disease, live vaccines, blood serum, tears, feathers, hemagglutination inhibition test, strain differences, vaccination, application methods, blood sampling, virus neutralization, oculonasal administration.

Sagrera, A.; Cobaleda, C.; Berger, S.; Marcos, M.J.; Shnyrov, V.; Villar, E. **Study of the influence of salt concentration on Newcastle disease virus matrix protein aggregation.** *Biochemistry and Molecular Biology International.* Oct 1998. v. 46 (3) p. 429-435. ISSN: 1039-9712
NAL call no: QD415.A1B52
Descriptors: ion strength effects, Newcastle disease, protein aggregation, salt effects.

Sander, J.E.; Willinghan, E.M.; Wilson, J.L.; Thayer, S.G**. The effect of inoculating Enterococcus faecalis into the yolk sac on chick quality and maternal antibody absorption.** *Avian Diseases.* Apr/June 1998. v. 42 (2) p. 359-363. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Four hundred thirty-two 1-day-old specific-pathogen-free chicks were randomly divided into 36 groups of 12. All chicks were given 0.2 ml of Newcastle disease antiserum (hemagglutination-inhibition [HI] titer 1:5120) by injection into the yolk sac at hatch. Half of the groups received 0.2 ml of *Enterococcus faecalis* (4.0 x 10(8) colony-forming units/ml) by injection into the yolk sac at hatch (treatment). The remaining 18 groups received no bacteria (control). Two treatment groups and two control groups were weighed, bled, killed, and yolk sac weighed daily for the first 9 days of life. Feed was weighed at placement and at the end of the trial. Blood was tested for packed cell volume (PCV), total plasma protein, and Newcastle disease HI titer. No significant difference was observed between treatment and control groups for chick body weight, PCV, and feed consumption. Total plasma protein and retained yolk weight were significantly higher for treatment groups over control ($P < 0.01$ and $P < 0.0001$, respectively). Also, the geometric mean serum HI titer (log2) for Newcastle disease antibody was significantly higher in the control chicks vs. the treatment chicks ($P < 0.01$).
Descriptors: chickens, chicks, Streptococcus faecalis, yolk sac, experimental infections, quality, Newcastle disease virus, immune serum, serology, weight, blood chemistry, blood plasma, protein content, feed intake, liveweight, maternal immunity, maternal antibodies.

Seal, B.S.; King, D.J.; Locke, D.P.; Senne, D.A.; Jackwood, M.W. **Phylogenetic relationships among highly virulent Newcastle disease virus isolates obtained from exotic birds and poultry from 1989-1996**. *Journal of Clinical Microbiology.* Apr 1998. v. 36 (4) p. 1141-1145. ISSN: 0095-1137
NAL call no: QR46.J6
Descriptors: virulence, phylogenetics, amino acid sequences, nucleotide sequences.
Molecular sequence data: genbank/af015507. genbank/af015508. genbank/af015509. genbank/af015510. genbank/af015511. genbank/af015512. genbank/af015513. genbank/af015514. genbank/af015515. genbank/af015516. genbank/af015517. genbank/af015518. genbank/af015520. genbank/af015519.

Sick, C.; Schultz, U.; Munster, U.; Meier, J.; Kaspers, B.; Staeheli, P. **Promoter structures and differential responses to viral and nonviral inducers of chicken type I interferon genes.** *The Journal of Biological Chemistry.* Apr 17, 1998. v. 273 (16) p. 9749-9754. ISSN: 0021-9258
NAL call no: 381 J824
Descriptors: chickens, promoters, interferon, genes, nucleotide sequences, recombinant DNA, reporter genes, luciferase, messenger RNA, gene expression, genetic regulation, Newcastle disease virus, experimental infections, immunostimulants, chifn1 gene, chifn2-gene.
Molecular sequence data: genbank/y14968. genbank/y14969. imidazoquinoline-s-28463.

Stram, Y.; Shchori, D.; Chinitch, Y.; David, D.; Molad, T.; Samina, I. **Molecular characterization of an unassigned Israeli Newcastle disease virus isolate**. *Avian Diseases.* Oct/Dec 1998. v. 42 (4) p. 746-751. ISSN: 0005-2086 Note: Spanish summary.

NAL call no: 41.8 Av5
Abstract: Detection of Newcastle disease virus (NDV) and avian pathotyping of NDV isolates are extremely important because the appearance of virulent virus has significant economic consequences in terms of vaccination, eradication, and the ability to export poultry products. By using nucleotide and amino acid (aa) homology analysis, we could demonstrate that a NDV broiler isolate is a velogenic virus. This analysis was done after mean death time and intracerebral pathogenicity index tests gave inconsistent results. By establishing a nucleotide sequence dendrogram, we found that the disputed Ber-Tuvia was clearly in the same group as the known Herev-Laet, a velogenic isolate. The difference between Ber-Tuvia 92 arid the Herev-Laet velogenic isolate was 6% as opposed to >16% of the meso- arid lentogenic isolates. The Ber-Tuvia isolate contains the Arg/Arg arid Lys/Arg aa at positions 112, 113 arid 115, 116, respectively, in the fusion protein cleavage aa sequence, which is typical for virulent NDV isolates.
Descriptors: Newcastle disease virus, strain differences, pathotypes, detection, identification, diagnosis, virulence, vaccination, disease control, export controls, exports, nucleotide sequences, amino acid sequences, mortality, pathogenicity, phylogenetics, Israel, molecular sequence data.

Swain, P.; Verma, K.C.; Kataria, J.M.; Mohanty, S.K.; Dhama, K. **Antigenic characterization of Indian isolates and vaccine strains of Newcastle disease virus.** *Tropical Animal Health and Production.* Oct 1998. v. 30 (5) p. 295-298. ISSN: 0049-4747
NAL call no: SF601.T7
Descriptors: chickens, Newcastle disease virus, monoclonal antibodies, strain differences, ELISA, neutralization tests, epitopes, virulence, viral-antigens, viral proteins, immunoprecipitation tests.

Takakuwa, H.; Ito, T.; Takada, A.; Okazaki, K.; Kida, H. **An attenuation mechanism of Newcastle disease vaccine strain TCND.** *Archives of Virology*. 1998. v. 143 (6) p. 1129-1143. ISSN: 0304-8608
NAL call no: 448.3 Ar23
Descriptors: virulence, strain differences, virual strain TCND, attenuation.

Villegas, P. **Viral diseases of the respiratory system.** *Poultry Science*. Aug 1998. v. 77 (8) p. 1143-1145. ISSN: 0032-5791 Note: Paper presented at the symposium "Infectious Poultry Diseases" held August 2-3, 1997, in Athens, Georgia, sponsored by the Poultry Science Association and the American Association of Avian Pathologists.
NAL call no: 47.8 Am33P
Abstract: Infectious bronchitis, Newcastle disease, infectious laryngotracheitis, avian influenza, and pneumovirus are the viruses that more frequently affect the respiratory tract of chickens. Because of the tendency to change its antigenic properties, infectious bronchitis is currently the viral disease present in most poultry producing areas of the world. New serotypes and variant strains are reported in several countries. Current commercially available vaccines do not always provide protection against new field isolates. Vaccination programs are constantly adjusted in an attempt to improve protection against this disease. Infectious laryngotracheitis has appeared in the broiler industry as a serious disease. Improved vaccines are needed to control the disease in broilers. In the U.S., the control of the highly pathogenic forms of avian influenza and the velogenic forms of Newcastle disease have been achieved by eradication. In other countries, effective vaccines have been used to control Newcastle and avian influenza. Avian pneumovirus infection is also an emerging disease of chickens and turkeys.
Descriptors: chickens, respiratory diseases, infectious bronchitis virus, serotypes, Newcastle disease virus, viral diseases, pneumovirus, avian influenzavirus, infectious laryngotracheitis.

Watanabe, K.; Tsuge, Y.; Shimoyamada, M. **Binding activities of pronase-treated fragments from egg white ovomucin with anti-ovomucin antibodies and Newcastle disease virus.** *Journal of Agricultural and Food Chemistry.* Nov 1998. v. 46 (11) p. 4501-4506. ISSN: 0021-8561
NAL call no: 381 J8223
Abstract: The prepared gel-like ovomucin and its beta-subunit were treated with Pronase at various ratios (1/25600-1/6.25) to the sample weight at 37 degrees C for 24 h. The concentration, chemical composition, and SDS-polyacrylamide gel electrophoretic patterns of the obtained soluble fractions and their abilities to bind to anti-ovomucin antibodies and Newcastle disease virus (NDV) were measured. At a ratio of 1/6400 the highest soluble fraction (solubility: nearly 100%) was obtained. At a ratio of 1/800 the fragment with the highest binding activity to the antibodies was obtained, and at a ratio of 1/50 the fragments with the disulfide bonds intact (apparent molecular masses, AMMs: 55, 45, and 40 kDa) which showed binding to the antibodies were prepared and partially characterized. Fragments (AMMs: 220, 120, and 100 kDa) at ratios of 1/3200-1/800 and the final Pronase-resistant fragment (AMM: 120 kDa) at ratios of 1/12.5-1/6.25 with a binding activity to NDV could then be prepared. From the analysis of the fragments of Pronase-treated beta-subunit, the AMM 120-kDa fragment was demonstrated to be a part of the AMM 220-kDa fragment.
Descriptors: Newcastle disease virus, egg proteins, glycoproteins, egg albumen, antibodies, binding, amino-acids, chemical composition, structure activity relationships, enzyme treatment, protein subunits.

Zoeller, B.; Popp, M.; Walter, A.; Redmann-Muller, I.; Lodemann, E.; Jungwirth, C. **Overexpression of chicken interferon regulatory factor-1 (Ch-IRF-1) induces constitutive expression of MHC class I antigens but does not confer virus resistance to a permanent chicken fibroblast cell line.** *Gene*.Nov 19, 1998. v. 222 (2) p. 269-278. ISSN: 0378-1119
NAL call no: QH442.A1G4
Descriptors: chickens, transcription-factors, gene expression, messenger RNA, major histocompatibility complex, histocompatibility antigens, interferon, binding proteins, fibroblasts, disease resistance, Newcastle disease virus, vaccinia virus, Sindbis virus, vesicular stomatitis virus, transcriptional activators, gene overexpression, beta microglubulin, gyanylate binding protein, B F antigen.

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Alexander, D.J.; Manvell, R.J.; Lowings, J.P.; Frost, K.M.; Collins, M.S.; Russell, P.H.; Smith, J.E. **Antigenic diversity and similarities detected in avian paramyxovirus type 1 (Newcastle disease virus) isolates using monoclonal antibodies**. *Avian Pathology*. June 1997. v. 26 (2) p. 399-418. ISSN: 0307-9457 Note: Summaries in French, German and Spanish.
NAL call no: SF995.A1A9
Abstract: Newcastle disease (ND) virus (APMV-1) isolates submitted to the International Reference Laboratory for ND were characterised antigenically by their ability to cause binding of mouse monoclonal antibodies (mAbs) to cell cultures infected with the isolate. Since the availability of the mAbs 1526 viruses have

been examined using a panel of nine mAbs and 818 with an extended panel of 26 mAbs. Using the nine mAb panel a total of 14 different patterns was seen and viruses grouped by the same pattern showed relationships with each other which were either biological, temporal or geographical or more than one of these. There was a marked tendency of viruses placed in the same group to show similar virulence for chickens. Extension of the panel to 26 mAbs produced 39 distinct patterns, although some of these were seen with only a single virus. Again, viruses inducing similar binding patterns shared similar properties and some binding patterns were specific for viruses causing discrete epizootics. Cluster analysis of the mAb binding patterns did not produce concise, discrete groupings, but did emphasise some relationships between virus properties and antigenicity. Examples of the usefulness of this approach were the ability to link two important outbreaks to the contamination of stored food by infected feral pigeons, and the demonstration of two separate viruses responsible for outbreaks in countries of the European Union during 1991 to 1994 thus preventing erroneous epizootiological tracing.
Descriptors: Newcastle disease virus, antigenic variation, monoclonal antibodies, virulence, chickens, antigens, binding, cluster analysis.

Cadman, H.F.; Kelly, P.J.; De Angelis, N.D.; Rohde, C.; Collins, N.; Zulu, T. **Comparison of enzyme-linked immunosorbent assay and haemagglutination inhibition test for the detection of antibodies against Newcastle disease virus in ostriches (*Struthio camelus*).** *Avian Pathology.* June 1997. v. 26 (2) p. 357-363. ISSN: 0307-9457 Note: Summaries in French, German and Spanish.
NAL call no: SF995.A1A9
Abstract: Reactivity of ostrich sera to Newcastle disease virus (NDV) by enzyme-linked immunosorbent assay (ELISA) and haemagglutination inhibition (HI) test were compared. Ten-month old ostriches seronegative by both tests were vaccinated with an oil-based NDV vaccine on days 0 and 11. Significant levels of reactive antibodies were first detected on day 11 by ELISA (sample/positive ratio > 0.2 in 11/20 birds; 55%) and HI (titre > 1/8 in 10/20 birds; 50%). At the end of the experiment (day 37) all birds had significant antibody levels by ELISA, but only 16/20 (80%) by HI test. There was a sigmoidal relationship (r= 0.62, 3rd degree polynomial) between antibody levels detected by ELISA and by HI test. Antibodies reactive with NDV in naturally exposed ostriches from Zimbabwe and Botswana were also detected by ELISA (112/165; 68%) and HI (85/165; 52%).
Descriptors: ostriches, Newcastle disease virus, ELISA, hemagglutination inhibition test, antibodies, detection, vaccination, Newcastle disease, diagnostic value.

Deng, R.; Mirza, A.M.; Mahon, P.J.; Iorio, R.M. **Functional chimeric HN glycoproteins derived from Newcastle disease virus and human parainfluenza virus-3.** *Archives of Virology, Supplementum.* 1997. (suppl.13) p. 115-130. ISSN: 0939-1983. Note: Paper presented at the 9th Munich Symposium on Microbiology entitled "Viral Zoonoses and Food of Animal Origin: a Re-Evaluation of Possible Hazards for Human Health," Munich. Edited by O.R. Kaaden, C.P. Czerny, and W. Eichhorn.
NAL call no: QR355.A72
Descriptors: Newcastle disease virus, parainfluenza-3-virus, chimeras, envelope proteins, viral hemagglutinins, sialidase, enzyme activity, molecular conformation, amino acid sequences.

Errington, W.; Emmerson, P.T. **Assembly of recombinant Newcastle disease virus nucleocapsid protein into nucleocapsid-like structures is inhibited by the phosphoprotein.** *The Journal of General Virology.* Sept 1997. v. 78 (pt. 9) p. 2335-2339. ISSN: 0022-1317
NAL call no: QR360.A1J6
Abstract: A recombinant baculovirus expressing the nucleocapsid gene (NP) of Newcastle disease virus (NDV), a member of the genus Rubulavirus, has been generated and shown to express the native protein to high levels in insect cells. In contrast to the NP protein of the rubulavirus human parainfluenza virus 2, the NDV protein has been demonstrated by electron microscopy and caesium chloride gradient analysis to be capable of self-assembly in vivo to form nucleocapsid-like structures in the absence of other NDV proteins. These structures, which contained RNA that was resistant to micrococcal nuclease digestion, were also observed when the protein was expressed in *E. coli*, a phenomenon which was not inhibited by the presence of a 40 amino acid fusion region at the amino terminus of the protein. Further, the formation of these structures was inhibited by the co-expression of the phosphoprotein (P). Therefore, we conclude that the P protein acts as a chaperone, preventing uncontrolled encapsulation of non-viral RNA by NP protein.
Descriptors: nucleocapsid protein gene, phosphoprotein inhibition, recombinant baculovirus.

Folitse, Raphael Deladem**.** *Early Diagnosis and Control of Newcastle Disease in Chickens.* 1997. vii, 86 leaves: ill. Note: Thesis (M.S.)--University of Minnesota, 1997.
Descriptors: chickens, diagnosis, prevention and control.

Friedman, A.; Sklan, D. **Effect of dietary fatty acids on humoral immune response of turkeys.** *British Poultry Science.* Sept 1997. v. 38 (4) p. 342-348. ISSN: 0007-1668
NAL call no: 47.8 B77
Abstract: 1. This study examined the effect of increasing amounts of dietary polyunsaturated fatty acids on the fatty acid composition in serum and antibody production following a standard vaccination programme in growing turkeys. Turkey poults were fed on 5 diets containing 75g/kg added fat made up of different proportions of palm and soyabean oils, and were vaccinated against Newcastle disease, infectious bronchitis and necrotic enteritis according to a standard vaccination programme. Blood samples were taken before and one week after each vaccination. 2. Fatty acid composition in serum reflected the composition of the diets although arachidonic acid concentration was not changed by dietary fatty acid content. Growth, erythrocyte and leukocyte parameters were not affected by the respective diets. 3. Specific antibody production was related quadratically to serum linoleic and total n-6 polyunsaturated fatty acid concentrations. No correlation was found with linolenic or arachidonic acids. 4. It is concluded that dietary fatty acid composition can augment the specific anti-vaccine immune response in turkey poults.
Descriptors: turkeys, dietary fat, polyenoic fatty acids, vaccination, palm oils, soybean oil, antibody formation, blood serum, linoleic acid, linolenic acid, arachidonic acid.

Heckert, R.A.; Best, M.; Jordan, L.T.; Dulac, G.C.; Eddington, D.L.; Sterritt, W.G**. Efficacy of vaporized hydrogen peroxide against exotic animal viruses.** *Applied and Environmental Microbiology.* Oct 1997. v. 63 (10) p. 3916-3918. ISSN: 0099-2240
NAL call no: 448.3 Ap5
Abstract: The efficacy of vapor-phase hydrogen peroxide in a pass-through box for the decontamination of equipment and inanimate materials potentially contaminated with exotic animal viruses was evaluated. Tests were conducted with a variety of viral agents, which included representatives of several virus families (orthomyxoviridae, Reoviridae, Flaviviridae, Paramyxoviridae, Herpesviridae, Picornaviridae. Caliciviridae, and Rhabdoviridae) from both avian and mammalian species, with particular emphasis on animal viruses exotic to Canada. The effects of the gas on a variety of laboratory equipment were also studied. Virus suspensions in cell culture media, egg fluid, or blood were dried onto glass and stainless steel. Virus viability was assessed after exposure to vapor-phase hydrogen peroxide for 30 min. For all viruses tested and under all conditions (except one), the decontamination process reduced the virus titer to 0 embryo-lethal doses for the avian viruses (avian influenza and Newcastle disease viruses) or less than 10 tissue culture infective doses for the mammalian viruses (African

swine fever, bluetongue, hog cholera, pseudorabies, swine vesicular disease, vesicular exanthema, and vesicular stomatitis viruses. The laboratory equipment exposed to the gas appeared to suffer no adverse effects. Vapor-phase hydrogen peroxide decontamination can be recommended as a safe and efficacious way of removing potentially virus-contaminated objects from biocontainment level III laboratories in which exotic animal disease virus agents are handled.
Descriptors: decontamination, biocontainment, exotic animal viruses, virus contaminated objects, orthomyxoviridae, Reoviridae, Flaviviridae, Paramyxoviridae, Herpesviridae, Picornaviridae. Caliciviridae, Rhabdoviridae.

Heller, E.D.; Levy, A.M.; Vaiman, R.; Schwartsburd, B. **Chicken-embryo fibroblasts produce two types of interferon upon stimulation with Newcastle disease virus.** *Veterinary Immunology and Immunopathology*. July 1997. v. 57 (3/4) p. 289-303. ISSN: 0165-2427
NAL call no: SF757.2.V38
Abstract: Controversy has long surrounded the question of whether chickens, like mammals, can produce two types of interferon (IFN). Recently, type-I and type-II chicken IFNs have been cloned. Our study focuses on the further characterization of native fibroblast and spleen IFNs and shows that chicken embryo fibroblasts (CEFs) produce a mixture of type-I and type-II IFNs. IFN was purified by three different methods, controlled pore-glass chromatography, ion-exchange chromatography and preparative SDS-PAGE. Three protein bands showing IFN-like anti-viral activity, from CEFs which had been virus-stimulated for IFN production, were detected at 25, 27 and 29 kDa. Polyclonal antibodies produced against these bands showed partial cross-reaction with purified media from mitogen-stimulated spleen cells in ELISA, western blot analysis and anti-viral activity neutralization assay. Differences between purified conditioned media from CEF and spleen were found with respect to the stimulation of macrophages for nitric oxide production, pH stability and signal transduction pathways; only CEF IFN activated the IFN-stimulated gene factor-3 complex, whereas both CEF and spleen IFNs activated the IFN regulatory factor-1 gene. These findings concur with the differences that are known to exist between mammalian type-I and type-II IFNs. Attempts at sequencing the 25 and 27 kDa proteins by Edman degradation yielded evidence of N-terminal blockage.
Descriptors: interferon development, chicken fibroblasts.

Kant, A.; Koch, G.; van Roozelaar, D.J.; Balk, F.; Huurne, A. ter. **Differentiation of virulent and non-virulent strains of Newcastle disease virus within 24 hours by polymerase chain reaction.** *Avian Pathology*. Dec 1997. v. 26 (4) p. 837-849. ISSN: 0307-9457 Note: Summaries in French, German, and Spanish.
NAL call no: SF995.A1A9
Abstract: Fast diagnosis of Newcastle disease is a prerequisite for confining outbreaks. Diagnosis implies the differentiation of virulent and non-virulent Newcastle disease viruses (NDV). However, conventional methods, i.e. isolation of the virus and determination of the intracerebral pathogenicity index, take at least 5 days. Therefore, we investigated whether diagnosis can be performed by using the reverse transcriptase-polymerase chain reaction (RT-PCR) on RNA isolated directly from tissue homogenate. Two oligonucleotide primers, representing the sequence at the cleavage site of the F protein of either virulent or non-virulent NDV strains, respectively, were used to differentiate NDV. Using the RT-PCR we were able to differentiate 15 NDV reference strains, 11 of which were virulent and 14 non-virulent. The RT-PCR was further validated by using homogenate of brain, trachea, lung and spleen from 12 chicken flocks and one turkey flock suspected of Newcastle disease. The RT-PCR detected virulent NDV in samples of seven flocks and non-virulent NDV in two out of three flocks in agreement with conventional methods. However the RT-PCR failed to detect virus in 1/3 flocks from which non-virulent virus was isolated. The results are discussed. We conclude that the RT-PCR described can be used to confirm diagnosis of Newcastle disease within 24 h using RNA isolated directly from tissue homogenate.
Descriptors: Newcastle disease virus, virulence, strain differences, differential diagnosis, polymerase chain reaction, reverse transcriptase, RNA, rapid methods.

King, D.J.; Seal, B.S. **Biological and molecular characterization of Newcastle disease virus isolates from surveillance of live bird markets in the northeastern United States.** *Avian Diseases.* July/Sept 1997. v. 41 (3) p. 683-689. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Newcastle disease virus (NDV) is frequently recovered from surveillance samples collected by U.S. Department of Agriculture, Animal and Plant Health Inspection Service personnel in live bird markets. Six NDV isolates, five from chickens and one from a pheasant, were characterized for comparison with reference NDV isolates from poultry and other birds. All isolates tested were of low virulence for chickens. Four of the six isolates were similar to reference lentogens B1 and La Sota, but two isolates, one from a chicken and one from a pheasant, were different. The aberrant chicken isolate had a monoclonal antibody-binding profile like an unusual Canadian pigeon isolate. Sequence analysis of the matrix gene of this isolate demonstrated that it differed from all isolates included in the comparison and therefore may represent a third phylogenetic NDV group. The pheasant isolate had a monoclonal antibody-binding profile typical of other U.S. NDV lentogens but had a matrix gene sequence and hemagglutinin thermostability similar to strains Ulster and Queensland V4 (QV4), viruses originally isolated in Northern Ireland and Australia, respectively. The pheasant virus is the first lentogen isolated in the United States known to be closely related phylogenetically to Ulster and QV4. The unusual chicken and pheasant isolates were readily shed from the intestinal tract during chicken passage, whereas the other isolates were shed from the respiratory tract with little or no intestinal shedding. The frequency in live bird markets of viruses similar to those previously thought to be exotic to the United States is unknown.
Descriptors: chickens, pheasants, Newcastle disease virus, virulence, characterization, nucleotide sequences, genetic diversity, phylogenetics, infectivity, thermal properties, Northeastern States, USA.
Molecular sequence data: genbank/u79551. genbank/u79552. genbank/u79553.

Lessard, M.; Hutchings, D.; Cave, N.A. **Cell-mediated and humoral immune responses in broiler chickens maintained on diets containing different levels of vitamin A.** *Poultry Science.* Oct 1997. v. 76 (10) p. 1368-1378. ISSN: 0032-5791
NAL call no: 47.8 Am33P
Abstract: Broiler chickens were examined for the effects of low (400 IU/kg), standard (1,500 IU/kg), or high (15,000 IU/kg) dietary vitamin A (VitA) levels on immune responsiveness postimmunization to Newcastle disease virus (NDV). A control pair-fed group (1,500 IU/kg) was included to compensate for the reduced feed intake associated with diet containing the low level of VitA. Interdigital skin reactions to phytohemagglutinin (PHA) and CD4:CD8 T lymphocyte ratios were significantly reduced in chickens fed the low VitA diet, whereas their antibody responses to NDV were significantly increased as compared to birds that consumed the 1,500 to 15,000 VitA diet ad libitum. On the other hand, birds on the high VitA diet had reduced lymphocyte responses to concanavalin A and pokeweed, but not to PHA. No effect of dietary VitA was observed for natural killer activity, nor on levels of percentage of cells expressing Class II MHC antigens among groups that consumed feed ad libitum. The results indicated that both humoral and cellular immune responses were modulated by levels of VitA in the diet, and suggest that VitA-deficient chickens developed a T helper (Th)2 immune response, whereas the chickens fed highly enriched VitA diet showed a Th1 immune response.
Descriptors: broilers, retinol, dosage, humoral immunity, cell mediated immunity, lymphocyte transformation, natural killer cells, cytotoxic T lymphocytes, T4 lymphocytes, T8 lymphocytes, spleen, weight, liver, body weight, skin, allergic reactions, antibody formation.

Roy, P.; Anandan, S.; Ravikumar, G.; Koteeswaran, A.; Venugopalan, A.T. **Use of egg yolk in seromonitoring against Newcastle disease.** *Tropical Animal Health and Production.* Nov 1997. v. 29 (4) p. 245-246. ISSN: 0049-4747

NAL call no: SF601.T7
Descriptors: hens, serological surveys, Newcastle disease virus, egg yolk, seroconversion, hemagglutination tests, solvents, chloroform.

Roy, P.; Venugopalan, A.T. **Agar-gel-immunodiffusion and counterimmunoelectrophoresis for diagnosis of Newcastle disease.** *Tropical Animal Health and Production.* Nov 1997. v. 29 (4) p. 231-234. ISSN: 0049-4747 Note: Summaries in French and Spanish.
NAL call no: SF601.T7
Descriptors: chickens, experimental infections, Newcastle disease virus, immunodiffusion tests, tissues, hemagglutination tests, rapid methods, counterimmunoelectrophoresis, accuracy.

Russell, P.H.; Dwivedi, P.N.; Davison, T.F**. The effects of cyclosporin A and cyclophosphamide on the populations of B and T cells and virus in the Harderian gland of chickens vaccinated with the Hitchner B1 strain of Newcastle disease virus.** *Veterinary Immunology and Immunopathology.* Dec 12, 1997. v. 60 (1/2) p. 171-185. ISSN: 0165-2427
NAL call no: SF757.2.V38
Descriptors: chickens, Newcastle disease virus, vaccination, strains, ciclosporin, cyclophosphamide, B lymphocytes, T lymphocytes, glands animal, immune response, immunohistochemistry, antigens, cytoplasm IGM, viral replication, concanavalin A.

Stone, H.; Mitchell, B.; Brugh, M**. In ovo vaccination of chicken embryos with experimental Newcastle disease and avian influenze oil-emulsion vaccines.** *Avian Diseases.* Oct/Dec 1997. v. 41 (4) p. 856-863. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Inactivated oil-emulsion (OE) Newcastle disease (ND) and avian influenza (AI) vaccines were injected into 18-day-old white rock (WR) and white leghorn (WL) chicken embryos to evaluate their immunologic efficacy and their effects on hatchability. Embryonating eggs were inoculated at 1.5 inches depth with various vaccine volumes and antigen concentrations. Serum hemagglutination-inhibition (HI) titers were first detected in chickens at 2 wk posthatch. Protection against morbidity and mortality was demonstrated in all of 10 chickens vaccinated as embryos and challenged with viscerotropic velogenic ND virus at 53 days of age and also in all of eight in ovo- vaccinated chickens challenged with highly pathogenic AI virus at 34 days of age. All of five unvaccinated control chickens for each respective ND- and AI-vaccinated group died. In pooled groups from successive hatches, the hatchability of WR or WL embryos injected with 100 microliters of vaccine was not significantly different ($P > 0.05$) from unvaccinated hatchmate controls when needle gauges of 22, 20, and 18 were used. Seroconversion rates of chickens vaccinated as embryos ranged from 27% to 100% with ND vaccination and 85% to 100% for AI vaccination. For ND, geometric mean HI titers of chickens per vaccine group ranged from 11 to 733, and in pooled groups, the range was 49 to 531. Titers for AI vaccine groups ranged from 156 to 1178. This study demonstrated that acceptable hatchability, seroconversion rates, and protective immunity can be attained with in ovo inoculation of ND or AI OE vaccines if the vaccines are prepared with sufficient antigen and administered properly.
Descriptors: chick embryos, vaccination, Newcastle disease virus, avian influenzavirus, viral diseases, vaccines efficacy, evaluation, egg hatchability, dosage, antigens, morbidity, mortality, pathogenicity, application equipment, seroconversion, immunity, formulations, needle gauges.

Stone, H.D**. Newcastle disease oil emulsion vaccines prepared with animal, vegetable, and synthetic oils.** *Avian Diseases.* July/Sept 1997. v. 41 (3) p. 591-597. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: Animal, vegetable, and synthetic oils were tested as potential replacements for mineral oil in Newcastle disease oil emulsion vaccines. Emulsifying surfactants of seed oil origin comprised 10% of the oil phase that was used to prepare water-in-oil emulsion vaccines that contained a final concentration of 20% aqueous antigen. The hemagglutination inhibition responses of chickens inoculated with 46 of the newly formulated oil vaccines were, in most cases, not significantly different from chose of control chickens inoculated with mineral oil vaccine. Tissue reactions associated with animal, vegetable, and synthetic oil vaccines were less severe than chose associated with mineral oil vaccines. Viscosity of the mineral oil formulations ranged from 1/2 to 3 1/2 times that of the mineral oil control vaccines. These findings indicate that any of several oils may be more suitable than mineral oil for preparation of immune adjuvants for poultry vaccines.
Descriptors: Newcastle disease virus, vaccines, vaccine development, animal and plant oils, emulsions, surfactants, chickens, adverse effects, viscosity.

Stone-Hulslander, J.; Morrison, T.G. **Detection of an interaction between the HN and F proteins in Newcastle disease virus-infected cells.** *Journal of Virology.* Sept 1997. v. 71 (9) p. 6287-6295. ISSN: 0022-538X
NAL call no: QR360.J6
Abstract: For many paramyxoviruses, including Newcastle disease virus (NDV), syncytium formation requires the expression of both surface glycoproteins (HN and F) in the same cell, and evidence suggests that fusion involves a specific interaction between the HN and F proteins. Because a potential interaction in paramyxovirus-infected cells has never been demonstrated, such as interaction was explored by using coimmunoprecipitation and cross-linking. Both HN and F proteins could be precipitated with heterologous antisera after a 5-min radioactive pulse as well as after a 2-h chase in nonradioactive medium, but at low levels. Chemical cross-linking increased detection of complexes containing HN and F proteins at the cell surface. After cross-linking, intermediate- as well as high-molecular-weight species containing both proteins were precipitated with monospecific antisera. Precipitation of proteins with anti-HN after cross-linking resulted in the detection of complexes which electrophoresed in the stacker region of the gel, from 160 to 300 kDa, at 150 kDa, and at 74 kDa. Precipitates obtained with anti-F after cross-linking contained species which migrated in the stacker region of the gel, between 160 and 300 kDa, at 120 kDa, and at 66 kDa. The three to four discrete complexes ranging in size from 160 to 300 kDa contained both HN and F proteins when precipitated with either HN or F antisera. That cross-linking of complexes containing both HN and F proteins was not simply a function of overexpression of viral glycoproteins at the cell surface was addressed by demonstrating cross-linking at early time points postinfection, when levels of viral surface glycoproteins are low. Use of cells infected with an avirulent strain of NDV showed that chemically cross-linked HN and F proteins were precipitated independent of cleavage of F0. Furthermore, under conditions that maximized HN protein binding to its receptor, there was no change in the percentages of HN and F0 proteins precipitated with heterologous antisera, but a decrease in F1 protein precipitated was observed upon attachment. These data argue that the HN and F proteins interact in the rough endoplasmic reticulum. Upon attachment of the HN protein to its receptor, the HN protein undergoes a conformational change which causes a conformational change in the associated F protein, releasing the hydrophobic fusion peptide into the target membrane and initiating fusion.
Descriptors: viral hemagglutinins, sialidase, viral proteins, fusion protein.

Thirumurugan, G.; Jayakumar, R.; Kumanan, K.; Venugopalan, A.T.; Nachimuthu, K. **Latex immunoassay for rapid detection of Newcastle disease virus.** *Tropical Animal Health and Production*. Edinburgh, Scotland: Edinburgh University Press. Nov 1997. v. 29 (4) p. 227-230. ISSN: 0049-4747
NAL call no: SF601.T7
Descriptors: Newcastle disease virus, latex agglutination test, accuracy, rapid methods, tissues, hemagglutination inhibition test.

Tsuge, Y.; Shimoyamada, M.; Watanabe, K. **Bindings of ovomucin to Newcastle disease virus and anti-ovomucin antibodies and its heat stability based on binding abilities.** *Journal of Agricultural and Food Chemistry*. Dec 1997. v. 45 (12) p. 4629-4634. ISSN: 0021-8561
NAL call no: 381 J8223
Abstract: The bindings of ovomucin, its chemically modified compounds, including its disulfide-reduced and alkylated alpha- and beta-subunits, and desialylated ovomucin to NDV and anti-ovomucin antibodies were determined by ELISA. We found that the NeuAc residue in the beta-subunit greatly contributed to the binding of ovomucin to NDV, and disulfide bonds in ovomucin contributed to the binding of ovomucin to antibodies. The conformational, biological, and chemical alterations of ovomucin heated at 60-100 degrees C for 10 min under the various pH conditions (pH 6-12) were examined on the changes in the ability to NDV and anti-ovomucin antibodies which were also determined by ELISA, along with determinations of SDS-PAGE patterns and CD spectra. Ovomucin degraded together with the increases in temperature and pH, depending on destruction of NeuAc in beta-subunit, and cleavages of disulfide bonds in inter- and intrasubunits and peptide bonds in alpha- and beta-subunits.
Descriptors: ovomycin binding, Newcastle Disease virus, anti-ovomycin, ELISA, SDS-PAGE patterns, CD spectra, temperatue, pH.

Tsuge, Y.; Shimoyamada, M.; Watanabe, K. **Structural features of Newcastle Disease Virus-and anti-ovomucin antibody-binding glycopeptides from pronase-treated ovomucin.** *Journal of Agricultural and Food Chemistry*. July 1997. v. 45 (7) p. 2393-2398. ISSN: 0021-8561
NAL call no: 381 J8223
Abstract: Pronase-treated ovomucin was applied on a Sephacryl S-400 column chromatography and separated into five fractions. The SDS-polyacrylamide gel electrophoretic pattern, and amino acid and carbohydrate compositions, of each of the obtained fractions were compared to those of ovomucin and its alpha- and beta-subunits. Subsequently, bindings of each fraction to hen newcastle disease virus (NDV) and anti-ovomucin antibodies were estimated. It was found that the P1, P2, and P3 fractions from the beta-subunit which were composed of O-glycoproteins, containing more or less cluttered sialic acid moieties, had higher binding activity to NDV, while the peptide-rich P4 and P5 fractions mainly derived from the alpha-subunit had higher binding activity to the anti-ovomucin antibodies.
Descriptors: Newcastle disease virus, egg proteins, proteolysis, protein subunits.

Williams, R.; Boshoff, C.H.; Verwoerd, D.; Schoeman, M.; Van Wyk, A.; Gerdes, T.H.; Roos, K. **Detection of antibodies to Newcastle disease virus in ostriches (*Struthio camelus*) by an indirect ELISA.** *Avian Diseases*. Oct/Dec 1997. v. 41 (4) p. 864-869. ISSN: 0005-2086 Note: Spanish summary.
NAL call no: 41.8 Av5
Abstract: A two-graph receiver operating characteristic analysis, performed on the hemagglutination-inhibition (HI) and enzyme-linked immunosorbent assay (ELISA) test results of a Newcastle disease virus (NDV)-positive and NDV-negative control group of ostrich sera, proved that the ELISA was superior to the HI in both sensitivity and specificity. Comparison of results of the two assays performed on a panel of simulated positive sera ranging from very weak to very strong showed that the ELISA was at least 10 times more sensitive than the HI in detecting low levels of ostrich antibodies to NDV. The ELISA also has the advantage of using untreated serum in a single dilution as opposed to the HI test, which uses pretreated serum in titration.
Descriptors: ostriches, antibodies, Newcastle disease virus, antibody testing, ELISA, hemagglutination inhibition test, diagnosis, evaluation, comparisons, serology.

Return to: Main Contents | Bibliography Contents

USDA Funded Research Records from the Current Research Information System (CRIS)

(1)

ACCESSION NO: 0168532 SUBFILE: CRIS
PROJ NO: ARK01611 AGENCY: CSREES ARK
PROJ TYPE: HATCH PROJ STATUS: EXTENDED MULTISTATE PROJ NO: NE-60
START: 01 OCT 1998 TERM: 30 SEP 2003 FY: 2002

INVESTIGATOR: Erf, G. F.

PERFORMING INSTITUTION:
POULTRY SCIENCES
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FAYETTEVILLE, ARKANSAS 72703

GENETIC BASES FOR RESISTANCE AND IMMUNITY TO AVIAN DISEASES
OBJECTIVES

Identify and characterize environmental, dietary and physiologic factors that modulate immune system development, optimal immune function and disease resistance in poultry genetic stocks.

APPROACH: Contributing research will include the Smyth line chickens which develop spontaneous post-hatch, autoimmune vitiligo. Three MHC-matched lines of chickens, all homozygous for the MHC B101 haplotype will be used in this project. Included are the autoimmune vitiliginous Smyth line (SL), the parental Brown line (BL), and the normally pigmented Light Brown Leghorn. Special emphasis will be placed on identifying environmental factors required for the expression of vitiligo in genetically susceptible SL chickens and on the immune mechanisms involved in autoimmune destruction of pigment cells in SL vitiligo. Additionally, immunomodulatory effects of dietary supplements on the avian immune system will be examined in broilers and in turkeys. Scientific methods used will include in vitro culture systems and flow cytometry.

PROGRESS: 2002/01 TO 2002/12

Mutant Smyth line chickens spontaneously develop post-hatch loss of eye and feather pigment. This loss of pigment is due to the destruction of pigment cells by the immune system. The similarities between the autoimmune loss of pigment cells in Smyth line chickens and the pigment loss observed in human vitiligo have lead to the acceptance of the SL chicken as the best animal model to study autoimmune vitiligo. During the last calendar year, we completed a study (funded by the National Vitiligo Foundation), on the role of environmental factors such as turkey herpesvirus (HVT) vaccine and other live virus vaccines (Newcastle disease virus), in the development of Smyth line vitiligo. We have shown that only live HVT vaccine can be associated with a higher incidence of vitiligo compared to control treatments. The fact that gluteraldehyde-fixed (dead HVT) did not increase the incidence of vitiligo above controls, points towards the importance of the HVT infection in triggering vitiligo expression. As HVT translocates to the feather tissue, where melanocytes are located, we hypothesize that the local immune response to HVT infection may lead to the destruction of already inherently defective melanocytes and the development of autoimmune vitiligo. In another vitiligo incidence study (funded by the National Vitiligo Foundation), we examined the effect of recombinant chicken interferon gamma (IFN-g) administered to SL chicks during the first 6 weeks of life compared to vehicle-injected chicks. The incidence of vitiligo by 20 weeks of age in IFN-g-injected chicks was 0 % for males and 87.5 % for females, whereas in vehicle-injected chickens the incidence of vitiligo at 20 weeks of age was 0 % for males and 25 % for females (none of the chickens were vaccinated at hatch - hence the low spontaneous incidence of vitiligo). The ability of IFN-g to induce expression of vitiligo in vitiligo susceptible SL chickens together with the observed gender difference in the effects of IFN-g on the expression of SL vitiligo adds to the value of this animal model for human autoimmune vitiligo and autoimmune disease in general. Currently, graduate students Amber Austin, Becky Lockhart, and Dilshika Wijesekera are all working on the melanocyte defect in Smyth line chickens that may lead to the recognition of the melanocytes by the immune system. Aspects examined include antioxidant state, extent of lipid-peroxidation, and oxidation of proteins in the target tissue, as well as the response of melanocytes to inflammatory agents and oxidative intermediates. These studies are conducted using ex vivo feather tissue and melanocyte cultures and are funded by the NIH-AREA grant (R15). Research on Smyth line chickens was presented at the International Meeting of the Pigment Cell Research Society at Egmond an Zee, the Netherlands and the Workshop on Molecular Pathogenesis of Marek's Disease and Avian Immunology, Limassol, Cyprus.

IMPACT: 2002/01 TO 2002/12

The use of an animal model that is genetically susceptible to development of autoimmune vitiligo provides an excellent opportunity to study the cause and effect relationship between genetic susceptibility and the factors leading to the onset and expression of autoimmune disease. Knowledge gained from these studies will find direct application in the management and prevention of autoimmune disease. Additionally, these studies on immune system dysfunction and mechanisms of pathogenesis will yield important new knowledge regarding immune system development and function in avian species.

PUBLICATIONS: 2002/01 TO 2002/12

1. Erf, G. F. 2002. Smyth line autoimmune vitiligo - similar to human autoimmune vitiligo. Pages 316-332 in Modern Concepts of Immunology in Veterinary Medicine-Poultry Immunology. Mathew, T., editor. Advances in Medical and Veterinary Virology, Immunology and Epidemiology, Thajema Publishers, Vineland, NJ.
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(2)
ACCESSION NO: 0098242 SUBFILE: CRIS
PROJ NO: CA-V*-PHR-4652-AH96 AGENCY: CSREES CALB
PROJ TYPE: ANIMAL HEALTH PROJ STATUS: TERMINATED
START: 01 OCT 1996 TERM: 30 SEP 2001 FY: 2000

INVESTIGATOR: Lam, K. M.

PERFORMING INSTITUTION:
POPULATION HEALTH & REPRODUCTION
UNIV OF CALIFORNIA (VET-MED)
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NEWCASTLE DISEASE VIRUS STRAINS

OBJECTIVES: A. To determine that Newcastle disease virus (ND V) can cause apoptosls in heterophils and macrophage of chickens. B. To determine that chicken heterophils and macrophage are capable of inducing oxidative burst, and the suppression of oxidative burst by Newcastle disease virus.

APPROACH: A. Heterophils and macrophages will be infected with ND V in vitro. Gel electrophoresis, electron microscopy, flow cytometry, and in situ hybridization will be used to confirm the presence of apoptosis in the infected cells. B. The ability of heterophils and macrophages to produce hydrogen peroxide will be determined by the stimulation of cells with dichlorofluorescein (DCF) and phorbol myristate acetate (PMA), and followed by flow cytometric examination. The effect of ND V on hydrogen peroxide production will also be determined. C. Heterophils and macrophages will be pre-treated with various recombinant human cytokines and then determine for their oxidative burst by DCF and PMA.

PROGRESS: 1996/10 TO 2001/09
The efforts in this year have been concentrated on chicken heterophils and thrombocytes and the effect of Newcastle disease virus on their functions. 1. It is widely believed that chicken heterophils and adherent cells do not have myeloperoxidase activity. However, this laboratory provides ample evidence showing that these cells do have myeloperoxidase activity. 2. Chicken thrombocytes are capable of chemotaxis and phagocytosis. These functions, however, are greatly reduced after a short-term incubation in vitro with Newcastle disease virus.

IMPACT: 1996/10 TO 2001/09
The goal of this project was to A. determine that Newcastle disease virus (ND V) can cause apoptosls in heterophils and macrophage of chickens. B. To determine that chicken heterophils and macrophage are capable of inducing oxidative burst, and the suppression of oxidative burst by Newcastle disease virus.

PUBLICATIONS: 1996/10 TO 2001/09
1. Lam KM. 1997. Myeloperoxidase activity in chicken heterophils and adherent cells. Vet. Immunol. Immunopathol. 57:327-335.
2. Lam KM. 1997. Activation, adhesion, migration and death of chicken thrombocytes. Comp. Haematol. Intl. 1:81-87.

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(3)
ACCESSION NO: 0182013 SUBFILE: CRIS
PROJ NO: CALV-AH-176 AGENCY: CSREES CALV
PROJ TYPE: ANIMAL HEALTH PROJ STATUS: NEW
START: 01 OCT 1998 TERM: 30 SEP 2003 FY: 2001

INVESTIGATOR: Gardner, I. A.

PERFORMING INSTITUTION:
MEDICINE & EPIDEMOLOGY
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QUANTITATIVE METHODS TO CERTIFY FREEDOM OF ANIMALS FROM PATHOGENS

OBJECTIVES: 1. Develop a Bayesian approach to certify disease freedom of a country/region that incorporates uncertainty in probability estimates. 2. Compare frequentist and Bayesian approaches to certify disease freedom using common data sets and to compare sample size requirements for surveys with both approaches.

APPROACH: 1. The Bayesian approach will be implemented with the Gibbs sampler, an interactive Markov-chain Monte Carlo method. The mathematical calculations will incorporate the prior probability that a country is free of disease, the uncertainty in sensitivity and specificity estimates and the possible clustering of positive test results at a herd level. The output will be a probabilistic estimate of disease freedom. 2. Frequentist and Bayesian estimates will be compared with common published data sets on porcine reproductive and respiratory syndrome and Newcastle Disease. The effect of selected prior distributions for the Bayesian approach will be evaluated. Sample sites used in frequentist calculations for surveys will be compared with estimates that we will derive using Bayesian approaches.

NON-TECHNICAL SUMMARY: If countries and regions are able to "certify" freedom from important animal pathogens, trade opportunities may increase and product export costs may decrease. To develop a Bayesian statistical approach (using Gibbs sampling) to quantification of disease freedom. The output from the model will be probability distributions that can be used to make inferences about the proportion of diseased herds, within-herd prevalence, and the probability that a country is free of disease. The research will be involve collaboration with others in the US, Australia and Switzerland.

PROGRESS: 2002/01 TO 2002/12
Quantitative approaches are needed to allow scientifically-valid inferences about freedom of animals from important pathogens that affect animal trade. Freedom in the context of these inferences includes a pathogen prevalence less than a threshold (e.g. <0.2% of infected herds). We developed a hierarchical Bayesian statistical model that uses herd-level test results from multiple herds in a region or country or zone, and adjusts for uncertainty in the sensitivity and specificity of tests and the prior probability of infectious agent. The model allows inferences about the post-test probability of freedom from infection, the proportion of infected herds, and the within-herd prevalence. Using published survey data for porcine reproductive and respiratory syndrome and Newcastle Disease in poultry, we have shown that inferences from our Bayesian approach are similar to those from an alternate simulation modeling approach. The Bayesian model is superior to previous methods because it allows inferences about the proportion of infected herds and within-herd prevalence which are important inputs into risk assessment models. The model has been modified to include the possibility of different sample sizes in each of the herds, and the use of additional tests in animals that are positive on the first screening test.

IMPACT: 2002/01 TO 2002/12
The new method has potential to be used internationally as a tool in substantiating a country's claim of freedom from animal pathogens.

PUBLICATIONS: 2002/01 TO 2002/12
No publications reported this period

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(4)
ACCESSION NO: 0177509 SUBFILE: CRIS
PROJ NO: CALV-CAHFS95CDFA6601 AGENCY: CSVM CALV
PROJ TYPE: STATE PROJ STATUS: EXTENDED
START: 01 JUL 1994 TERM: 30 JUN 2004 FY: 2001

INVESTIGATOR: Ardans, A. A.

PERFORMING INSTITUTION:
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CALIFORNIA ANIMAL HEALTH AND FOOD SAFETY SYSTEM

OBJECTIVES: To provide laboratory diagnostic support of the highest quality for the surveillance and control of diseases and the enhancement of health of livestock and poultry in California, including programs designed to protect people from animal diseases transmissible to humans.

APPROACH: The CVDLS is composed of a full service, central reference laboratory at UC Davis and four laboratories located at Turlock (poultry), Fresno (poultry and regulatory services), Tulare (mammalian services) and San Bernardino (general services for poultry, mammalian and regulatory). These laboratories are linked by a computer based Management Information and Surveillance System to function as a single entity.

PROGRESS: 2002/01 TO 2002/12
Avian influenza, H6N2, reoccurred in Southern California with many flocks experiencing significant mortality and egg production drops of considerable duration. In contrast to previous years, numerous flocks in central California also became infected. Chickens in active egg production were most severely affected with little disease in younger pullets. Severe reproductive tract disease presenting with necrotic salpingitis and yolk peritonitis were consistent observations. Laboratory support included postmortem examination, virus isolation, and serology for commercial flocks. USDA and CDFA approved the use of vaccine in commercial flocks for which laboratory monitoring was provided. A trial is underway to compare commercially available influenza antigen rapid detection kits with virus isolation. The CAHFS was federally approved to participate in bovine tuberculosis slaughter plant surveillance, which has resulted in an increased sample submission and improved surveillance. Through this program three bovine tuberculosis infected dairy herds were discovered resulting in extensive testing and postmortem examination of over 200 cattle. One dairy, 6,400 cows, has been depopulated and another two herds are being scheduled. An entire herd test (2,496 cows) using the gamma interferon test, was conducted and results are being compared with caudal fold and comparative cervical testing along with postmortem findings. In late September exotic Newcastle disease was diagnosed in Southern California game birds by the San Bernardino branch, CAHFS. The disease was found to be rapidly spreading. Widespread infection was found among game birds, which unfortunately spread to commercial egg producing facilities. Late on December 24 the disease was diagnosed on a commercial premise with over one million birds and to date over three million birds have been euthanized along with over 110,000 game birds. The massive laboratory support required in support of the eradication has suspended many of the ongoing creative investigative efforts. Significant effort has been dedicated to the development and validation of rapid molecular based assays and is being coordinated with efforts at Southeastern Poultry Research Laboratory and the National Veterinary Services Laboratory (NVSL). Considerable personnel support has been provided by laboratories throughout the country, including NVSL who have provided pathologists, virology technicians, and clerical assistance. Milk is routinely screened for beta-lactam antibiotics using highly sensitive, rapid screening tests, which are known to have considerable false positive results, which result in the dumping of an entire tank truckload of milk. CAHFS developed a quantitative method using liquid chromatography with tandem mass spectrometry for beta-lactam antibiotics, which has been used to screen potentially contaminated large amounts of cheese. The assay was also used in a highly visible antibiotic contamination that occurred in a large bay area milk processing plant, which resulted in the recall of over 800,000 gallons of milk and milk products.

IMPACT: 2002/01 TO 2002/12
The resources of the California Animal Health and Food Safety Laboratory System (CAHFS) in concert with School of Veterinary Medicine researchers continue to demonstrate and investigate naturally occurring conditions of economic significance to California's production animal agriculture. During 2002 much of the system's resources has been dedicated to major animal health issues affecting California livestock and poultry.

PUBLICATIONS: 2002/01 TO 2002/12
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4. Cramer G, Kelton D, Duffield TF, Hobson JC, Lissemore K, Hietala SK, Peregrine AS. 2002. Neospora caninum serostatus and culling of Holstein cattle. Journal of the American Veterinary Medical Association, 221:1165-1168.
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37. Walker RL, Read DH, Hayes DC, Nordhausen RW. 2002. Equine abortion associated with the Borrelia parkeri-B. turicatae tick-borne relapsing fever spirochete group. Journal of Clinical Microbiology, 40:1558-1562.
38. Webby RJ, Woolcock PR, Krauss SL, Webster RG. 2002. Reassortment and influenza transmission of North American H6N2 influenza viruses. Virology, 295:44-53.
39. Woolcock PR, McFarland MD, Lai S and Chin RP. 2002. Enhanced Recovery of Avian Influenza Virus Isolates using a Combination of Chicken Embryo Inoculation Methods. Avian Diseases, 45:1030-1035.
40. Zakhartchouk A, Bout A, Woods LW, Lehmkuhl HD, Havenga MJE. 2002. Odocoileus hemionus deer adenovirus is related to the members of Atadenovirus genus. Archives of Virology, 147:841-847.

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(5)
ACCESSION NO: 0181168 SUBFILE: CRIS
PROJ NO: CONS-9802281 AGENCY: CSREES CONS
PROJ TYPE: NRI COMPETITIVE GRANT PROJ STATUS: EXTENDED
CONTRACT/GRANT/AGREEMENT NO: 98-35204-6954
START: 01 DEC 1998 TERM: 31 OCT 2001 GRANT YR: 1998

GRANT AMT: $180,000

INVESTIGATOR: Sekellick, M. J.; Marcus, P. I.

PERFORMING INSTITUTION:
MOLECULAR AND CELL BIOLOGY
UNIV OF CONNECTICUT
STORRS, CONNECTICUT 06268

RECOMBINANT CHICKEN INTERFERONS AS ANTIVIRAL AGENTS

OBJECTIVES: 9802281. Our goal is to develop chicken interferons singly, or in synergistic mixtures, as novel biological response modifiers for the prevention or cure of viral diseases. Specific objectives include: (1) Determine the spectrum and degree of sensitivity of avian viruses of economic and public health importance to the action of Types I and II recombinant chicken interferons in vitro, in ovo, and in the chicken, acting singly, and in mixtures that display synergy; (2) Determine the nature of the heterogeneity in avian influenza virus sensitivity to recombinant chicken interferon; (3) Determine the antiviral effects of recombinant chicken interferon administered orally thorugh novel means and/or intranasally, as an effector of the humoral and mucosal system; and (4) develop a line of chickens with genetically enhanced sensitivity to the action of interferon.

APPROACH: The recently cloned and expressed genes of Types I and II chicken interferons will be produced as glycosylated recombinant molecules in stably transfected COS cells or in *E. coli*., purified, and tested for their in vitro, in ovo and in vivo activity against avian viruses of economic importance.

PROGRESS: 2000/01 TO 2000/12
Interferons (IFN) are components of the innate immune system and constitute the first and immediate line of defense against virus infection. They are produced rapidly by virus-infected cells, are released into the surrounding milieu within hours, and act within minutes following binding to specific cellular receptors on uninfected cells. Subsequent signal transduction and activation of transcription factors result in the activation of over 100 IFN-stimulated genes. The multiple intracellular modes of action that result from expression of these IFN-stimulated genes, and their efficacy against a broad spectrum of virus families, including those subject to antigenic changes that mute the effectiveness of vaccines, make IFNs novel biological modifiers worthy of tests to determine the range of their protective and curative properties. Double-stranded RNA (dsRNA) is a second biological response modifier of equally formidable activity. This class of molecules has emerged as singularly important in both the induction and action phases of the IFN system, and as an activator of many genes capable of producing multiple effects on cells and the immune system. Interestingly, many viruses have evolved mechanisms to prevent activation of cellular proteins designed to sense, and counteract, the presence of dsRNA. These include production of viral gene products which sequester dsRNA, and small helical RNAs. These molecules potentially prevent activation of dsRNA-dependent pathways of interferon action, or block expression of cellular genes activated exclusively by dsRNA that may contribute to the antiviral state. Not surprisingly, these means have provided viruses with highly effective mechanisms against IFN action. One of the most successful of the anti-IFN mechanisms is exemplified by the almost absolute resistance to the action of IFN displayed by avian reovirus (ARV). This resistance is attributed to the dsRNA-binding capacity of the sigma alpha core protein. Thus, dsRNA could be rate limiting in an ARV infected cell providing a means of preventing the development of an IFN- or dsRNA-mediated antiviral state. In support of this hypothesis, we have shown that dsRNA added exogenously to IFN-treated cells in the form of poly(rI):poly(rC) is effective in establishing in a dose-dependent manner an antiviral state against ARV as well as Newcastle disease virus, another virus that is otherwise highly resistant to interferon action. In order to abrogate IFN resistance, dsRNA must be added after, but not before, an IFN-mediated latent antiviral state is established. The combined sequential treatment with IFN and dsRNA may be useful in overcoming the anti-IFN activity of viruses of clinical interest, or in other clinical conditions.

IMPACT: 2000/01 TO 2000/12
The combined sequential application of interferon and double-stranded RNA may be useful in overcoming the anti-interferon activity of viruses of clinical interest, and even find relevance in other clinical conditions where interferon by itself is marginally, if at all, effective.

PUBLICATIONS: 2000/01 TO 2000/12
1. Sekellick, M.J., Carra, S.A., Bowman, A., Hopkins, D.A. and Marcus, P.I. 2000. Transient resistance of influenza virus to interferon action attributed to random multiple packaging and activity of NS genes. Journal of Interferon and Cytokine Research 20:963-970.
2. Marcus, P.I. and Sekellick, M.J. 2000. Combined action of interferon and dsRNA enhances antiviral effects. European Cytokine Network 11:186.

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(6)
ACCESSION NO: 0007173 SUBFILE: CRIS
PROJ NO: CONS00122 AGENCY: SAES CONS
PROJ TYPE: STATE PROJ STATUS: EXTENDED
START: 01 AUG 1964 TERM: 30 JUN 2004 FY: 2001

INVESTIGATOR: Van Kruiningen, H.

PERFORMING INSTITUTION:
PATHOBIOLOGY
UNIV OF CONNECTICUT
STORRS, CONNECTICUT 06268

PULLORUM DISEASE CONTROL

OBJECTIVES: Pullorum-Typhoid Eradication.

APPROACH: This program involves the serologic testing of 500,000 to 700,000 avian blood samples per year for the presence of Salmonella pullorum and S. gallinarum. Reacting birds are called to the laboratory for bacteriological examination. IfS. pullorum or S. gallinarum is isolated, the reacting flock is retested at 21 day intervals until two successive negative flock tests are obtained. Control and regulatory action are administered by the Commissioner of Agriculture through the State Veterinarian.

PROGRESS: 2002/01 TO 2002/12
This is a collaborative project with the Connecticut Department of Agriculture. The purpose is to monitor and diagnose infectious diseases of poultry including Salmonella pullorum, Salmonella enteritidis, Mycoplasma gallisepticum and synoviae, Newcastle disease and Avian Influenza. A total of 35,340 agglutination, plate agglutination and hemagglutination tests were done. These included: 15,174 microtiter tests for S. pullorum (1 positive), 8,177 agglutination tests for M. gallisepticum (71 positive), 8,366 plate agglutination tests for M. synoviae (112 positive), 3 for Newcastle disease (O positive) and 3,620 for Avian Influenza (0 positive).

IMPACT: 2002/01 TO 2002/12
This monitoring program for infectious disease of Connecticut poultry identified several important disease agents, including Mycoplasma gallisepticum and synoviae.

PUBLICATIONS: 2002/01 TO 2002/12
No publications reported this period

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(7)
ACCESSION NO: 0086778 SUBFILE: CRIS
PROJ NO: CONS00541 AGENCY: CSREES CONS
PROJ TYPE: HATCH **PROJ STATUS: TERMINATED MULTISTATE PROJ NO: NE-138**
START: 01 OCT 1996 TERM: 30 SEP 2002 FY: 2001

INVESTIGATOR: Khan, M. I.

PERFORMING INSTITUTION:
PATHOBIOLOGY
UNIV OF CONNECTICUT
STORRS, CONNECTICUT 06268

EPIDEMIOLOGY AND CONTROL OF EMERGING STRAINS OF POULTRY DISEASE RESPIRATORY AGENTS

OBJECTIVES: Develop and evaluate rapid diagnostic capabilities for the identification of emerging IBV, ILTV, mycoplasmas, and IBDV.

APPROACH: Infectious bronchitis virus (IBV) specific RT-PCR. IBV strains Massachusetts (Mass 41), Connecticut (Conn 46), Arkansas (Ark 99), and Delaware variant (072) will be initially grown in chicken embryo kidney cells (CEK), plaque-purified and characterized by oligonucleotide fingerprinting. The viruses will then be grown in 10-to-11-day-old chicken embryos, genomic viral RNA isolated by standard procedures, copied into cDNA by reverse transcription and cloned into the plasmid pUC18. The screening and identification of IBV specific segments of the cDNA will be done by cross-hybridization (DNA:RNA) against a panel of IBV field, and variant strains, and other avian pathogenic viruses of Newcastle disease, avian influenza, infectious laryngotracheitis, reovirus, fowlpox and infectious bursal disease. Clones containing unique sequences will be selected as strain-specific probes. Sequence analysis of the cDNA fragments will be performed in order to identify DNA primers specific for strains of IBV. Efficacy of the cDNA probes as well as RT-PCR's will be tested for their sensitivities and specificities in experimental infections. Eight-week-old SPF chickens will be inoculated intratracheally in IBV strains, Mass, Conn, Ark, and Delaware variant.

PROGRESS: 1996/10 TO 2002/09
Development of recombinant DNA vaccine that expresses S1 of IBV and Immunogenicity studies A recombinant fowlpox virus (rFPV) containing a cDNA copy of S1 gene of IBV (rFPV-S1) was constructed and its immunogenicity and vaccine potential were evaluated. Initially, rFPV-S1 was shown to express the S1 protein in vitro by using indirect immunofluorescence staining and Western blot analysis. Later, in vivo expression was demonstrated by the detection of IBV-specific serum IgG and neutralization antibodies in the sera of chickens immunized with rFPV-S1. That the recombinant virus elicited anti-IBV protective immunity was indicated by the manifested, relatively mild clinical signs of disease, decreased titers of recovered challenge virus, and less severe histological changes of the tracheas in virulent IBV-challenged chickens previously receiving rFPV-S1 as compared to parental FPV vaccinated control birds. In contrast, chickens immunized with either recombinant or parental FPV were resistant to a subsequent, virulent FPV challenge. As to a preferred method of immunization, wing web inoculation appeared to be superior to the subcutaneous route since a greater percentage of birds vaccinated by the former protocol exhibited an anti-IBV humoral immune response. Thus, rFPV-S1 has potential as a poultry vaccine against both fowlpox and infectious bronchitis.

IMPACT: 1996/10 TO 2002/09
Impact: 1. Recombinant Fowlpox virus containing S1 gene has potential for a poultry vaccine against both fowlpox and infectious bronchitis. 2. DNA vaccine containing whole S gene instead of S1 of IBV in pCMV plasmid vector could provide better protection against IBV infection.

PUBLICATIONS: 1996/10 TO 2002/09
1. Wang, X., W. M. Schnitzlein, D. N. Tripathy and M. I. Khan. 2002. Construction and immunogenicity studies of recombinant fowlpox containing the S1 gene of Infectious bronchitis virus. Avian Dis.46: 831-834.
2. Khan, M. I. 2002. Avian Pathogenic Mycoplasmas. PCR detection of Microbial Pathogens. Methods in Molecular Biology. eds. J. Frey and K. Sachse. Humana Press Inc. Totowa, NJ. November, 2002.

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(8)
ACCESSION NO: 0406071 SUBFILE: CRIS
PROJ NO: AP-511 AGENCY: ERS MTED
PROJ TYPE: USDA COOPERATIVE AGREEMENT PROJ STATUS: NEW
START: 15 OCT 2001 TERM: 31 DEC 2003

INVESTIGATOR: Hahn, W.; Salin, D.; Harvey, D.

PERFORMING INSTITUTION:
Economic Research Service
USDA/ERS
1800 M STREET NW
WASHINGTON, DISTRICT OF COLUMBIA 20036

AP SPECIAL TOPICS: THE ECONOMIC EFFECT OF CHANGES IN SANITARY REGULATIONS ON BROILER TRADE IN THE AMERICAS

OBJECTIVES: Sanitary and phytosanitary (SPS) measures are impediments to trade and affect both the flow and the magnitude of trade. Newcastle Disease (ND) and highly pathogenic avian influenza (HPAI), included in List A of the International Organization for Epizootics (OIE) classification of transmissible animal diseases, are two highly infections diseases that restrict poultry trade. The END-free status gives the United States an advantage in poultry trade. However, changes in END status of potential large poultry suppliers could have a major impact in U.S poultry exports, especially in the high-value white meat. For Instance, since 1999 Mexico (the sixth world largest broiler importer) has intensify efforts to gain more END free states and eligibility to export fresh, chilled, and frozen poultry to the United States. Effective August 1, 2002 Canada recognized Brazils poultry inspection system. Eight Brazilian states were recognized free of END by the Canadian Food Inspection Agency (CFIA). Brazil is the second largest world exporter. The three objectives are (1) Analyze the impact on broiler markets and trade due to changes in sanitary regulations affecting trade in the Americas; (2) Measure how broiler prices, production, and trade will change (over the intermediate/long run) as a result of allowing Mexicos and Brazils END-free regions to ship poultry to the United States and Canada; and (3) Measure the sensitivity of these results to alternative estimates of supply and demand elasticities.

APPROACH: Objective 1: Analyze price differentials of poultry products between the countries in the Americas to determine the potential trade flows between countries. We will be collecting primary data on the structure of the Mexican broiler marketing system. Secondary price and quantity data will be collected for all four countries. Objectives 2 and 3: Production, export, price, and population estimates will be obtained from the other three countries and added to import data from the ERS. These will be combined to describe the broiler supply and demand conditions in the Americas. The U.S.-Mexico broiler trade model will be expanded to include Canada and Brazil. This model takes a static baseline and replicates it if there are no policy changes. The policy changes evaluated are changes in END-free-status for regions in Mexico and Brazil, and the subsequent allowance by APHIS/FSIS for these END-free regions to ship product to the United States.

NON-TECHNICAL SUMMARY: This project evaluates the potential economic impact of changes in sanitary restrictions on broiler trade in the Americas.

PROJECT CONTACT:
Name: Hahn, W.
Phone: 202-694-5175
Email: WHAHN@ers.usda.gov

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(9)
ACCESSION NO: 0181427 SUBFILE: CRIS
PROJ NO: FLA-VME-03777 **AGENCY: CSREES FLA**
PROJ TYPE: ANIMAL HEALTH PROJ STATUS: NEW
START: 04 MAR 1999 TERM: 30 SEP 2003 FY: 2001

INVESTIGATOR: Spalding, M. G.; Forester, D. J.

PERFORMING INSTITUTION:
COLLEGE OF VETERINARY MEDICINE
UNIVERSITY OF FLORIDA
GAINESVILLE, FLORIDA 32610

SURVEILLANCE FOR DISEASES OF WILDLIFE WHICH ARE TRANSMISSIBLE TO LIVESTOCK AND POULTRY IN FLORIDA

OBJECTIVES: The objectives are to determine the distribution and prevalance of wildlife diseses that are transmissible to livestock and pountry in Florida. These diseases include parasitic and infectious diseases such as Newcastle Disease in double-crested cormrants, eastern equine encephalitis in sandhill cranes and whooping cranees, mycoplasmal conjunctivitis in songbirds, and fascioloidosis, haemonchosis, dictyocaulosis, tuberculosis, and chronic wasting disease in white-tailed deer, and others.

APPROACH: Serologic studies and virus isolations will be conducted on eggs, nestlings, and adult double-crested cormorants from several colonies in Florida to identify Newcastle disease virus. Sandhill crane adults and chicks of various ages will be captured and tested serologially for antibodies to eastern equine

encephalitis (EEE) virus. Sentinel studies will be conducted using pen-reared bobwhites to determine seasonal transmission of EEE virus. Mosquitoes will be collected, identified, pooled, and tested for EEE virus. Other species of wildlife including songbirds and white-tailed deer will be examined to detect mycoplasmal conjunctivitis, chronic wasting disease and other diseases.

PROGRESS: 2001/10 TO 2002/10
We continue to receive specimens, especially from the Florida Fish and Wildlife Conservation Commission and monitor them for exposure to eastern equine encephalitis and West Nile virus. Additional specimens, especially of native doves had been tested for exposure to pigeon paramyxovirus 1, and virus that is very similar to Newcastle Disease virus and of concern to the poultry farmers in Florida.

IMPACT: 2001/10 TO 2002/10
Pigeon paramyxovirus 1, though very similar to Newcastle Disease virus, does not appear to be virulent in domestic poultry.

PUBLICATIONS: 2001/10 TO 2002/10
1. Forrester, D. J. and M. G. Spalding. 2001. Salmonellosis in a wild turkey from Florida. Florida Field Naturalist 29(2): 51-53.
2. Spalding, M.G., S.A. Nesbitt, S.T. Schwidert, and R.J. Dusek. 2001. The use of radio transmitters to monitor survival of sandhill crane chicks. Proc. North Ammerican Crane Workshop 8: 213-215.
3. Nesbitt, S.A., M.J. Folk, K.A. Sullivan, S.T. Schwikert, and M.G. Spalding. 2001. An update of the whooping crane release project through June 2001. Proc. N. Am. Crane Worksh. 8: 62-73.
4. Frederick, P. C., M. G. Spalding, and R. Dusek. 2002. Wading birds as bioindicators of mercury contamination in Florida, USA: Annual and geographic variation. Environmental Toxicology and Chemistry 21(1): 163-167.
5. Spalding, M. G., C. A. Yowell, D. S. Lindsay, E. C. Greiner, and J. B. Dame. 2002. Sarcocystis meningoencephalitis in a northern gannet (Morus bassanus). Journal of Wildlife Diseases 38(2): 432-437.
6. Varela, A., J.M. Kinsella, and M.G. Spalding. 2002. Presence of encysted immature nematodes in a released whooping crane (Grus americana). Journal of Zoo and Wildlife Medicine 32: 523-525.
7. Buergelt, C.D., B.L. Homer, and M.G. Spalding. 2002. Causes of mortality in the Florida panther (Felis concolor coryi). Annals of the New Your Academy of Sciences 969: 350-353.

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(10)
ACCESSION NO: 0178041 SUBFILE: CRIS
PROJ NO: **FLAV-CO-00204 AGENCY: CSREES FLAV**
PROJ TYPE: ANIMAL HEALTH PROJ STATUS: TERMINATED
START: 16 APR 1998 TERM: 30 MAR 2001 FY: 2001

INVESTIGATOR: Romero, C. H.; Butcher, G. D.

PERFORMING INSTITUTION:
PATHOBIOLOGY
UNIVERSITY OF FLORIDA
GAINESVILLE, FLORIDA 32610

DEVELOPMENT OF RECOMBINANT POULTRY VACCINES

OBJECTIVES: To validate existing stocks of recombinant herpes virus of turkeys (HVT) as to gene content and expression in chicken embryo fibroblasts (CEFs). To prepare stocks of recombinant HVT and maintain the stocks in liquid nitrogen for future validation and preparation of vaccine. To develop assays for identifying and testing gene expression in the recombinant vaccines. To identify new insertion sites in the HVT genome for cloning of immunogenic genes obtained from avian viruses of economic impact. To identify genes of avian pathogens that code for immunogenic proteins that confer disease resistance in vaccinated chickens. To develop new recombinant vaccines based on HVT as a vector and to perform potency and protection tests in chickens.

APPROACH: Cultures are prepared from chicken embryos on the 11th day of incubation . Large stocks of primary cells, chicken embryo fibroblasts (CEFs) are aliquoted and maintained frozen in liquid nitrogen tanks. Only these cell stocks guaranteed of extraneous viral or bacterial contamination are used in the validation or development of new assays on recombinant viruses and DNA molecules. Recombinant and wild-type viral RNA and DNA is extracted from infected CEFs and purified in order to locate and identify the inserted foreign genes in the viral genome utilizing reverse transcription and polymerase chain reaction (RT-PCR) amplification. The functionality of these genes is determined utilizing techniques such as Western blots, immunoprecipitation and enzymatic assays. New genomic insertion sites are found by cloning viral fragments in bacterial plasmids and by looking for unique restriction sites in these fragments. Then, by a process of homologous recombination in CEFs utilizing infectious HVT DNA and recombinant plasmid DNA recombinant viruses are screened for as proof of the non-essentiality of the insertion site. Genes of avian pathogens known to code for immunogenic proteins are then generated by PCR or RT-PCR and tested for protein expression before being cloned into the HVT vector or eukaryotic expression vectors.

PROGRESS: 1998/04 TO 2001/03
Specific-pathogen-free chickens injected with 200ug of naked DNA molecules expressing the glycoprotein B of serotypes 1 and 3 of Marek's disease virus and the MEQ protein were not protected from challenge with the virulent RB-1B strain. The chicken interferon gamma and interleukin-2 genes have been amplified and cloned in order to test them as immunological adjuvants when administered with DNA molecules that express Marek's disease virus genes. The capsid protein VP2 of infectious bursal disease virus has been re-created and injected into chickens in order to evaluate its expression in vivo and its fate and distribution in lymphod tissues. Final transfer vectors for generating recombinant vaccines based on the herpes virus of turkeys and the Rispens strain of Marek's disease virus are now constructed and being tested in transfection experiments. Assays based on the RT-PCR have been developed in order to test the transcription of foreign genes expressed from recombinant vaccines based on the herpes virus of turkeys. These assays test for the transcription of the full gB,gC and gD genes of serotypes 1, 2 and 3 of Marek's disease virus. Similarly, primers have been developed for the differential amplification of the complete gB, gC and gD genes of serotypes 1, 2 and 3 of Marek's disease virus. Restriction fragment polymorphism of the DNA products with selected enzymes add to the

specificity of the assay. Several non-essential regions in the genome of the herpes virus of turkeys and the Rispens strain have been cloned and characterized. The nucleotide and deduced amino acid sequence of turkey interleukin-2 has been determined. Restriction analysis of genomic DNA extracted from fowl poxvirus vaccines and from two fowl poxvirus recombinants used by the poultry industry in the United States allows for the differentiation of mild from hotter strains. Similarly, restriction analysis of DNA and probing of recombinant fowl poxvirus vaccines against Newcastle disease from different commercial sources allows for the distinction between these vaccines.

IMPACT: 1998/04 TO 2001/03
The ability to generate functionally active genes of avian pathogens has been established. The RT-PCR technique can be used for the validation and testing of recombinant vaccines.

PUBLICATIONS: 1998/04 TO 2001/03
1. ROMERO,C.H. and CHUNG,H.Y. Restriction fragment length polymorphism of classical and recombinant fowlpox virus vaccines used by the poultry industry in the USA. XII International Poxvirus Symposium, June 6-10, 1998. St. Thomas, Virgin Islands, USA.
2. ROMERO,C.H. and CHUNG,H.Y. Amplification and restriction analysis of a highly conserved gene of Marek's disease virus to differentiate starins of serotypes 1,2 and 3. American Association of Avian Pathologists Meeting, July 25-29, 1998. Baltimore, Maryland, USA.
3. ROMERO, C.H., Cai, X., Elyar, J.S. and Evans, K. Cloning, sequence, and expression of turkey interleukin-2. Avian Diseases, 2000 (submitted).

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(11)
ACCESSION NO: 0400221 SUBFILE: CRIS
PROJ NO: 6612-32000-019-00D AGENCY: ARS 6612
PROJ TYPE: USDA INHOUSE PROJ STATUS: TERMINATED
START: 09 APR 1996 TERM: 08 APR 2001 FY: 2001

INVESTIGATOR: TUMPEY T; MITCHELL B W; HOLT P S; SWAYNE D E

PERFORMING INSTITUTION:
AGRICULTURAL RESEARCH SERVICE
ATHENS, GEORGIA 30613

STIMULATION OF MUCOSAL IMMUNITY IN CHICKENS TO PROTECT AGAINST ENTERIC AND RESPIRATORY PATHOGENS
OBJECTIVES: Examine the development of local humoral immune response at mucosal surfaces in chickens and compare this response with systemic immunity. Develop vaccines for mucosal immunity against intestinal and respiratory pathogens in poultry and diagnostic tests that will predict effectiveness. Determine the mechanisms for generation of airborne pathogens. Develop controls to improve poultry health and enhance mucosal vaccine effectiveness by reducing airborne pathgens and dust.

APPROACH: Birds will be orally infected with salmonella enteritidis (SE) and serum and intestinal anti-SE antibody levels will be ascertained over time. The birds will be re-infected to determine the development of serum and intestinal immunological memory. Immune recognition of different components of SE in serum and the intestinal tract will be compared. The protective role of serum and mucosal antibodies will be ascertained by passive administration of antibodies to naive birds and following the progression of the infection. The development of immunity in the intestinal tract will be dilineated by immunoassay of intestinal contents and elispot analysis of purified lamina propria lymphocytes. Dust and bacterial counts will be measured in hatching cabinets and other poultry production areas. Dust reduction techniques studied will include lowering air velocity and using an electrostatic space charge with a grounded collection system. Experiments will be conducted to characterize airborne transmission of SE and to explore treatments for reducing it.

PROGRESS: 2000/10 TO 2001/09
PROTECT AGAINST ENTERIC AND RESPIRATORY PATHOGENS 1. What major problem or issue is being resolved and how are you resolving it? The poultry industry is still threatened by avian influenza virus (AIV) and can result in substantial economic losses. Although the incidence of highly virulent AI strains are relatively rare, less pathogenic strains often circulate through chicken and turkey flocks and are responsible for significant morbidity, mortality and production losses throughout the world. Current parenteral vaccines and vaccine technologies provide protection against clinical signs and death from highly pathogenic AI virus challenge. However, prevention of highly and mildly pathogenic AI virus replication at mucosal sites is inconsistent and thus limits vaccines in preventing transmission. This is thought to be due in part to the observation that systemic vaccination is a poor inducer of mucosal immunity and therefore organisms can invade the host before the systemic immunity can impede the infection. Because AIV invade the mucosal surfaces, emphasis should be placed on vaccines that induce strong mucosal immunity. Thus, the main objective of this CRIS will be to develop mucosal vaccines for controlling AI in poultry and to characterize the immune effectors mediating vaccine protection. The development of new vaccine approaches for controlling such emerging or reemerging pathogens can be of great importance to the profitability of the poultry industry. In addition, effective mucosal vaccine strategies developed for AI will enable scientists to develop vaccine approaches for controlling other respiratory or gastrointestinal pathogens that affect poultry. 2. How serious is the problem? Why does it matter? It has been estimated that the next outbreak of a highly pathogenic AIV such as the 1983 outbreak in Pennsylvania will have an economic impact of up to $120 million to the poultry industries. Furthermore, the H5N1 outbreak in Hong Kong in 1997 has shown us that avian influenza subtypes, which were not thought to infect humans, are able to cross species barrier and cause disease to humans. During this outbreak, domestic chickens served as an intermediate host for the transmission of H5N1 virus from wild aquatic birds to humans. This realization has further strengthened the search for new and improved vaccines to protect against highly pathogenic AIV. Successful completion of experiments outlined in this CRIS could provide the next generation of vaccines capable of neutralizing these pathogens at the mucosal surfaces. 3. How does it relate to the National Program(s) and National Component(s)? National Program 103, Animal Health (100%) Vaccine Strategies, which prevent the initiation and dissemination of the organism within flocks, fit well with the animal health research component on Disease Control Strategies. 4. What were the most significant accomplishments this past year? A. Single Most Significant Accomplishment during FY 2000 year. The overall objective is the development of new vaccine approaches for controlling AI in poultry and to characterize the immune effectors mediating vaccine protection. This work at Southeast Poultry Research Laboratory identified a mucosal route of vaccination that results in protection against lethal AI virus challenge. This was done for purposes of improving the mucosal immune response(s) to AI in chickens. The specific accomplishment was the determination of significant antiviral antibody response that was detected after intratracheal vaccine administration via ELISA. This information will be used to

develop efficacious vaccines for stimulating protective immunity against AI and possibly other respiratory pathogens that affect poultry. B. Other Significant Accomplishment(s), if any. Research was also conducted to characterize the immune responses to mucosal vaccination and develop improved methods for identifying cells and antibody harvested from mucosal sites. This work at Southeast Poultry Research Laboratory led to the development of a ELISPOT assay to detect specific antibody secreting cells in the spleen and other tissues. Relatively high levels of IgG, and lower IgA secreting cells were detected from chickens vaccinated by the intratracheal or subcutaneous route. This work is crucial for the identification of immune effectors mediating protection and might suggest ways of maximizing such responses for poultry. 5. Describe the major accomplishments over the life of the project including their predicted or actual impact. This project was redirected to avian influenza vaccine development during FY2000. The Salmonella vaccine development that preceded this work has laid a foundation for commencing mucosal vaccine studies with AIV. These accomplishments include; (1) improved biological reagents needed to measure IgG and IgA antibody responses in chickens and turkeys, (2) identification of mucosal adjuvants that improve protection of killed vaccines in the gastrointestinal tract of poultry. (3) identification of alternative routes of vaccine administration for the induction of optimal immune responses. 6. What do you expect to accomplish, year by year, over the next 3 years? The development of mucosal vaccines in poultry will continue through FY2004. This process will include development and testing of novel mucosal vaccines and directly comparing them to traditional parenteral AI virus vaccines. Our research will continue to determine the optimal route of mucosal vaccination and test the inclusion of mucosal adjuvants and immunomodulators to a vaccine formula in an attempt to improve the quality of the immune response. The vaccines that have been prepared for this study include inactivated whole virus vaccines and subunit vaccines. New vaccine technologies will also be included to test protective immunity against AIV in chickens and turkeys. We will also examine whether these vaccines can be adapted for in ovo vaccination protocols. For FY2003 we will then characterize the antibody and cellular immune responses in various locations of the respiratory and intestinal tract of vaccinated animals. 7. What science and/or technologies have been transferred and to whom? When is the science and/or technology likely to become available to the end user (industry, farmer, other scientists)? What are the constraints if known, to the adoption & durability of the technology product? No activities were reported. 8. List your most important publications in the popular press (no abstracts) and presentations to non-scientific organizations and articles written about your work (NOTE: this does not replace your peer-reviewed publications which are listed below) No news articles or trade publications were reported.

PUBLICATIONS: 2000/10 TO 2001/09

1. Chaubal,L.H., Holt,P.S. Characterization of motility and identification of flagella proteins in the avian pathogen Salmonella pullorum. American Journal of Veterinary Research. 2000. v.60.p.1322-1327.
2. Katz,J.M., Lu,X., Frace,M. Morken,T., Zaki,S.R., Tumpey,T.M. Pathogenesis of and Immunity to Avian Influenza A H5 viruses. Biomedicine Pharmacotherapy. 2000. v.54.p.178-187.
3. Tumpey,T.M., Lu,X., Morken,T., Zaki,S.R., Katz,J.M. Depletion of lymphocytes and diminished cytokine production in mice infected with a highly virulent influenza A virus isolated from humans. Journal of Virology. 2000. v.73.p.6105-6116.
4. Tumpey,T.M., Renshaw,M., Clements,J., Katz,J.M. Mucosal delivery of inactivated influenza vaccine induces B cell dependent heterosubtypic protection against a lethal influenza A H5N1 virus. Journal of Virology. 2001. v.75.p.5141-5150.

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(12)
ACCESSION NO: 0402463 SUBFILE: CRIS
PROJ NO: 6612-32000-021-00D AGENCY: ARS 6612
PROJ TYPE: USDA INHOUSE PROJ STATUS: NEW
START: 12 OCT 1998 TERM: 11 OCT 2003 FY: 2001

INVESTIGATOR: KING D J; SEAL B S; VACANT; KAPCZYNSKI D R; SWAYNE D E; MITCHELL B W

PERFORMING INSTITUTION:
AGRICULTURAL RESEARCH SERVICE
ATHENS, GEORGIA 30613

VIRULENCE DETERMINANTS IMPORTANT TO PATHOGENESIS OF NEWCASTLE DISEASE VIRUS AND AVIAN PNEUMOVIRUS

OBJECTIVES: Molecular and biological characterization of new Newcastle disease virus (NDV) and avian pneumovirus (APV) isolates for molecular epidemiology critical in tracking outbreaks and resolution of issues that impact international trade. Identification and further characterization of determinants important to avian paramyxovirus pathogenesis. Development of improved control strategies, including vaccination and diagnostics based on data from prior objectives. Determine the reservoirs & sources of APV.

APPROACH: Acquisition of new NDV and APV isolates from poultry oubtreaks in the U.S. and other countries and surveys of North American wild bird populations. Biological and molecular properties of isolates will be compared with those acquired in prior years for virulence and epidemiologic determinations. Antigenic characterization will be accomplished using monoclonal and polyclonal antibodies. Gene sequences of isolates will be identified by automated sequencing of DNA prepared from RNA by reverse transcriptase polymerase chain reaction or from cloned DNA prepared from purified RNA. Isolates with sequences typical of virulent strains, but with low virulence for chickens will be passaged in chickens to select or adapt strains for virulence. NDV persistence after clinical recovery will be assessed. APV vaccines will be developed and evaluated for the ability to protect turkeys. Athens, GA, SEPRL; Main Lab & Bldg. 1 BL-2; Bldg 34 BL-3; 1/07/99.

PROGRESS: 2000/10 TO 2001/09

1. What major problem or issue is being resolved and how are you resolving it? Newcastle disease (ND) is a viral disease of poultry and a worldwide problem first recognized in the U.S. in the 1930s. Newcastle disease virus (NDV), also identified as avian paramyxovirus type 1 (APMV-1), infects all known wild and domestic bird species. Different NDV strains vary in virulence and produce differing clinical forms of the disease that range from high mortality to mild or inapparent respiratory infections. The mild form is the predominant one seen in the U.S. Avian pneumovirus (APV) infections of turkeys in the U.S., in contrast to ND, are of recent concern. APV was isolated from commercial turkeys in Colorado in 1996. The disease was reported in the United Kingdom in 1985 and prior to 1996 the disease was exotic to North America. The virus causes a mild, but rapidly spreading, upper respiratory disease and adverse effect on weight gain and feed conversion. Secondary bacterial infections increase the severity of the disease. The initial diagnosis of the disease in the U.S. was delayed because the U.S. isolate was of a different subtype than had been isolated elsewhere and serological assays to detect the new subtype were not available. Research to resolve the problem includes characterization of new isolates, determining their virulence, and developing control strategies, including vaccination and

diagnostics. 2. How serious is the problem? Why does it matter? The U.S. is free of virulent or exotic ND by successfully eradicating infections when they have occurred, most recently in 1998. Exotic ND is a reportable disease and its presence in commercial poultry will result in embargoes of poultry export from the effected country, a critical event for a major poultry exporter like the U.S. The threat of exposure of commercial poultry to virulent virus is constant and from several sources. It can be tracked from countries such as Mexico where the disease is indigenous, from the site of periodic ND outbreaks in migrating cormorants as occurred in 1992, 1997, and 1998 in the U.S., and from virus detected in smuggled birds or birds held in quarantine which has occurred in most years since the mid-1970s . Infections of commercial poultry with APMV-1 strains of low virulence also have economic impact due to reduced productivity from respiratory disease and reduced rate of weight gain. APV infections continue to cause productivity losses in turkeys in the Upper Midwest particularly in the state of Minnesota. 3. How does it relate to the National Program(s) and National Component(s)? The project contributes to National Program 103, Animal Health (100 percent). The research characterizes emergent domestic and exotic NDV and APV. The molecular and biological characterization of new virus isolates, the development of improved identification methods, and studies of the pathogenesis of those isolates are relevant to the Pathogen Detection and Diagnostics, the Microbial Genomics, and Mechanism of Disease components of the plan. The characterization of the immune response and development of improved vaccines are relevant to the Animal Immunology and the Strategies to Control Infectious and Non-Infectious Disease components of the plan. 4. What were the most significant accomplishments this past year? A. Most significant accomplishment. Existing diagnostic tests for APV were ineffective. Scientists on the project cloned the gene for the matrix protein of APV and collaborated with investigators at the University of Minnesota in development of a diagnostic test for APV antibodies. The test employs protein produced in a bacterial system from the cloned matrix gene as a target to capture antibodies in serum of infected turkeys. Preliminary tests of turkey serum from experimentally infected birds and field cases demonstrated high specificity of the new test. The problem of false positive reactions in the standard test were eliminated with the new test. B. Other significant accomplishments. The passage of domestic NDV isolates from birds species other than commercial poultry was evaluated as a method of identifying the risk of those isolates for poultry. One virus of moderate virulence initially became highly virulent after passage and demonstrated the potential risk of NDV infections of other birds for poultry. Existing APV diagnostic tests do not work in bird species other than chickens and turkeys. An additional APV serological method (competitive ELISA) was developed for testing serum of multiple bird species in ongoing surveillance studies. This test overcomes the limitations of previous tests that were designed for use in a single species, a severe limitation for surveillance studies. Effective vaccines against APV have limited protective ability. An inactivated APV vaccine was produced and limited protective immunity in turkeys was evaluated. This suggests that current technologies for producing killed APV vaccines will not be effective in producing an effective vaccine for control. 5. Describe the major accomplishments over the life of the project including their predicted or actual impact. The APV Colorado isolate (APV/CO) was the first U.S. isolate of APV and was previously found by sequence analysis of the virus genome to be a unique virus relative to the European APV types A and B strains. A mild disease was produced in turkeys inoculated with APV/CO and virus was recovered from the nasal cavity up to 5 days post-infection. Antiserum from the infected turkeys neutralized APV/CO and the Types A and B viruses from Europe but antisera against Types A and B did not neutralize APV/CO. Low and moderate virulence NDV strains are not known to cause overt disease but probes to identify virus genome in tissues of infected birds detected virus in heart muscle and air sac membranes of birds infected with those viruses. The lesions may predispose individuals to secondary infections and decreased meat and egg production even in the absence of obvious disease. Nucleotide sequence analysis of a low virulence NDV isolate from a live bird market in the Northeastern U.S. identified the virus as similar to isolates from other countries thought to be exotic to the U.S. Project scientists have continued to refine diagnostic tests utilizing nucleic acid amplification and sequencing for prediction of virulence of NDV isolates and for NDV epidemiology. Project scientists demonstrated that SPF white leghorns should be used for NDV pathogenicity evaluations because they are more susceptible to clinical disease and mortality than white rocks. 6. What do you expect to accomplish, year by year, over the next 3 years? Characterization of new domestic and exotic NDV and APV isolates to identify the diversity and risk of those isolates to poultry will continue through FY2006. Surveillance of wild bird populations in the Midwestern and Southeastern regions of the United States to obtain virus isolates of NDV and APV will continue through FY2003 and characterization of those isolates will continue through FY2005. A serological survey to detect birds positive to APV will also continue through FY2003. Identification of reservoirs of virus infections of wild birds that pose a risk to commercial poultry is the purpose of the surveillance studies. Antibodies specific to different proteins of NDV and APV will be prepared in FY2002 and will be evaluated as diagnostic reagents in virus characterization studies and as an adjunct to pathogenesis studies through FY2004. Pathogenesis studies, to identify tissue targets and virulence, of APV and NDV isolates will continue in chickens and turkeys through FY2006 for the purpose of identifying virulence markers that will lead to improved diagnostic test methods. Experimental models to test protective immunity against NDV and APV with newly formulated vaccines will be assessed by FY2003. The role of antibody and cell mediated immune response to NDV and APV in vaccinated and naive birds will be evaluated during the protective immunity studies and studies focusing on specific components of those responses will extend through FY2006. 7. What science and/or technologies have been transferred and to whom? When is the science and/or technology likely to become available to the end user (industry, farmer, other scientists)? What are the constraints if known, to the adoption & durability of the technology product? Incumbent scientists on the project collaborated with investigators at the University of Minnesota in development of recombinant antigen in a diagnostic for serological identification of antibodies to avian pneumovirus. The test has been evaluated with serum from experimental infected turkeys and from field cases and was shown to have high specificity and eliminated the problems of false positives in the standard test. Transfer of current findings to other scientists and diagnosticians will continue by publication of research results and via direct communication through correspondence and short term laboratory visits. 8. List your most important publications in the popular press (no abstracts) and presentations to non-scientific organizations and articles written about your work (NOTE: this does not replace your peer-reviewed publications which are listed below) King,D.J.,Seal,B.S. Current understanding of molecular correlates of virulence in Newcastle Disease Virus. International Hatchery Practice. 2000. v.14(7)(Suppl.):Vaccination at work in commercial broilers, p. 10-11. Gulati,B.R., Cameron,K.T., Seal,B.S., Goyal,S.M., Halvorson,D.A., Njenga, M.K. Development of a more sensitive and specific ELISA for detecting avian pneumovirus antibodies. Gobbles. 2000.v.57.p.16-18.

PUBLICATIONS: 2000/10 TO 2001/09

1. Cameron,K., Zhang,X., Seal,B., Rodriguez,M., Njenga,M.K. Antigens to viral capsid and non-capsid proteins are present in brain tissues and antibodies in sera of Theiler's virus-infected mice. Journal of Virological Methods. 2001.v.91.p.11-19.

2. Gulati,B.R., Cameron,K.T., Seal,B.S., Goyal,S.M., Halvorson,D.A., Njenga,M.K. Development of highly sensitive and specific enzyme-linked immunosorbent assay based on recombinant matrix protein for detection of avian pneumovirus antibodies. Journal of Clinical Microbiology. 2000.v.38. p.4010-4014.

3. Kapczynski,D.R., Koci,M., Kelley,L., Schultz-Cherry,S. Use of in vitro expressed capsid protein from turkey astrovirus to protect poults from PEMS-associated disease. Program of the Fifth International Congress of Veterinary Virology, Brescia, Italy. August, 2000.(Abstract)

4. Kapczynski, D.R.,Smith, C. Immune response of turkeys following intranasal vaccination with BPL-inactivated avian pneumovirus and live-virus challenge. Program of the American Association of Avian Pathologists at the American Veterinary Medical Association annual meeting. Boston, MA. July 14-18, 2001. (Abstract)

5. King,D.J. Efficacy of vaccine in protection against velogenic Newcastle Disease (ND). Proceedings of the United Animal Health Association.2000. p.591-593.

6. King,D.J.,Swayne,D.E. Newcastle disease update: International ND problems. Proceedings of the United Animal Health Association. 2000. p. 593-596.

7. King,D.J. Selection of Thermostable Newcastle Disease Virus from Reference and Vaccine Strains. Avian Diseases. 2001.v.45.p.512-516.

8. King,D.J., Kommers,G.D., Brown,C.C., Seal,B.S. Virulence of pigeon Newcastle disease virus isolates for chickens. Proceedings of the Fiftieth Western Poultry Disease Conference. 2001.p.15-16.

9. Kommers,G.D., King,D.J., Seal,B.S., Brown,C.C. Pathogenesis of five different pigeon-origin isolates of Newcastle disease virus for domestic chickens. Veterinary Pathology. 2000.v.37(5).p.546(Abstract No.94).

10. Locke,D.P., Sellers,H.S., Crawford,J.M., Schultz-Cherry,S., King,D.J., Meinersmann,R.J.,Seal,B.S. Newcastle disease virus phosphoprotein gene analysis and transcriptional editing in avian cells. Virus Research.2000. v.69.p.55-68.
11. Seal,B.S., Sellers,H.S. Avian paramyxoviruses evolve independently of their mammalian counterparts and deserve a genus designation among the subfamily Paramyxovirinae in the family Paramyxoviridae. Program of the Ninth Annual Meeting of the Society for Molecular Biology and Evolution, Athens, GA. July,7-10, 2001.(Abstract)
12. Seal,B.S. Molecular evolution of Newcastle disease virus and the application of molecular diagnostics. Program of the Respiratory Diseases of Poultry Symposium, American Association of Avian Pathologists at the American Veterianry Medical Association Annual Meeting in Boston, MA. July 14-18, 2001. (Abstract)
13. Seal,B.S. Avian Pneumoviruses and Emergence of a New Type in the United States. Animal Health Research Reviews.2000.v.1.p.67-72.
14. Seal,B.S., King,D.J. Newcastle Disease Virus. Available from: http://www.els.net Encyclopedia of Life Sciences[2000].
15. Sellers,H.S., Schultz-Cherry,S., Brown,C.C., Seal,B.S., King,D.J. Induction of apoptosis by Newcastle disease virus. Program of the Fifth International Congress of Veterinary Virology, Brescia, Italy. August,2000.(Abstract).
16. Suarez,D.L., Swayne,D.E., King,D.J. The ongoing threat of avian influenza and Newcastle disease to the U.S. poultry industry. Proceedings of the Fiftieth Western Poultry Disease Conference.2001.p.1-7.
17. Swayne,D.E., Suarez,D.L., King,D.J. Avian influenza (AI) and velogenic Newcastle disease (VND) update. Proceedings of 35th National Meeting of Poultry Health and Processing.2000.p.37-45.

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(13)
ACCESSION NO: 0401966 SUBFILE: CRIS
PROJ NO: 6612-32000-021-01T AGENCY: ARS 6612
TYPE: PROJ USDA INHOUSE PROJ STATUS: TERMINATED
START: 01 SEP 1998 TERM: 11 FEB 2001 FY: 2001

INVESTIGATOR: SEAL B S

PERFORMING INSTITUTION:
AGRICULTURAL RESEARCH SERVICE
ATHENS, GEORGIA 30613

CONSTRUCTION OF A NEWCASTLE DISEASE VIRUS MINI-GENOME

OBJECTIVES: Newcastle disease continues to pose a threat to U.S. poultry production with continued outbreaks worldwide reported by the Office of International Epizootes. Evidence from our laboratory demonstrates these agents are evolving so they are becoming more distantly related from current live-virus vaccines. The overall goal is to use reverse genetics of NDV to develop rescue systems for the creation of genetically engineered infectious viral clones.

APPROACH: Since NDV genomic RNA is minus-sense and therefore noninfectious, several cloned proteins must be expressed along with a positive sense anti-genomic RNA. The nucleoprotein (NP), phosphoprotein (P) and the polymerase (L) are currently being cloned into expression vectors. A NDV mini-genome that contains the NP, P and L genes with the appropriate leader and trailer sequences will be constructed. A reporter gene will be inserted between the P and L genes. The NDV mini-genome will be coexpressed with viral NP, P and L genes and monitored for expression of the reporter gene to validate a functional NDV rescue system. Athens, Georgia - Southeast Poultry Research Laboratory, Building 4, B/L-3; 01/07/99. Scientists & technicians associated with project: Bruce Seal and Joyce Bennett.

PROGRESS: 2000/10 TO 2001/09
1. What major problem or issue is being resolved and how are you resolving it? 2. How serious is the problem? Why does it matter? 3. How does it relate to the National Program(s) and National Component(s)? 4. What were the most significant accomplishments this past year? D. Progress report. This report serves to document research conducted under a specific cooperative agreement between ARS and the U.S. Poultry and Egg Association. Additional details of research can be found in the report for the parent project 6612-32000-021-00D Paramyxovirus Infections of Poultry. Complete nucleotide sequencing of the Newcastle disease virus (NDV) vaccine strain B1 is necessary to understand pathogenesis and develop NDV as a vaccine vector. Using nucleotide sequencing and mapping techniques, the full-length genomic sequence of the NDV vaccine strain B1 was determine. The sequence has been published in Genbank for use by all scientists. 5. Describe the major accomplishments over the life of the project including their predicted or actual impact. 6. What do you expect to accomplish, year by year, over the next 3 years? 7. What science and/or technologies have been transferred and to whom? When is the science and/or technology likely to become available to the end user (industry, farmer, other scientists)? What are the constraints if known, to the adoption & durability of the technology product? 8. List your most important publications in the popular press (no abstracts) and presentations to non-scientific organizations and articles written about your work (NOTE: this does not replace your peer-reviewed publications which are listed below) Sellers, H.S. and Seal, B.S. The full-length genomic sequence of NDV strain B1. GenBank accession number NC002617.

PUBLICATIONS: 2000/10 TO 2001/09
None.

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(14)
ACCESSION NO: 0404751 SUBFILE: CRIS
PROJ NO: 6612-32000-028-00D AGENCY: ARS 6612
PROJ TYPE: USDA INHOUSE PROJ STATUS: NEW
START: 07 APR 2001 TERM: 31 JAN 2003 FY: 2001

INVESTIGATOR: TUMPEY T; SWAYNE D E; VACANT; SUAREZ D L; MITCHELL B W

PERFORMING INSTITUTION:
AGRICULTURAL RESEARCH SERVICE
ATHENS, GEORGIA 30613

STIMULATION OF MUCOSAL IMMUNITY IN CHICKENS TO PROTECT AGAINST ENTERIC AND RESPIRATORY PATHOGENS

OBJECTIVES: Examine the development of local humoral immune response at mucosal surfaces in chickens and compare this response with systemic immunity. Develop vaccines for mucosal immunity against intestinal and respiratory pathogens in poultry and diagnostic tests that will predict effectiveness. Determine the mechanisms for generation of airborne pathogens.

APPROACH: The protective role of serum and mucosal antibodies will be ascertained by passive administration of antibodies to naive birds and following the progression of the infection. The development of immunity in the intestinal tract will be dilineated by immunoassay of intestinal contents and elispot analysis of purified lamina propria lymphocytes.

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(15)
ACCESSION NO: 0405248 SUBFILE: CRIS
PROJ NO: 6612-32000-038-00D AGENCY: ARS 6612
PROJ TYPE: USDA INHOUSE PROJ STATUS: NEW
START: 15 NOV 2001 TERM: 14 NOV 2006

INVESTIGATOR: KING D J; KAPCZYNSKI D R; SEAL B S; VACANT; SWAYNE D E; MITCHELL B W

PERFORMING INSTITUTION:
AGRICULTURAL RESEARCH SERVICE
ATHENS, GEORGIA 30613

IDENTIFICATION OF VIRULENCE DETERMINANTS, PATHOGENETIC MECHANISMS, ...AVIAN PARAMYXOVIRUSES

OBJECTIVES: 1. Characterization of emergent Newcastle disease virus (NDV) and avian pneumovirus (APV) isolates to extend the capabilities for molecular epidemiology of the most important avian paramyxovirus (APMV) infections. 2. Further characterization of determinants important to APMV pathogenesis. 3. Development of improved control strategies, including vaccination, diagnostics and identification of NDV and APV reservoirs.

APPROACH: NDV and APV isolates will be acquired from outbreaks and from surveys of North American wild bird populations. Wild waterfowl will be surveyed for APV specific antibodies. Antigenic differentiation with monoclonal and polyclonal antibodies and nucleotide sequence analysis of NDV and APV genes will provide molecular characterization and epidemiologic determinations. Virulence, persistence, and pathogenesis will be evaluated by inoculation of chickens or turkeys. Sequence analysis in combination with results from pathogenesis studies of isolates or infectious clones rescued from cloned NDV will provide the basis for identification of virulence markers useful for diagnostic development. Immunity to APV and NDV infections and newly developed live, inactivated and subunit vaccines will be assayed for both antibody mediated and cellular immune responses. Serum and mucosal antibody will be quantitated and isotype determined. Cytokine regulators of the immune response will be assayed. BSL-2 and BSL-3Ag, 8/10/01.

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(16)
ACCESSION NO: 0189393 SUBFILE: CRIS
PROJ NO: GEOV-0456 AGENCY: CSREES GEOV
PROJ TYPE: **ANIMAL HEALTH PROJ STATUS:** NEW
START: 01 OCT 2001 TERM: 30 SEP 2004 FY: 2002

INVESTIGATOR: Sellers, H. S.

PERFORMING INSTITUTION:
COLLEGE OF VET MEDICINE
UNIVERSITY OF GEORGIA
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ATHENS, GEORGIA 30602

DETECTION, ISOLATION AND CHARACTERIZATION OF AVIAN VIRUSES

OBJECTIVES: The objectives of this proposal are to provide diagnostic virology services for the U.S. poultry industry, conduct applied research on current avian disease isolates from the field, and improve detection and isolation methods for monitoring avian viruses. In addition to classical virus isolation techniques currently used in the diagnostic virology laboratory, we will incorporate molecular-based assays, which will have major benefits to the diagnostic laboratory. First, it will reduce the total number of SPF embryos required for diagnostic services, as they can sometimes be difficult to obtain and second, it will result decrease expenses incurred for the embryos, which have increased in price by approximately 44% since last year. Existing methods of viral detection and

isolation will be improved with the addition of a repository of fluorescent-labeled antibodies for direct/indirect detection of viral antigens. Continued research on diagnostic applications will improve turn-around time, accuracy and client satisfaction. Specific research projects will involve all major avian viruses in collaboration with the clinicians, faculty, and students at PDRC, as dictated by field situations.

APPROACH: Objectives. The following objectives are broad as this project is long-term and continuing flexibility is needed to adjust for new situations in the field. To provide diagnostic virology services in an accurate and reliable manner for the U.S. poultry industry Improve methods of detection and monitoring of avian viruses Apply new monoclonal antibodies (Mab) as they become available to diagnostic cases (i.e. monoclonal antibodies to IBDV, J. Rosenberger) Utilize fluorescent (FITC)-labeled antibodies for direct detection of viral antigen, as in recent subclinical Infectious Laryngotracheitis (ILT) cases Apply PCR and nucleic acid probe technology for diagnostic applications (i.e. real-time PCR utilizing the light cycler) Maintain contacts and working relationships with other research and diagnostic facilities for the exchange of data and reagents Conduct applied research on current avian virus diseases isolated from the field in collaboration with clinicians, faculty, students at PDRC and other poultry professionals in the field

NON-TECHNICAL SUMMARY: Despite rigorous vaccination in commercial poultry, avian viruses continue to cause problems resulting in production losses for the poultry industry. This project provides methods for detection, isolation and characterization of avian viruses.

PROGRESS: 2001/10 TO 2002/09
The mission of the diagnostic virology laboratory is to provide accurate and timely diagnostic virology services for the U.S. poultry industry, conduct applied research on current avian disease isolates from the field, and improve detection and isolation methods for monitoring avian viruses. During 2001-2002, the diagnostic virology lab processed 578 cases and isolated 687 viruses. This past year virus isolation for avian leukosis was added as a full-time service. Six hundred and forty six whole blood samples were submitted for leukosis isolation and subsequent antigen capture ELISA. Several new molecular-based assays have been incorporated. PCR is now available in a multiplex format for enteric coronaviruses and astroviruses. We are currently evaluating the sensitivity and specificity of this assay directly from field samples. In addition, an RT-PCR is available for Reoviruses. Our goal is to enhance our diagnostic offerings for enteric viruses of poultry. A live avian adenovirus vaccine (serotype 8) is currently being evaluated both pathologically and serologically in its ability to protect against inclusion body hepatitis caused by different serotypes of adenoviruses that were isolated over the past two years. Recent outbreaks of inclusion body hepatitis have been classified as serotype 11 adenovirus. During the past year (fall 2000-present) we have gathered evidence that a mild infectious laryngotracheitis virus (ILTV) is circulating in broiler flocks in the southeast. The condition is characterized by mild tracheitis, swollen sinuses and conjunctivitis with no mortality and minimal serological response. We are investigating the spread of the disease in broilers, evaluation of laboratory isolation and diagnostic procedures, and farm clean-out.

IMPACT: 2001/10 TO 2002/09
Improved methods of virus detection and isolation will expedite control measures used in the field to control and in some cases eradicate viral diseases. An emphasis has been placed on molecular diagnostics in the past year and as a result the time required for positive identification has been minimized thus providing much needed information in less time.

PUBLICATIONS: 2001/10 TO 2002/09
Kapczynski, D.R., H.S. Sellers, V. Simmons, S. Schultz-Cherry. Sequence analysis of the S3 gene from a turkey reovirus. Accepted to Virus Genes 2/2002.

PROJECT CONTACT:
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(17)
ACCESSION NO: 0194953 SUBFILE: CRIS
PROJ NO: GEOV-0466 AGENCY: CSREES GEOV
PROJ TYPE: SPECIAL GRANT PROJ STATUS: NEW
CONTRACT/GRANT/AGREEMENT NO: 2002-30001-12128 PROPOSAL NO: 2002-04435
START: 15 JUN 2002 TERM: 14 JUN 2004 GRANT YR: 2002
GRANT AMT: $2,000,000

INVESTIGATOR: Prasse, K. W.; Dickerson, H. W.; Miller, D. M.; Glisson, J. R.
PERFORMING INSTITUTION:
COLLEGE OF VET MEDICINE
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110 RIVERBEND ROAD
ATHENS, GEORGIA 30602

CORE ANIMAL DIAGNOSTIC LABORATORY

OBJECTIVES: Principle objective is to develop a regional capability to accurately and rapidly diagnose eight specific foreign animal diseases. Secondly, to establish a secure communications network with the other designated laboratories so that data may be shared throughout the network and with federal authorities.

APPROACH: Personnel will be trained in diagnostic procedures in eight foreign animal diseases. New equipment will be purchased to perform the diagnostic tests to detect the eight diseases. Developing a computerized reporting system in collaboration with 11 other states for reporting foreign animal diseases.

NON-TECHNICAL SUMMARY: There is a critical need for a national animal health reporting system to detect and report foreign animal diseases. This project will contribute to the development of a network of detecting and reporting foreign animal diseases nationwide.

PROJECT CONTACT:
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Fax: 706-542-5977
Email: miller@vet.uga.edu

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(18)
ACCESSION NO: 0152351 SUBFILE: CRIS
PROJ NO: IND073055V AGENCY: CSREES IND
PROJ TYPE: ANIMAL HEALTH PROJ STATUS: TERMINATED
START: 15 DEC 1995 TERM: 30 DEC 1998 FY: 1999

INVESTIGATOR: Guo, P.

PERFORMING INSTITUTION:
MICROBIOL PATHOLOGY & PUB HLTH
PURDUE UNIVERSITY
WEST LAFAYETTE, INDIANA 47907

CONSTRUCTION OF ATTENUATED RECOMBINANT AVIAN INFECTIOUS LARYNGOTRACHEITIS VIRUS VACCINES

OBJECTIVES: Our long term objective is to develop a polyvalent vaccine which is both effective in stimulating a high level of mucosal immunity against several avian respiratory tract infections, and is easy to administer, such as via aerosal spray to facilitate vaccination on large-flock chicken farms. Our short term goal of this proposal is to construct recombinant avian infectious laryngotracheitis viruses (ILTV) expressing the Fusion (F) glycoprotein of Newcastle disease virus (NDV) and the hemagglutinin (HA) of avian influenza virus (AIV), individually or in combination. Expression of the non-ILTV proteins will be monitored, and pathogenicity, immunogenicity and stability of the recombinant viruses will be tested by in vivo experiments.

APPROACH: Genes coding for the F protein of NDV and HA protein of AIV will be cloned by PCR after reverse transcription. The genes will be introduced into the ILTV genome via homologous recombination using marker genes for selection. Expression of the foreign genes will be monitored by immunofluorescence and western blot. Vaccination experiments will be performed to determine the minimum dose for 100% protection against NDV, AIV, and ILTV; stability of the recombinant viruses will be tested through in vivo passaging. Pathogenicity of the recombinant ILT viruses will be assessed symptomatically as well as by screening for tracheal lesions. The best route of vaccination to stimulate mucosal immunity will be determined by administration of the recombinant ILT-HA virus via different inoculation routes.

PROGRESS: 1995/12 TO 2000/09
Our research has recently identified an hepatoma cell line for the cultivation of infectious laryngotracheitis virus (ILTV), elucidated the assembly pathway of this pathogen, constructed three dual viral promoters simultaneously recognized by both mammalian and *E. coli* cells, documented the transactivation of the early SV40 promoter by ILTV co-infection, developed a simple procedure for ILT diagnosis and constructed recombinant ILTV with pathogenic gene deletion and foreign gene insertion. The recombinant ILTV will be used as a vector to develop a polyvalent vaccine for mucosal immunity against multiple avian respiratory tract infections.

PUBLICATIONS: 1995/12 TO 2000/09
1. Guo, P., E.Scholz, B.Maloney, and E.Welniak. 1994. Construction of recombinant avian infectious laryngotracheitis virus expressing bata-gal gene and DNA sequencing of insertion region. Virology 202:771-781.
2. Scholz, E., R. E. Porter, and P. Guo. 1994. Differential diagnosis of infectious laryngotracheitis from other avian respiratory disease by a simplified PCR procedure. J Virol Meth. 50:313-322.
3. Guo,P., E.Scholz, J.Turek, R.Nordgren, and B.Maloney. 1993. Assembly pathway of avian infectious laryngotracheitis virus. Am J Vet Res 54:2031-2039.
4. Scholz, E., C. L. Zhang, and P. Guo. 1993. Transactivation of the early SV40 promoter by avian infectious laryngotracheitis virus in avian hepatoma cells. J Virol Meth 45:291-301.
5. Scholz,E., E.Welniak, T.Nyholm, and P.Guo. 1993. An avian hepatoma cell line for cultivation of infectious laryngotracheitis virus and for expression of foreign genes with mammalian promotor. J Virol Meth 43:273-286.
6. Scholz, E. and P. Guo. 1995. Construction of Recombinant Avian Infectious Laryngotracheitis Virus with TK Gene disrupted by Bata-gal Coding Sequence. In Imm Viral Inf. Proc. 3rd Intl Cong Vet. Virol, 379-384..
7. Huang, Q., Y. Mat-Arip and P. Guo. 1997. Sequencing of a 5.5-kb DNA fragment and identification of a gene for a subunit of helicase/primase complex of avian laryngotracheitis virus. Virus Gene 15:(2): 119-121.

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(19)
ACCESSION NO: 0184128 SUBFILE: CRIS
PROJ NO: IOW03599 AGENCY: CSREES IOW
PROJ TYPE: HATCH PROJ STATUS: **NEW MULTISTATE PROJ NO: NC-228**

START: 01 OCT 1999 TERM: 30 SEP 2004 FY: 2002

INVESTIGATOR: Reynolds, D. L.

PERFORMING INSTITUTION:

VETERINARY MEDICINE
IOWA STATE UNIVERSITY
AMES, IOWA 50011

AVIAN RESPIRATORY DISEASES: PATHOGENESIS, SURVEILLANCE, DIAGNOSIS AND CONTROL

OBJECTIVES: Objective #1. Determine the pathogenesis and interactions of specific agents. Objective #2. Surveillance, occurrence and consequences of agents and hosts on disease susceptibility. Objective #3. Develop new and improved methods for the diagnosis, prevention and control of avian respiratory diseases.

APPROACH: Iowa will contribute to those studies concerning avian pneumovirus. Iowa will develop rapid diagnostics, explore new vaccination methods and study the pathogenesis of avian pneumoviruses. This will be done by employing molecular techniques and nonconventional vaccination methods and by exploring the role of passive immunity.

NON-TECHNICAL SUMMARY: Respiratory diseases afflicting poultry in modern commercial production operations are complex entities. Numerous factors including infectious agents, non-infectious agents and environmental factors may contribute to the disease complex. The purpose of this project is to have a significant impact on the diagnosis, control and prevention of poultry respiratory diseases.

PROGRESS: 2002/01 TO 2002/12
A study was initiated to evaluate biosecurity related to composting of large amounts of animal carcasses. In order to achieve a large amount of animal tissue, cattle carcasses were used. Twelve cattle carcasses averaging approximately 1,000 lbs. each, were delivered to the research site. The carcasses were placed into three 20-ft long windrow segments (constructed end-to-end to produce a single 60-ft long windrow). Each segment utilized one of three different cover materials (silage, ground cornstalks, finished yard waste compost). Newcastle disease virus (NDV) and avian encephalomyelitis virus (AEV) were used to evaluate the degree of bio-containment provided by composting. Twenty dozen 10-day-old embryonating chicken eggs were inoculated with NDV vaccine strain. Similarly, 20 dozen 6-day-old embryonating chicken eggs were inoculated with AE vaccine strain. The carcasses placed into the composting windrows were contaminated with these eggs prior to covering so as to simulate composting of diseased animals and contaminated bedding and feed. Specific Pathogen Free (SPF) chickens were used as sentinels to evaluate the bio-containment provided by composting. These birds were housed under SPF conditions prior to the beginning of the study. Twenty-four of the 12-week-old chickens were wing banded, sampled (blood) and transferred to the project site one day after the construction of the windrows. Four chickens were placed in each of six cages surrounding the composting windrow. Blood samples were collected from each bird following transport to the field research site, at the end of weeks 1, 2, 3, 4, 6 and 8. All serum samples have been tested for specific NDV and AE antibodies. The hemagglutination-Inhibition (HI) test is done for NDV. All samples from the sentinel poultry have tested negative for NDV. The same NDV and AE vaccines were used to test the ability of the composting system to inactivate pathogenic viruses found within diseased animal carcasses. Twenty-four vials and 12 cassettes were prepared from each virus. Eight cryogenic vials and 4 dialysis cassettes were inserted in each test section of the windrow. The vials are retrieved at day 1, the end of weeks 1,2,3,4, and 6 (remaining two vials to be retrieved at the end of weeks 8 and 10). The dialysis cassettes were collected at the end of weeks 1, 2, 3, and 4 from corn stalk and silage piles test segments. Cassettes that had been buried in the yard waste could not be recovered due to unanticipated plugging of the access port. These will be removed at the end of the biosecurity evaluation for the initial trial. Embryonated chicken eggs were inoculated with material from the recovered samples (10 eggs used for each sample). Test results are pending at this time.

IMPACT: 2002/01 TO 2002/12
The findings indicate that composting may be a safe and environmental feasible way to dispose of massive amounts of animal carcasses that may occur in such catastrophic disease events as avian influenza, foot and mouth disease, etc.

PUBLICATIONS: 2002/01 TO 2002/12
No publications reported this period

PROJECT CONTACT:
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(20)
ACCESSION NO: 0181438 SUBFILE: CRIS
PROJ NO: **IOWV-400-63-17 AGENCY: CSVM IOWV**
PROJ TYPE: **STATE PROJ STATUS: TERMINATED**
START: 01 MAY 1998 TERM: 31 DEC 1998 FY: 1999

INVESTIGATOR: Reynolds, D. L.

PERFORMING INSTITUTION:
VETERINARY MEDICINE

IOWA STATE UNIVERSITY
S. AND 16TH ELWOOD
AMES, IOWA 50011

STUDIES ON NEWCASTLE DISEASE VACCINATION IN TURKEYS

OBJECTIVES: The objective of this project is to assess a new recombinant vaccine for use in turkeys for the treatment of Newcastle disease. This vaccine is a fowlpox virus that expresses some Newcastle disease virus proteins. It has been proven efficacious for both fowlpox and Newcastle disease control in chickens. We are exploring the potential of using this vaccine to control Newcastle disease in turkeys. This product offers some potential advantages over conventional vaccines by decreasing the vaccine reaction in vaccinated birds and thus lessening the potential of precipitating respiratory disease complications post-vaccination

APPROACH: Some poults will be vaccinated with rFP/NDV at the hatchery. Vaccination of these poults will be by subcutaneous injection. Some poults will be vaccinated orally at 3 weeks of age. Blood samples will be collected by the medial wing vein method. Birds will be challenged with Texas GB strain of velogenic Newcastle disease virus by the intramuscular route. Following challenge, 5 birds per group (20 in all) will be tracheal swabbed using cotton-tipped applicators. Protection and efficacy will be assessed by challenge results, tracheal viral shedding of the challenge virus and seroconversion using HI titers.

NON-TECHNICAL SUMMARY: Newcastle disease in turkeys. This project will assess a new recombinant vaccine for use in turkeys for the treatment of Newcastle disease.

PROGRESS: 1998/05 TO 1998/12
The fowlpox vectored recombinant Newcastle vaccine (rFPNDV) was evaluated in turkeys. Turkeys received the rFPNDV subcutaneously at a day of age and then some turkeys were boostered vaccinated at 3 weeks of age with conventional B1 ND vaccine by the intranasal method. Birds were challenged at 6 weeks of age. It was found that those birds receiving B1 ND vaccine were protected but those birds recieiving only rFPNDV were marginally protected when compared to nonvaccinated birds.

IMPACT: 1998/05 TO 1998/12
The rFPNDV used by itself will not convey strong protection against challenge with velogenic NDV.

PUBLICATIONS: 1998/05 TO 1998/12
None, 1999

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(21)
ACCESSION NO: 0181440 SUBFILE: CRIS
PROJ NO: IOWV-400-63-26 AGENCY: CSVM IOWV
PROJ TYPE: STATE PROJ STATUS: TERMINATED
START: 01 OCT 1998 TERM: 30 SEP 1999 FY: 1999

INVESTIGATOR: Reynolds, D. L.

PERFORMING INSTITUTION:
VETERINARY MEDICINE
IOWA STATE UNIVERSITY
S. AND 16TH ELWOOD
AMES, IOWA 50011

STUDIES ON OASIS IN TURKEYS

OBJECTIVES: The objective of this trial is to determine if the nutritional supplement Oasis has any beneficial effect on enhancing the immune system of young turkeys.

APPROACH: Birds will be allowed access only to Oasis for 48 hours following hatch and prior to placing them into battery brooders. Corresponding control birds will not receive Oasis, food or water. Upon placing the birds they will be vaccinated with a commercial adjuvanated vaccine. Blood samples will be collected at weekly intervals for weeks. Antibody titers and total serum immunoglobulin will be assessed on the birds and the groups will be compared.

NON-TECHNICAL SUMMARY: Treatment/vaccine for Newcastle disease in turkeys. Assessing nutritional supplement prior to administration of a new recombinant vaccine for use in treating Newcastle disease in turkeys.

PROGRESS: 1998/10 TO 1999/09
Oasis is a commercial product that is used when transporting turkey poults or chick from the hatchery to remote locations. The product is a hydrated gel that is placed in the transport box. The hatchling birds pick and eat the material and is supplies nutrition and hydration during the transport period. The objective of this trial was to determine if Oasis had a positive influence on the immune response of the bird. Birds were hatched and one grup was placed on oasis for 48 hours

while a control group received nothing. The birds were also vaccinated with IBD immediately following hatch to determine if birds receiving Oasis would mount a higher antibody response. The results indicated there was no difference in the immune response to vaccination between those birds receiving oasis and those that did not.

IMPACT: 1998/10 TO 1999/09
Hydrated gel material will not act to stimulate a better immune response in commercial poultry.

PUBLICATIONS: 1998/10 TO 1999/09
None, 1999

PROJECT CONTACT:
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(22)
ACCESSION NO: 0181442 SUBFILE: CRIS
PROJ NO: IOWV-400-63-88 AGENCY: CSVM IOWV
PROJ TYPE: STATE PROJ STATUS: TERMINATED
START: 01 SEP 1997 TERM: 31 AUG 1998 FY: 1999

INVESTIGATOR: Reynolds, D. L.

PERFORMING INSTITUTION:
VETERINARY MEDICINE
IOWA STATE UNIVERSITY
S. AND 16TH ELWOOD
AMES, IOWA 50011

STUDIES ON NEWCASTLE DISEASE

OBJECTIVES: The objective of this proposal is to determine if intrayolk-sac (IYS) injection could be used to efficaciously vaccinate birds against Newcastle disease.

APPROACH: Groups of birds were vaccinated by the IYS route with commercial licensed Newcastle disease (ND) vaccine. These birds will be compared to birds that had been vaccinated in the coventional way (spray) or had not received vaccine. Seroconversion will be determined by weekly blood collection and performing HI titers. Protection will be assessed by challenging the birds with Texas GB strain of NDV.

NON-TECHNICAL SUMMARY: Newcastle disease in chickens. Objective is to determine if an intrayolk-sac injection could be used to vaccinate against Newcastle disesase.

PROGRESS: 1997/09 TO 1998/08
Immunoglobulins purified from the egg yolks of chickens vaccinated against Newcastle disease virus (NDV) were digested with pepsin. The resulting Fab' fragments were either injected in ovo or subcutaneously at the day of hatch. The absorption of the Fab' fragments and their biologic activity was assessed by serologic assay (HI titers) and challenge to the Texas GB strain of NDV. It was found that no biologic activity, i.e. HI titers or protection against challenge, occurred with Fab' vaccinated chickens.

IMPACT: 1997/09 TO 1998/08
Passive immunization may be an important strategy in controlling certain avian pathogens. The results of this study that passive immunity will require the entire immunoglobulin molecule.

PUBLICATIONS: 1997/09 TO 1998/08
Reynolds, D. L., S. Akinc and A. Ali. Studies on the passive immunity employing the Fab' fragment of chicken immunoglobulin. Oral presentation. AAAP/AVMA annual convention meeting. New Orleans, LA. July 10 - 14, 1999.

PROJECT CONTACT:
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(23)
ACCESSION NO: 0132087 SUBFILE: CRIS
PROJ NO: IOWV-701-23-10-0005 AGENCY: CSVM IOWV
PROJ TYPE: STATE PROJ STATUS: TERMINATED

START: 01 JUL 1986 TERM: 30 JUN 2001 FY: 2001

INVESTIGATOR: Reynolds, D. L.

PERFORMING INSTITUTION:
VETERINARY MEDICINE
IOWA STATE UNIVERSITY
AMES, IOWA 50011

RESPIRATORY DISEASES OF POULTRY

OBJECTIVES: To develop diagnostic techniques to aid in the control of poultry respiratory diseases of economic importance. To improve current methods of management and prevention of poultry respiratory diseases.

APPROACH: To apply modern laboratory techniques and develop new products that relate to the above objectives.

PROGRESS: 1986/07 TO 2001/06
Newcastle disease (ND) is a highly contagious viral disease of poultry capable of causing high morbidity and mortality. The traditional strategy for controlling outbreaks of highly pathogenic ND is to eradicate exposed, or potentially exposed, flocks of birds. Although this strategy has proved successful, it typically results in large numbers of birds being euthanized. The environmental, economic and animal ethical issues of this strategy are of increasing concern. The objective of this study was to examine the potential for using passive immunization as an alternative strategy for controlling highly pathogenic outbreaks of ND. Here we determine the time interval between exposure and providing protection by administering anti-Newcastle disease virus (NDV) specific immunoglobulin subsequent to virulent NDV challenge. Different groups of chickens were passively immunized (i.e. received Anti-NDV antibody) at various times with respect to challenge corresponding to 24 hrs. prechallenge, day of challenge, 1, 2, 3, 4, 5, 6, 8 and 9 days post challenge. HI titers were evaluated prechallenge prior to antibody injection and 24 hours post passive immunization. Serologic results indicated that all birds passively immunized had titers between 10 and 12 log2. The results of the challenge indicated that all birds that received passive immunization by 3 days following challenge were protected. Protection began to wane by 4 days post challenge and little (if any) protection was afforded by 8 days post challenge. In general, if birds were administered immunoglobulins prior to clinical signs of ND, they were afforded protection.

IMPACT: 1986/07 TO 2001/06
The results of the passive immunity studies indicate that providing passive protection to birds at the time of, or subsequent to, challenge can provide protection. This method of protection may be an alternative to eradication.

PUBLICATIONS: 1986/07 TO 2001/06
Reynolds, Donald and Sevinc Akinc. Passive immunization protects birds following challenge with virulent NDV. Oral presentation. AVMA / AAAP annual meeting. Boston, MA. July 14-18, 2001.

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(24)
ACCESSION NO: 0175014 SUBFILE: CRIS
PROJ NO: MD-D-115 AGENCY: CSREES MD.
PROJ TYPE: HATCH PROJ STATUS: TERMINATED MULTISTATE PROJ NO: **NE-138**
START: 01 OCT 1996 TERM: 30 SEP 2002 FY: 2001

INVESTIGATOR: Vakharia, V. N.; Heckert, R. A.

PERFORMING INSTITUTION:
VETERINARY MEDICINE
UNIV OF MARYLAND
COLLEGE PARK, MARYLAND 20742

EPIDEMIOLOGY AND CONTROL OF EMERGING STRAINS OF POULTRY RESPITORY DISEASE AGENTS

OBJECTIVES: Design and implement novel immune and genetic prophylactic strategies for effective control of respitory diseases caused by emerging IBV, ILTV, mycoplasmas, IBDV, and CAV.

APPROACH: Approach: The genomic DNA of chicken anemia vius (CAV) will be cloned and complete nucleotide sequence determined. The VPI and VP2 genes will be subcloned and expressed in a baculovirus expression system. The synthesized proteins will be characterized with monoclonal antibodies and then evaluated as immunogens serologically and via challenge.

PROGRESS: 1996/10 TO 2002/09
To develop an attenuated, multi-spectrum vaccine candidate that can protect against classical and variant strains of infectious bursal disease virus (IBDV), we

constructed several full-length and chimeric cDNA clones of segments A and B of the D78 and GLS strains. Using the cRNA-based reverse genetics system developed for IBDV, we generated recombinant viruses after transfection in Vero cells. A panel of IBDV-specific monoclonal antibodies (MAbs) was used to characterize the recovered viruses and their replication kinetics was compared with that of the parental D78 strain in vitro. Viruses deficient in the expression of VP5 nonstructural protein (NS) grew to slightly lower titers than D78 virus and exhibited decreased cytotoxic and apoptotic effects in cell culture. To evaluate the efficacy of the recombinant IBDV vaccine, we inoculated 3-week-old chickens with this virus and challenged them with STC and variant GLS viruses. Based on histopathology and serology tests, we observed that the chickens inoculated with recombinant IBDV vaccine (containing a GLS-specific epitope) failed to induce any pathological lesions or clinical signs of disease, and were completely protected against both classic and variant IBDV strains. In another study, we show that dimethylsulfoxide (DMSO) enhances liposome-mediated transfection of nucleic acid in chicken macrophage cells and that this could be exploited for transcutaneous delivery of naked DNA through the intact skin of chickens. We found that DMSO enhanced transfection efficiencies of lipofectamine and polyethyleneimine in HD-11 chicken macrophage cells. Based on this principle, we showed that transcutaneous delivery of a DNA plasmid-dimethylsulfoxide mixture (1:1) to untreated skin of chickens result in a wide distribution of the plasmid in the body. Distribution studies were done using plasmids encoding enhanced green fluorescent protein (EGFP) reporter gene and a bivalent DNA vaccine coding for IBDV and Newcastle disease virus (NDV) immunogenic protein genes. This bivalent vaccine induced mucosal and systemic immune responses, as evidenced by IgA and IgM production in the tears and serum of vaccinated chickens. Mucosal immune responses in the tears after topical vaccination were significantly higher than after intramuscular delivery of the same DNA vaccine and were characterized by the absence of an IgG response. The biodistribution of plasmid indicated that topical delivery with DMSO resulted in a wide distribution and persistence of the plasmid until 15 weeks post-primary vaccination. Both delivery methods resulted in insert-specific message being made in several body tissues, but after topical delivery the virus-specific mRNA could be detected in the bone marrow of one out of three chickens until 15 weeks post-primary vaccination. Furthermore, transcutaneous delivery of this DNA vaccine using DMSO conferred protection from challenge with virulent IBDV (86% survival) and NDV (86% survival). This novel transcutaneous method of delivery of a DNA vaccine shows promise as being an easy and effective way to deliver nucleic acids through intact skin for vaccination or therapeutic purposes.

IMPACT: 1996/10 TO 2002/09

We have developed an attenuated, multivalent IBDV vaccine that can protect against classic and variant strains, and have developed methods for delivery of a DNA vaccine. These findings will aid in the development of cost-effective vaccines for viral pathogens and better equip the chicken farmers with tool necessary to combat viral diseases.

PUBLICATIONS: 1996/10 TO 2002/09

1. Elankumaran, S., Heckert, R.A., and Moura, L. 2002. Persistence and tissue distribution of a variant strain of infectious bursal disease virus in commercial broiler chickens. Avian Dis. 46:169-176.
2. Heckert, R.A., Elankumaran S, Oshop G, and Vakharia V.N. 2002. A novel transcutaneous plasmid-dimethylsulfoxide delivery technique for avian nucleic acid immunization. Vet Immunol Immunopathol. 89:67-81.
3. Oshop G, Elankumaran S, Heckert R.A. 2002. DNA vaccination in the avian. Vet Immunol Immunopathol. 89:1-12. Oshop, G.L., Elankumaran, S., Vakharia, V.N., and Heckert, R.A. 2002. In ovo delivery of DNA to the avian embryo. Vaccine (in press).
4. Vakharia, V.N. 2002. Molecular determinants of virulence in infectious bursal disease virus. 3rd European Concerted Research Action (COST 839) Meeting on Immunosuppressive Viral Diseases in Poultry, April 25-28, Leipzig, Germany.
5. Liu, M., Brandt, M., Liu, Y., Edwards, G.H., and Vakharia, V.N. 2002. Recombinant attenuated IBDV vaccine that protects against classic and variant strains. 138th American Veterinary Medical Association Annual Convention, July 13-17, 2002, Nashville, TN.
6. Liu, M., and Vakharia, V.N. 2002. Two amino acid residues in VP2 protein of IBDV are involved in cell entry and efficient replication in vivo. 21st Annual Meeting of American Society for Virology, July 20-24, Lexington, KY.

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(25)
ACCESSION NO: 0190633 SUBFILE: CRIS
PROJ NO: MD-VTMD-9201 AGENCY: CSREES MD.
PROJ TYPE: NRI COMPETITIVE GRANT PROJ STATUS: NEW
CONTRACT/GRANT/AGREEMENT NO: 2002-35204-11601 PROPOSAL NO: 2001-02372
START: 15 DEC 2001 TERM: 31 DEC 2003 GRANT YR: 2002
GRANT AMT: $228,000

INVESTIGATOR: Samal, S.; Gelb, J.

PERFORMING INSTITUTION:
VETERINARY MEDICINE
UNIV OF MARYLAND
COLLEGE PARK, MARYLAND 20742

RECOMBINANT NEWCASTLE DISEASE VIRUS EXPRESSING IBV SPIKE PROTEIN.

OBJECTIVES: A recombinant Newcastle Disease Virus (NDV) containing the spike S1 glycoprotein gene of avian infectious bronchitis virus (IBV) will be recovered from cloned cDNAs. The level of expression, intracellular transport, and processing of the IBV S1 protein expressed from the recombinant NDV will be examined. The recombinant NDV expressing the S1 protein will be evaluated as a vaccine to control both of these economically important diseases.

APPROACH: A reverse genetic system developed by our laboratory will be used to recover a recombinant Newcastle disease virus (NDV) containing the S1 gene of infectious bronchitis virus (IBV). This system involves simultaneous expression of antigenome-sense NDV RNA from the full-length plasmid and NDV NP, P, and L proteins from co-transfected plasmids. The S1 gene of IBV strain Mass 41 will be inserted into the 3' proximal locus of the NDV strain LaSota full-length cDNA clone. The correct expression of the IBV S1 protein will be determined by immunoprecipitation and immunofluorescence assays. The pathogenicity and immunogenicity of recombinant NDV expressing the S1 protein of IBV will be evaluated in two-week-old chickens. The vaccinated chickens will be challenged with virulent NDV and IBV strains. For the vaccine to be satisfactory, 90% of the vaccinated chickens should be negative for virus recovery and survive challenge.

NON-TECHNICAL SUMMARY: IBV is the most common respiratory disease in poultry in the USA in recent years. Currently available IBV vaccines are

unstable. In contrast, NDV strain LaSota is a safe and stable vaccine for both NDV and IBV. We have developed a system to produce live NDV strain LaSota from DNA. This system not only allows us to produce live NDV strain LaSota from DNA but also allows us to introduce foreign genes into the genetic material of NDV. We propose to insert the immunogenic and protective portion of the spike protein of Infectious Bronchitis Virus (IBV) into the genetic material of NDV strain LaSota.

PROGRESS: 2002/01 TO 2003/01
We have constructed two NDV cDNA constructs containing the S1 gene of IBV strain Mass 41. In one construct, the S1 gene was introduced into the first position, before the NP gene, in the full-length cDNA of NDV strain Beaudette C. In the other construct, the S1 gene of Mass 41 was introduced into the third position, after P gene, in the full-length cDNA of NDV strain LaSota. Recombinant NDV strains Beaudette C and LaSota containing the S1 gene were recovered after transfection of HEp-2 cells following our standard recovery protocol. Recombinant NDV strains containing the S1 gene of IBV were first examined by RT-PCR to confirm the presence of the S1 gene in the genome of recombinant NDV. To determine whether the recombinant NDV strains correctly expressed the IBV S1 protein in infected cells, Western blot analysis was performed. Our results showed that correct size S1 protein was expressed from recombinant NDV strains. Pathogenicity studies of these recombinant NDV strains in 10-day-old chicks showed that the ICPI values were slightly lowered. Studies are underway to determine whether the S1 protein is incorporated into NDV particles.

IMPACT: 2002/01 TO 2003/01
The use of the recombinant NDV vector to deliver the S protein of IBV should provide immunity against IBV and NDV strains. Unlike currently available IBV attenuated vaccines and field strains, NDV is highly stable. Thus, the recombinant NDV/IBV vaccine should not contribute to the evolution of new IBV variants that continue to plague the poultry industry. Our proposed vaccine will be highly beneficial to the poultry industry.

PUBLICATIONS: 2002/01 TO 2003/01
No publications reported this period

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(26)
ACCESSION NO: 0180471 SUBFILE: CRIS
PROJ NO: MDR-9802290 AGENCY: CSREES MD.R
PROJ TYPE: NRI COMPETITIVE GRANT PROJ STATUS: EXTENDED
CONTRACT/GRANT/AGREEMENT NO: 98-35204-6427
START: **01 OCT 1998 TERM: 30 SEP 2001 FY: 2000 GRANT YR: 1998**
GRANT AMT: $140,000
INVESTIGATOR: Samal, S. K.

PERFORMING INSTITUTION:
REGIONAL COLLEGE OF VET MED
UNIV OF MARYLAND
COLLEGE PARK, MARYLAND 20742

PRODUCTION OF INFECTIOUS NEWCASTLE DISEASE VIRUS FROM CDNA: POTENTIAL FOR VACCINE DEV. AND BASIC

OBJECTIVES: 9802290. 1. Construction of a full-length NDV cDNA clone. 2. Recovery and characterization of infectious NDV from cDNA. 3. Construction of NDV with mutations in the fusion protein cleavage site.

APPROACH: A full-length cDNA of the genomic RNA of NDV will be constructed using reverse-transcriptase polymerase chain reaction. The cDNA will be cloned into a plasmid flanked by a T7 promoter and ribozyme sequences. Infectious NDV will be produced by the intercelluler coexpression of T7 based plasmid cDNAs. One cDNA will encode the complete NDV genome and the other cDNAs will encode NDV proteins required for first round of virus specific mRNA synthesis. T7 polymerase will be supplied by a replication-deficient recombinant vaccinia virus. The recovered virus will be characterized using several invitro methods. Mutations will be introduced into NDV cDNA by site directed mutagenesis.

PROGRESS: 1999/10 TO 2000/09
A recombinant NDV strain, Beaudette C, was generated from cloned cDNAs. Characterization of the recombinant NDV showed similarities in growth and pathogenicity to that of the parental wild-type virus. The sequence of the cleavage site of the fusion protein of the recombinant NDV were altered by site-directed mutagenesis. Recombinant NDV containing the mutation required trypsin activation for fusion and infectivity in cell culture. The virulence of the recombinant NDV with altered fusion protein cleavage site was also lowered. This result showed that the cleavage of the fusion protein plays an important role in the pathogenesis of NDV.

IMPACT: 1999/10 TO 2000/09
Recovery of infectious recombinant Newcastle Disease Virus from cloned DNA can produce better vaccines against Newcastle Disease in poultry. This new technology will also enable recombinant Newcastle Disease Virus to be used as vaccine vector for other avian pathogens. Thus, production of recombinant Newcastle Disease Virus has a great potential for the development of vaccines against avian pathogens and will significantly benefit the poultry industry.

PUBLICATIONS: 1999/10 TO 2000/09

Krishnamurthy, S., Huang, Z. and Samal, S.K. 2000. Recovery of a virulent strain of Newcastle Disease Virus from cloned cDNA: epression of a foreign gene results in growth retardation and attenuation. Virology 278: 168-182.

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(27)
ACCESSION NO: 0180895 SUBFILE: CRIS
PROJ NO: MICK-9803219 AGENCY: CSREES MICK
PROJ TYPE: SMALL BUSINESS GRANT PROJ STATUS: EXTENDED
CONTRACT/GRANT/AGREEMENT NO: 98-33610-6303
START: 01 SEP 1998 TERM: 31 AUG 2001 GRANT YR: 1998
GRANT AMT: $225,000

INVESTIGATOR: Reilly, J. D.

PERFORMING INSTITUTION:
ORIGEN, INC.
NATURA, INC.
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IMMORTAL CELL LINE FOR POULTRY VACCINE PRODUCTION & DIAGNOSTICS

OBJECTIVES: 9803219. There are two technical objectives for this SBIR Phase II proposal. The first technical objective is to develop methods for using OCLTM cells to make vaccines that are at least comparable to traditional methods in yield and efficacy. The viruses that will be used are SB1-OCLTM, CVI988-OCLTM, avian influenza virus, and vaccine strains of avian reovirus, Newcastle disease virus, fowlpox virus, cell culture-adapted infectious bursal disease virus, and duck enteritis virus. The second technical objective is to compare sensitivity and range of OCLTM-based VI assays to traditional methods. The viruses that will be used are avian influenza virus, avian reovirus, Newcastle disease virus, fowl pox virus, and duck enteritis virus.

APPROACH: The components of the first objective are: 1) One-step growth curves to determine yield of virus in OCLTM cells compared to traditional methods, 2) Modify various growth parameters including initial cell density, MOI, temperature, media composition to maximize the yield of each virus, 3) Compare immunogenicity of virus produced on OCLTM cells to virus produced by traditional methods, 4) Compare safety of virus produced on OCLTM cells to virus produced by traditional methods, and 5) Scale growth of each virus up to production levels. Specifically, the components of the second objectives are: 1) Compare sensitivity of OCLTM-based VI assays to traditional methods, and 2) Compare susceptibility of a panel of virus strains and field isolates for each virus tested to traditional methods of detection. The Immunogenicity and safety tests will be performed as described for each virus in 9 CFR PP113.

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(28)
ACCESSION NO: 0172971 SUBFILE: CRIS
PROJ NO: MISV-322090 AGENCY: CSREES MISV
PROJ TYPE: ANIMAL HEALTH PROJ STATUS: TERMINATED
START: 01 OCT 1996 TERM: 30 JUN 2002 FY: 2002

INVESTIGATOR: Wang, C.; Magee, D.; Keirs, R. W.

PERFORMING INSTITUTION:
COLLEGE OF VETERINARY MEDICINE
MISSISSIPPI STATE UNIV
MISSISSIPPI STATE, MISSISSIPPI 39762

INFECTIOUS BRONCHITIS VIRUS INFECTION IN COMMERCIAL BROILERSAND CHICKEN EMBRYOS

OBJECTIVES: Serotype IBV from selected Mississippi flocks experiencing respiratory problems by RT-PCR and IFA; Determine whether commonly used vaccine strains mutate at serial passage in chicken embryos, and Evaluate the persistence and the replication competition if IBV strains in various organs and tissues.

APPROACH: Trachea, cecal tonsils and cloacal contents will be collected from birds suffering from respiratory problems within Mississippi. The viruses isolated will be serotyped by IFA with monoclonal antibodies (MAbs) and PCR specific for Mass, Conn or Ark strains. SPF chicken embryos will be artificially inoculated with Mass, Ark or Mass/Ark combination respectively. The viruses will be passaged from chicken to chicken and examined for mutation by PCR and sequencing. The persistence of IBV in tissues or lymphocytes will be determined by IFA and RT-PCR.

NON-TECHNICAL SUMMARY: The project seeks to understand how infectious bronchitis virus infection occurs in and affects commercial broilers and chicken embryos.

PROGRESS: 1996/10 TO 2002/06
Infectious bronchitis (IB) is an acute, highly contagious viral respiratory disease and one of the most common and economically important diseases in the poultry

industry. The objectives of this study were to 1) study the epidemiology of IB in Mississippi; 2) find the best method to detect and type infectious bronchitis virus (IBV); and 3) understand the pathogenesis of IBV. We have identified that Arkansas 99 (Ark 99) serotype was the predominate serotype that caused the 1988 IB outbreak. The results also indicate that within a 1 year period Ark type IBV in Mississippi was spread with little or no change in its genetic sequence. We also found that the reverse transcription polymerase chain reaction (RT-PCR) is more sensitive method to detect and type IBV than the indirect fluorescent antibody assay (IFA), especially when there is more than one strain of IBV involved, but the IFA is rapid and cheaper than the RT-PCR. Our study suggests fusion is the mechanism for IBV to enter the cells. Entry into susceptible cells of IBV seems to be more efficient at a slightly basic pH. The study also suggests that the feline aminopeptidase N molecule plays a role in IBV entry.

IMPACT: 1996/10 TO 2002/06
This study help to understand the pathogenesis of infectious bronchitis virus and to utilize the best method to diagnose the disease when there is an IB outbreak. The resulting information provided prevention and control strategies to save millions of dollars lost annually due the virus, consequently significantly enhancing profitability.

PUBLICATIONS: 1996/10 TO 2002/06
1. Wang C, Miguel B, Hong C, Austin FW, and Keirs RW. Comparision of the immunofluorescent assay and reverse transcription-polymerase chain reaction to detect and type infectious bronchitis virus. Avian Dis, 1999, 43:590-596.
2. Shi Q and Wang C. Genetic relationships of infectious bronchitis virus isolates from Mississippi broilers. Avian Dis, 2000, 44:66-73.
3. Miguel B, Pharr GT, and Wang C. The role of feline aminopeptidase N as a receptor for infectious bronchitis virus. Arch. Virol. 2002; 55:57-63.

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(29)
ACCESSION NO: 0172972 SUBFILE: CRIS
PROJ NO: MISV-329040 AGENCY: CSREES MISV
PROJ TYPE: ANIMAL HEALTH PROJ STATUS: TERMINATED
START: 01 OCT 1996 TERM: 30 JUN 2002 FY: 2002

INVESTIGATOR: Montgomery, R. D.; Maslin, W.; Boyle, C. R.

PERFORMING INSTITUTION:
COLLEGE OF VETERINARY MEDICINE
MISSISSIPPI STATE UNIV
MISSISSIPPI STATE, MISSISSIPPI 39762

THE HEAD-ASSOCIATED LYMPHOID OF CHICKENS AND ITS IMMUNOLOGICAL ROLE

OBJECTIVES: Improve the methodology used to evaluate the HALT; Effects of various stressors on the HALT; and (3) Effect of GH on pathogenesis of various pathogens.

APPROACH: An ELISA will be developed to quantitate the various classes of immunoglobulin (Ig) present in tears (IgA, IgG, IgM) of chickens exposed to a test antigen (B. abortus). Once developed, the ELISA will be used to re-evaluate the default GH B. abortus assay to determine which parameters can be modified to increase the sensitivity and specificity of the assay; Stressors known to have an impact on lymphoid systems and/or the respiratory tract will be given to various ages of SPF chicks. Following exposure, these chicks will be subjected to both structural and functional analysis to determine the effect of these agents on the HALT; and Respiratory tract-oriented microbial pathogens, including viruses and bacteria will be given to both GH-intact and GHx chicks of various ages. The pathogenesis of these stressors will be monitored in both types of subjects by conducting sequential microbial recoveries and histological analyses of targtet sites specific for the particular agent used. Optionally, if the pathogenesis of vaccine viruses are studied, the GH-intact and GHx chicks may be challenged at the end of the trial to determine the degree of protection in both.

NON-TECHNICAL SUMMARY: Defining the immunological role of the head-associated lymphoid tissues of chickens is the focus of this project. This work will aid us in understanding how to utilize the tissue to enhance immune responses in the chicken.

PROGRESS: 1996/10 TO 2002/06
Thirty-six modified-live virus vaccines, including 16 infectious bronchitis virus (IBV), 10 Newcastle Disease virus (NDV), and 10 NDV/IBV vaccines were evaluated for their effects on the gland of Harder (GH) and other head-associated lymphoid tissue (HALT) sites. Some of the IBV vaccines, either alone or in combination with NDV, were found to interfere with the GH/HALT's ability to respond to antigenic stimulation and to alter specific histological attributes. Two hundred and eight *E. coli* were collected from various lesions (respiratory, intestinal, yolk, joint, etc.). These isolates were characterized biochemically, analyzed for their plasmid content(s), analyzed for their sensitivity to antibiotics, and evaluated for their lethality in embryonated chicken eggs, which reputedly correlates with in vivo pathogenicity in young chickens. One of the *E. coli*, which repeatedly spared embryonated eggs was adapted to grow in the presence of nalidixic acid and evaluated in the chicks that hatched. Although overall hatchability was reduced, a number of infected embryos did hatch into viable and healthy-appearing chicks. However, those chicks had lowered body weights and increased early mortality. Consistently high levels of the nalidixic acid resistant-*E. coli* were recovered from the yolk of these chicks and moderate levels were detected in their lung and trachea. *E. coli* was also recovered from the respiratory tract of non-infected chicks that were hatched in contact with the *E. coli* chicks, indicating that *E. coli* can be transmitted vertically through the embryo and amplified horizontally to susceptible neonates at the time of hatching. Data from an extensive respiratory outbreak that occurred in Mississippi broilers during 1998-1999

was collected and analyzed. Arkansas and, to some extent, Connecticut IBV, were the principal agents detected in this outbreak. Epidemiological factors collected with these cases included date received, identity of growout company involved, age of birds, strain(s) of IBV in vaccination program, infectious bursal disease (IBD) vaccination status, condition of samples received, any respiratory lesions noted, and the geographic location of farm. In general, the number and distribution of 1) cases received, 2) cases positive for virus, and 3) viruses detected were proportional to the epidemiological factors collected.

IMPACT: 1996/10 TO 2002/06
This research indicated that by our use of 36 modified live virus vaccines which included 16 infectious bronchitis virus, 10 Newcastle Disease viruses, and 10 NDV/IBV vaccines, either alone or in combination, we were successful in interfering with the GH/HALT's ability to respond to antigenic stimulation and to alter specific histological attributes.

PUBLICATIONS: 1996/10 TO 2002/06
1. Montgomery, R. D., C. R. Boyle, W. R. Maslin, and D. L. Magee. Attempts to reproduce a runting/stunting-type syndrome using infectious agents isolated from affected Mississippi broilers. Avian Dis. 41:80-92. 1997.
2. Montgomery, R. D., W. R. Maslin, and C. R. Boyle Effects of Newcastle disease vaccines and Newcastle disease/infectious bronchitis virus combination vaccines on the head-associated lymphoid tissues of chickens. Avian Dis. 41:399-406. 1997.
3. Montgomery, R. D., C. R. Boyle, T. A. Lenarduzzi, and L. S. Jones. Chicks Hatched from *Escherichia coli*-infected Embryos. Avian Diseases. 43:553-563. 1999.

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(30)
ACCESSION NO: 0187676 SUBFILE: CRIS
PROJ NO: MO-ASAH0594 AGENCY: CSREES MO.
PROJ TYPE: ANIMAL HEALTH PROJ STATUS: TERMINATED
START: 01 OCT 2000 TERM: 30 SEP 2001 FY: 2001

INVESTIGATOR: Ledoux, D. R.; Bermudez, A. J.; Rottinghaus, G. E.

PERFORMING INSTITUTION:
ANIMAL SCIENCES
UNIVERSITY OF MISSOURI
COLUMBIA, MISSOURI 65211

CHARACTERIZATION OF TOXICOLOGICAL EFFECTS OF MULTIPLE MYCOTOXINS IN POULTRY

OBJECTIVES: Determine the additive, synergistic, or antagonistic effects of low levels of multiple mycotoxins on performance, organ weights, hematology, serum chemistry, and immune function of poultry.

APPROACH: Chicks and poults will be fed combinations of low levels of mycotoxins (naturally occurring levels) for three to four weeks and the individual and combined effects of the mycotoxins will be assessed based on growth performance, organ weights, hematology, serum chemistry, and immune function. The primary and secondary antibody response to inactivated Newcastle disease virus (NDV) will be used to examine the humoral immune response of broilers and turkeys. A [3H]-thymidine incorporation assay will be used to assess the proliferation of chick and turkey lymphocytes in response to two mitogens, concanavalin A and pokeweed mitogen. An Escherichia coli challenge will be used to evaluate the ability of chicks and turkeys, fed combinations of mycotoxins, to clear the bacteria from the peripheral circulation. Additionally, birds will be fed mycotoxins, vaccinated against selected poultry diseases and vaccine titers determined. In addition, vaccinated birds will then be challenged with the disease organisms to determine if the efficacy of the vaccine has been reduced by the mycotoxins.

NON-TECHNICAL SUMMARY: U.S. poultry producers have a continuous problem with mycotoxin-contaminated feedstuffs causing poorly defined syndromes. It has been speculated that many of these syndromes might be caused by synergism between low levels of several mycotoxins. Results of these studies will demonstrate whether multiple toxins are responsible for previously reported syndromes.

PROGRESS: 2001/01 TO 2001/12
A 21-day experiment was conducted to determine if the turkey could be used as a model for evaluating the efficacy of adsorbents to ameliorate the toxic effects of aflatoxin (AF). Dietary treatments fed from day of hatch included: 0 ppb AF, 100 ppb AF, 200 ppb AF, 300 ppb AF, 400 ppb AF, 500 ppb AF, and 600 ppb AF. AF was supplied by A. parasiticus culture material that contained 986 ppm AFB1, 29 ppm AFB2, 464 ppm AFG1, and 9 ppm AFG2. Compared with controls, poults fed 200 ppb AF or higher had reduced ($P < .001$) feed intake and lower ($P < .001$) body weight gains. Significant mortality (14/20) occurred in poults fed 600 ppb AF. Compared with controls, poults fed 100 ppb AF or higher had lower ($P < .001$) relative liver weights, whereas poults fed 200 ppb AF or higher had increased ($P < .001$) relative kidney weights. Histopathological analysis indicated the presence of liver lesions in poults fed 100 ppb AF or higher. The primary hepatic lesions were biliary hyperplasia, hepatocellular hyperplasia, and hepatic necrosis with the severity of lesions increasing with increasing AF dose. Kidney lesions were noted in poults fed diets containing 400 ppb AF or higher with a mild to moderate membranous thickening of the glomerular capillary basement membrane noted in most specimens. Results confirm previous reports that suggest turkeys are very sensitive to the toxic effects of AF. The lowest level of AF (100 ppb) that caused toxic effects in poults in this study is 20 fold lower than the levels (2 ppm or higher) reported to cause toxic effects in broilers under laboratory conditions.

IMPACT: 2001/01 TO 2001/12
Results suggest that the turkey could be used as a more sensitive model to evaluate the efficacy of adsorbents to ameliorate the toxic effects of AF at levels that have been reported to cause toxicity under field conditions.

PUBLICATIONS: 2001/01 TO 2001/12
1. Broomhead, J. N., D. R. Ledoux, A. J. Bermudez, and G. E. Rottinghaus, 2002. Chronic effects of fumonisin B1 in broilers and turkeys fed dietary treatments to market age. Poultry Science 81:56-61.
2. Ledoux, D. R., G. E. Rottinghaus, and A. J. Bermudez, 2001. In vitro binding of mycotoxins by adsorbents does not always translate into in vivo efficacy. Pp. 279-287 In: Mycotoxins And Phycotoxins In Perspective At The Turn Of The Millenium. Proceedings of the Xth International IUPAC symposium on Mycotoxins and Phycotoxins.
3. Butkeraitis, P., J. N. Broomhead, E. A. Guaiume, D. R. Ledoux, A. J. Bermudez, and G. E. Rottinghaus, 2002. A turkey model for evaluating the efficacy of adsorbents to ameliorate the toxic effects of aflatoxin. Abstracts International Poultry Scientific Forum, January 14-15, Atlanta, Georgia, page 45.
4. Ledoux, D. R., J. Broomhead, A. J. Bermudez, and G. E. Rottinghaus, 2001. Mycotoxin-Nutrient interactions. pp. 82-94. Proceedings 62nd Minnesota Nutrition Conference & Minnesota Corn Growers Association Technical Symposium. Minneapolis, Minnesota, September 11-12.
5. Ledoux, D. R., G. E. Rottinghaus, A. J. Bermudez, and J. N. Broomhead, 2001. Is fumonisin B1 a threat to the poultry industry? Abstracts The World Mycotoxin Forum, 14-15 May 2001, Noordwijk, The Netherlands. Page 80.
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(31)
ACCESSION NO: 0088380 SUBFILE: CRIS
PROJ NO: OHO00740 AGENCY: CSREES OHO
PROJ TYPE: HATCH PROJ STATUS: TERMINATED MULTISTATE PROJ NO: NC-168
START: 01 OCT 1997 TERM: 30 SEP 2003 FY: 2002

INVESTIGATOR: Nestor, K. E.; Velleman, S. G.

PERFORMING INSTITUTION:
ANIMAL SCIENCES
OHIO STATE UNIV
WOOSTER, OHIO 44691

ADVANCED TECHNOLOGIES FOR THE GENETIC IMPROVEMENT OF POULTRY

OBJECTIVES: Develop, compare, and integrate emerging technologies with classical quantitative genetics for improvement of economic traits in poultry.

APPROACH: Long-term lines of turkeys selected for increased egg production and increased 16-week body weight and their corresponding randombred controls will be maintained. Also, Japanese quail lines divergently selected for 4-week body weight (HW, LW) and plasma yolk precursor (HP, LP) and lines (HW-HP, HW-LP) selected for a combination of these traits will be maintained. A randombred (R1) control population of Japanese quail will be maintained without selection. Attempts will be made to study genetic variation among the experimental turkey and Japanese quail lines by DNA fingerprinting and study of MHC haplotypes. The turkey lines will be studied for resistance to certain diseases including fowl cholera and Newcastle disease. Turkey proteoglycans during skeletal development will be characterized.

PROGRESS: 1997/10 TO 2003/09
Beltsville Small White (BSW) turkeys have been utilized as an experimental model in the study of bacterial, parasitic, and fungal diseases. Given the critical role of the major histocompatibility comple (MHC) antigens in the initial steps of immune response to specific pathogens, the MHC Class II of BSW turkeys was characterized. Southern blot analysis of PvuII-digested turkey DNA that was hybridized with a chicken Class II beta gene genomic clone revealed two restriction fragment length polymorphism profiles not previously identified in experimental or commercial breeder lines of turkeys. These fingerprint profiles differed in a single 6.0-kb gand that was present in approximately 38% of the birds examined. The DNA fragments of 5.0, 4.1, 3.3, and 3.1 were present in both profiles. Furthermore, no mixed lymphocyte reaction was observed between individuals within the BSW turkey line. The present results indicate that BSW turkeys represent a unique source of genetic diversity for MHC Class II haplotypes. Candidate male and female breeders from a number of genetic lines of turkeys that were reared intermingled, with the sexes housed in different buildings on the same farm, were vaccinated with a live Newcastle disease virus vaccine (type B1, strain B1, Lasota) just prior to the commencement of egg production. In 1999, an average mortality of 5.8 % occurred immediately following vaccination and the level of mortality varied among lines. Mortality was greater in large-bodied lines than in small-bodied lines. Affected birds exhibited multiple areas of focal necrosis in the liver and spleen and congestion of the heart and lungs. The percentage mortality occurring following similar vaccination in 2000 averaged 2.6 and mortality was greater in one line (F line) than the other genetic groups and higher in females than in males. Mortality in the F line, selected for increased body weight and known to be susceptible to various diseases, averaged 15.1% for both years. Attempts failed in both years to isolate *Pasteurella multocida* or other bacteria. There was a positive correlation between increased body weight and increased mortality following vaccination with the live LaSota vaccine.

IMPACT: 1997/10 TO 2003/09
The MHC has been shown to be involved in disease resistance in turkeys. Knowledge of variation in MHC haplotypes is important for turkey breeders when they select for disease resistance. Selection for increased growth rate reduces disease resistance in turkeys so commercial turkey breeders should include selection for disease resistance in their program.

PUBLICATIONS: 1997/10 TO 2003/09
1. Sacco, R. E., K. E. Nestor, and R. A. Kunkle, 2000. Genetic variation in response of turkeys to experimental infection with Bordetella avium. Avian Dis.

44:197-200.
2. Sacco, R. E., R. B. Rimler, X. Ye, and K. E. Nestor, 2001. Identification of new major histocompatibility complex Class II restriction fragment length polymorphisms in a closed experimental line of Beltsville Small White turkeys. Poultry Sci. 80:1109-1111.

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(32)
ACCESSION NO: 0166758 SUBFILE: CRIS
PROJ NO: VA-135458 AGENCY: CSREES VA.
PROJ TYPE: HATCH PROJ STATUS: TERMINATED
START: 01 JAN 1995 TERM: 31 DEC 1998 FY: 1999

INVESTIGATOR: Lee, J. C.

PERFORMING INSTITUTION:
COLLEGE OF VETERINARY MEDICINE
VIRGINIA POLYTECHNIC INSTITUTE
BLACKSBURG, VIRGINIA 24061

DISEASE, EPIDEMIOLOGIC AND TOXICOLOGIC INVESTIGATIONS IN VIRGINIA

OBJECTIVES: To identify and respond in a timely manner to sudden disease outbreaks and toxicoses affecting Virginia agricultural producers. To determine the economic impact of these outbreaks.

APPROACH: Funds will be allocated to individual investigators or interdisciplinary teams for 3 purposes: To investigate disease entities of unknown etiology and with potential risk of significant economic loss to agricultural animals in Virginia. To support epidemiologic studies of disease and impaired productivity of animals. These data will support economic analysis of the impact of specific diseases and conditions on Virginia producers. To supplement field investigations in which toxicologic agents are suspected and to develop analytical techniques for toxic substances determined to be of clinical importance in Virginia.

NON-TECHNICAL SUMMARY: Sudden disease outbreaks and toxicoses impact Virginia agricultural producers and require timely investigation and assessment. This project allocates funds to research disease outbreaks and toxicoses with potentially significant economic loss to agricultural animals in Virginia. Projects must be for one of three purposes: 1-Investigate disease entities of unknown etiology, 2-Epidemiologic studies of disease and impaired productivity, or 3-Field investigations where toxicologic agents are suspected.

PROGRESS: 1995/01 TO 1998/12
This project was designed to provide a mechanism for quick, initial response to disease and toxicity, particularly in Virginia. Several studies were conducted as need arose, including Equine Potomac Horse Fever, avian influenze, and Newcastle Disease. Recently the project funded a study on turkey enteritis syndrome (TES), a condition causing serious economic loss and producer changes in Virginia. Turkey Corona Virus (TVC) and Cochlosoma anatis (a protozoan parasite)are two agents frequently isolated from TES outbreaks. TVC is readily transmitted, but not so after four hours of infected animal removal. C. anatis alone causes enteritic disease. In combination, these agents result in a higher mortality rate and illness is more severe than with a single agent.

IMPACT: 1995/01 TO 1998/12
This project allows quick response to conditions of animal and related human health in the Commonwealth of Virginia. As concerns of disease, toxicology, or potential epidemics emerge, veterinarians are enabled to respond quickly and provide initial research to assess and resolve situations.

PUBLICATIONS: 1995/01 TO 1998/12
No publications reported this period

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(33)
ACCESSION NO: 7000416 SUBFILE: ICAR
PROJ NO: W9601 AGENCY: OTHER FEDERAL
START: 01 APR 1997 TERM: 31 MAR 2000 FY: 1997

INVESTIGATOR: WRIGHT P

PERFORMING INSTITUTION:
CANADIAN FOOD INSPECTION AGENCY NATIONAL CENTRE FOR FOREIGN ANIMAL DISEASES
820 Elgin Avenue
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DEVELOPMENT, STANDARDIZATION AND VALIDATION OF SEROLOGICAL TESTS FOR THE DIAGNOSIS OF FOREIGN ANIMAL DISEASES.

NARRATIVE: IMPACT: Oct 1996 Enhanced capability and confidence in the detection of: - E/WEE (Eastern/Western equine encephalitis), ND (Newcastle disease) and AI (avian influenza) in imported ostriches. - E/WEE, FMD and VS (Vesicular stomatitus) in imported llamas and alpacas. International recognition and confidence related to our proficiency in the detection of VS, HC (hog cholera), PR (pseudo rabies), ASF (African swine fever), ND, AI and TRT (turkey rhinotracheitis) in traditional species.

OBJECTIVES: Oct 1996 To develop, monitor and improve, on an ongoing basis, diagnostic reagents and protocols for the diagnosis of foreign animal disease, and ensure that they meet or exceed the standards for prescribed tests as set by the OIE Standards Commission.

PROGRESS:
Oct 1996 new project

NOTES: CONTACT: WRIGHT P; PHONE: 204-984-1007; FAX: 204-275-0402

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(34)
ACCESSION NO: 7000548 SUBFILE: ICAR
PROJ NO: NV9401 AGENCY: OTHER FEDERAL
START: 01 APR 1997 TERM: 31 MAR 1998 FY: 1997

INVESTIGATOR: VYDELINGUM S; TECH
PERFORMING INSTITUTION:
CANADIAN FOOD INSPECTION AGENCY CENTRE OF EXPERTISE FOR PLANT QUARANTINE PESTS
3851 Fallowfield Road R.R. #7
Nepean, Ontario K2H 7V2

VALIDATION OF PCR METHODS FOR THE DETECTION OF FAD VIRUSES

NARRATIVE: IMPACT: Oct 1996 Reliable, accurate, sensitive, rapid and easy to perform FAD tests is the anticipated benefit.

OBJECTIVES: Oct 1996 - Complete the validation of the PCR method for the detection of Hog cholera, Bluetongue and pseudorabies viruses. - Validate the PCR method for African swine fever, Newcastle disease and Avian influenza viruses.

PROGRESS:
Oct 1996 new project

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WORLD WIDE WEB SITES

END USDA RESOURCES

Animal and Plant Health Inspection Service
Exotic Newcastle Disease (END) Homepage
http://www.aphis.usda.gov/lpa/issues/issues_archive/enc/exoticnc.html

Food Safety and Inspection Service
Library of Export Requirements
Presents information on foreign country export requirements for meat and poultry products.
http://www.fsis.usda.gov/OFO/export/explib.htm#notices

END AFFECTED STATES

CALIFORNIA
Department of Fish and Game Newcastle Disease Information Links
http://www.dfg.ca.gov/enforcement/newcastle.html

Department of Food and Agriculture Exotic Newcastle Disease

http://www.cdfa.ca.gov/ahfss/avian_health_program.htm

Los Angeles County Department of Health Services - Veterinary Public Health
Exotic Newcastle Disease Outbreak
http://www.lapublichealth.org/vet/newcastle.htm

NEVADA
Department of Agriculture
http://agri.state.nv.us/ENDPR.pdf

TEXAS
Texas Animal Health Commission Exotic Newcastle Disease
http://www.tahc.state.tx.us/

Division of Emergency Management – END Daily situation reports
http://www.txdps.state.tx.us/dem/sitrepindex.htm

State Foreign Animal Diseases Plan
http://www.tahc.state.tx.us/emergency/FAD_plan_final.pdf

END INTERNATIONAL

UNITED KINGDOM
DEFRA
http://www.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/newcastle/index.htm

AUSTRALIA
Australian Veterinary Emergency Plan
The documents provide guidance based on sound analysis, linking policy, strategies, implementation, coordination and emergency-management plans.
http://www.animalhealthaustralia.com.au/aahc/index.cfm?E9711767-B85D-D391-45FC-CDBC07BD1CD4

Office international des Épizooties
Disease Information is a weekly compilation of emergency messages and animal health follow-up reports provided to the OIE by Member Countries in order to inform the international community on significant epidemiological events occurring in their territories.
http://www.oie.int/eng/info/hebdo/A_INFO.HTM

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (EMPRES)
http://www.fao.org/EMPRES/default.htm

Towards a Global Early Warning System for Animal Diseases
The concept of a global early warning system for priority transboundary animal diseases (TADs) of livestock was initially raised during the review of the EMPRES programme in 1996 (expert consultation, 24-26 July 1996). This became necessary in order to help member countries to be better prepared to fight animal diseases of an epizootic nature.
http://www.fao.org/DOCREP/004/Y3649E/Y3649E00.HTM

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