Faculty Research Interests
Department of Animal and Food Sciences
University of Delaware

ALPHIN , ROBERT L. , Public Service Faculty/ Allen Laboratory Manager

Publications:

E.R. Benson, G.W. Malone, R.L. Alphin, E. Staicu and K. Johnson. 2007. Application of In- house Composting on Viral Inactivity of Newcastle Disease Virus. Poultry Science. Submitted

Benson. E.R., G.W. Malone and R.L. Alphin. 2007. The use of water based foam for mass emergency depopulation of floor reared poultry. World Poultry magazine. Submitted 04/11/2007

M. D. Dawson, M. E. Lombardi, E. R. Benson, R. L. Alphin, and G. W. Malone Using Accelerometers to Determine the Cessation of Activity of Broilers J Appl Poult Res 2007 16(4): 583-591.

Benson. E. R., G. W. Malone, R. L. Alphin, M. D. Dawson, C. R. Pope, and G. L. Van Wicklen. 2007. Foam-based mass emergency depopulation of floor-reared meat-type poultry operations. Poultry Sci. 86:219-224.

Alphin. R.L., Common chemicals could be used against bird flu, Delmarva Farmer Newspaper. May 8, 2007.

Alphin. R.L., Dealing with avian flu on an international level, Delmarva Farmer Newspaper. Nov. 14, 2006.

Alphin. R.L., Biosecurity, planning is key to Delmarva preparedness. Delmarva Farmer Newspaper. May 9, 2006.

Dawson. M.D. , P.L. Reyes, E.R. Benson, R.L. Alphin, G.W. Malone, G.L. Van Wicklen, and I. Estevez. 2006. Evaluation of Foam Based Humane Mass Euthanasia Methodology for Floor-Reared Meat-Type Poultry Operations. Applied Engineering in Agriculture. 22(5): 787-794.

Malone. G., S. Cloud, R. Alphin, L. Carr and N. Tablante. In-House Composting of Litter and Poultry Carcasses Infected with Avian Influenza. Poultry Sci. Vol. 83 (Suppl 1) 2004.

BURNSIDE, JOAN, Ph.D., Professor

Discipline: Avian Genomics

Research: Dr. Burnside's current research focus is on chicken genomics, with an emphasis on high throughput sequencing for the purpose of developing a collection of chicken ESTs. This EST collection is being used to prepare DNA microarrays, which are used to profile the development of the immune system. Analyses of changes in these profiles during challenges to the immune system are being conducted as a means to predict vaccine efficiency. In addition, the arrays are used for the identification of candidate genes involved in disease resistance.

Publications:

Masahiro Niikura, Ph.D.; Taejoong Kim, Ph.D.; Henry D Hunt, Ph.D.; Joan Burnside,Ph.D.; Robin W Morgan, Ph.D.; Jery D Dodgson, Ph.D.; Hans H. Cheng, Ph.D. Marek's disease virus up-regulates major histocompatibility complex class II cell surface expression in infected cells Virology manuscript (in press)

Burnside J. Bernberg E, AndersonA Lu C, Meyers BC, Green PJ, Jain N, Isaacs G, Morgan RW Marek's disease viurus encodes microRNAs that map to meq and the Latency associated transcript. 2006 J.Virology 80:8778-8786

P E Neiman, R Kimmel A Icreverzi K Elsaesser S-J Bowers J Burnside and J Delrow Genomic instability during Myc-induced lymphomagenesis in the bursa of Fabricius 2006 Oncogene 25:6325-6335

Carre W, Wang X, Porter TE, Nys Y, Tang J, Bernberg E, Morgan R, Burnside J, Aggrey SE, Simon J, Cogburn LA. Chicken genomics resource: sequencing and annotation of 35,407 ESTs from single

and multiple tissue cDNA libraries and CAP3 assembly of a chicken gene index. 2006 Physiol Genomics:25(3):514-24.
Burnside, J., Neiman, P., Tang, J., Basom, R., Talbot, R., Aronszajn, M., Burt, D., Delrow, J. 2005.
Development of a cDNA array for chicken gene expression analysis BMC Genomics 2005, 6:13 (4Feb2005)
Tresgaskes, C.A., Glasnsbeek, L.H., Gill, A.D., Hunt, L.G., Burnside, J., Young, J.R. 2005. Conservation of biological properties of the CD40 ligand, CD154 in a non-mammalian vertebrate. Developmental and Comparative Immunology 20:361-374.
Hubbard S.J., Grafham DV, Beattie KJ, Overton IM, McLaren SR, Croning MD, Boardman PE, Bonfield J.K., Burnside J., Davies R.M., Farrell, E.R., Francis M.D., Griffiths-Jones S, Humphray SJ, Hyland C., Scott, C.E., Tang, H., Taylor, R.G., Tickle C., Brown W.R., Birney E., Rogers J., Wilson, S.A. Transcriptome analysis for the chicken based on 19,626 finished cDNA sequences and 485,337 expressed sequence tags. 2005. Genome Res., 15:174-183.
Mirnics, Zeljka Korade, Caudell, Eva, Gao, YanHua, Kuwahara, Kazuhiko, Sakaguchi, Nobuo, Kurosaki, Tomohiro, Burnside, Joan, Mirnics, Karoly, Corey, Seth J. Microarray Analysis of Lyn-Deficient B Cells Reveals Germinal Center-Associated Nuclear Protein and Other Genes Associated with the Lymphoid Germinal Center, J. Immunol., 2004, 172:4133-4141.
Degen, W.G.J., van Daal, N., van Zuilekom, H.I., Burnside, J., Schijns, V. 2004 Identification and molecular cloning of functional chicken IL-12, J. Immunol., 4371-4380.
Cui, J., L. Sofer, S. Cloud, and J. Burnside. 2004. Patterns of gene expression in the developing chick t hymus, Developmental Dynamics, 229: 243-258.
Ouyang M., Case J, Tirunagaru V., Burnside J. 2003. 565 Triples of Chicken, Human, and Mouse Candidate Orthologs, *Journal of Molecular Evolution*, 57:271-281.
Cogburn L.A, Morgan R., Burnside J. 2002. Expressed sequence tags, DNA chips technology and gene expression profiling. In: Poultry Breeding and Biotechnology, William M. Muir (ed). In press.
Kampa D. and Burnside J. 2002. JAK3 regulated genes: DNA Array analysis of ConA-IL2 activated chicken T cells treated with a specific JAK3 inhibitor, *J. Interferon and Cytokine Research,* 22:975-980.
Thorpe C., Hoober K.L., Raje S., Glynn N.M., Burnside J., Turi, G.K., Coppock, D.L., Sulfhydryl oxidases:emerging catalysts of protein disulfide bond formation in eukaryotes. 2002 *Archives of Biochemistry and Biophysics,* 405:1-12.

HAIQIANG CHEN, Ph.D., Assistant Professor

Discipline: Food Processing and Food Safety

Research: Current research focuses on high pressure processing, antimicrobial packaging, and modeling. Specific research projects include the use of high pressure processing and antimicrobial packaging to control *Listeria monocytogenes* in ready-to-eat meat and seafood products.

Publications:

Ye, M., Neetoo, H., and Chen, H. 2007. Control of *Listeria monocytogenes* on ham steaks by antimicrobials incorporated into chitosan-coated plastic films. Submitted to Food Micro.Neetoo, H., Ye, M., and Chen, H. 2007. Use of antimicrobial-coated plastic films to control *Listeria monocytogenes* on cold-smoked salmon. International Smoked Seafood Conference Proceedings.
Neetoo, H, Ye, M. Chen, H., Joerger, R.D., Hicks, D.T., Hoover. D.G. 2007. Use of nisin-coated plastic films to control *Listeria monocytogenes* on vacuum-packaged cold-smoked salmon. Int. J. Food Micro. Revision submitted.
Kural, A. and Chen, H. 2007. Inactivation of *Vibrio vulnificus* in oysters by high pressure and low temperature. Int. J. Food Micro. Submitted.
Neetoo, H., Ye, M., and Chen, H. 2007. The effectiveness and shelf-life of plastic films coated with nisin for inhibition of *Listeria monocytogenes*. J. Food Prot. 70:1267-1271.

Chen, H. 2007. Temperature-assisted pressure inactivation of *Listeria monocytogenes* in turkey breast meat. Int. J. Food Micro. 117:55-60.

Kingsley, D.H., Holliman, D., Calci, K., Chen, H., and Flick, G. 2007. Inactivation of a norovirus by high pressure processing. Appl. Environmental Microbiol. 73: 581-585.

Chen, H. 2007. Use of linear, Weibull, and log-logistic functions to model pressure inactivation of seven foodborne pathogens in milk. Food Micro. 24:197-204.

Kingsley, D.H., Guan, D., Hoover, D.G., and Chen, H. 2006. Inactivation of hepatitis A virus by high pressure processing: the role of temperature and pressure oscillation. J. Food Prot. 69:2454-2459.

Hoover, D. G. and Chen, H. 2006. Processing & Preservative Aids: Bacteriocins. In *Encyclopedia of Biotechnology in Agriculture and Food* (D. Heldman, A. Bridges, D.G. Hoover, and M. Wheeler, eds.). Marcel Dekker, Inc. New York. In press.

Joerger, R.D., Chen, H., and K. Kniel. 2006. Characterization of a spontaneous *cts*R deletion mutant of *Listeria monocytogenes* ScottA. Foodborne Pathogens & Disease. 3:196-202.

Grove, S.F., Lee, A., Lewis, T., Stewart, C.M., Chen, H., and Hoover, D.G. 2006. Inactivation of foodborne viruses of significance by high pressure and other processes. J. Food Prot. 69: 957-968.

Guan, D., Chen, H., and Hoover, D.G. 2006. Inactivation of *Staphylococcus aureus* and *Escherichia coli* O157:H7 under isothermal-endpoint pressure conditions. J. Food Eng. 77: 620-627.

Hoover, D.G., Guan, D., and Chen, H. 2006. High hydrostatic pressure processing. In *Advances in Microbial Foods Safety* (V.K. Juneja, J.P. Cherry, and M.H. Tunick, eds.). ACS Symposium Series, American Chemical Society, Washington, DC.

Chen, H., Guan, D., and Hoover, D.G. 2006. Sensitivities of foodborne pathogens to pressure changes. J. Food Prot. 69:130-136.

Chen, H., Hoover, D.G., and Kingsley, D.H. 2005. Temperature and treatment time influence high hydrostatic pressure inactivation of feline calicivirus, a norovirus surrogate. J. Food Prot. 68:2389–2394.

Hoover, D. G. and Chen, H. 2005. Bacteriocins with potential for use in foods. In *Antimicrobials in Foods* (P.M. Davidson and A.L. Branen, eds.). Marcel Dekker, Inc. New York.

Guan, D., Chen, H., and Hoover, D.G. 2005. Inactivation of *Salmonella* Typhimurium DT 104 in UHT whole milk by high hydrostatic pressure. Int. J. Food Microbiol. 104: 145-153.

Chen, H and Hoover, D.G. 2004. Use of Weibull model to describe and predict pressure inactivation of *Listeria monocytogenes* Scott A in whole milk. Innov. Food Sci. Emerg. Technol. 5:269-276.

Chen, H., Joerger, R.D., Kingsley, D.H., and Hoover, D.G. 2004. Pressure inactivation kinetics of phage λ CI 857. *J. Food Prot.,* 67:505–511.

Kingsley, D.H., Chen, H., Hoover, D.G. 2004. Inactivation of selected picornaviruses by high hydrostatic pressure. *Virus Res.,* 102:221-224.

Chen, H and Hoover, D. G. 2003a. Modeling the combined effect of high hydrostatic pressure and mild heat on the inactivation kinetics of *Listeria monocytogenes* Scott A in whole milk. *Innov. Food Sci. Emerg. Technol.*, 4:25-34.

Chen, H. and Hoover, D.G. 2003b. Bacteriocins and their Food Applications. Comprehensive Rev. Food Sci. Food Safety, 2:81-100.

Chen, H. and Hoover, D.G. 2003c. Pressure inactivation kinetics of *Yersinia enterocolitica* ATCC 35669. Int. J. Food Microbiol., 87:161-171.

Hoover, D. G. and Chen, H. 2003. Bacteriocins with potential for use in foods. In *Antimicrobials in Foods* (P.M. Davidson and A.L. Branen, eds.). Marcel Dekker, Inc. New York. In press.

Chen, H., Anantheswaran, R. C., and Knabel, S. J. 2002. Effect of rapid cooling of shell eggs on microcracks development, penetration of *Salmonella* Enteritidis, and eggshell strength. *Journal of Food Processing and Preservation*, 26:57-73.

Chen, H., Anantheswaran, R. C., and Knabel, S. J. 2002. Effect of rapid cooling on the growth and penetration of *Salmonella* Enteritidis into egg contents. *Journal of Food Safety*, 22:255-271.

COGBURN, LARRY A., Ph.D., Professor

Discipline: Avian Physiology

Research: Endocrine regulation of growth and development in broiler chickens. Research program involves manipulation of the thyrotropic axes to enhance growth rate and improve body composition. We were the first to clone and characterize the chicken growth hormone receptor (cGHR) gene and have identified molecular defects in the cGHR gene which are responsible for sex-linked dwarfism in chickens. Recently, we have examined the developmental expression and tissue distribution of the cGHR in different strains of broiler chickens genetically selected for growth rate, high body fat or increased lean body mass. We have also discovered the expression of unique truncated transcripts of the prolactin receptor gene in the testes of sexually-mature chickens which could be important for normal sexual maturation and reproductive competence in the rooster. My overall research program is directed at the application of molecular biology to improve the efficiency and/or quality of poultry meat production.

Publications:

Beccavin, C., B. Chevalier, L.A. Cogburn, J. Simon and M. Duclos. 2001. Insulin-like growth factors and body growth in chickens divergently selected for high or low growth rate. *J. Endocrinol,.* 168:297-306.

Cogburn, L.A., X. Wang, L. Li, J.D. Pesek, M.C. McGuinness, M. Derouet, M. Duclos, J. Williams, B. Leclercq and J. Simon. 2000. Developmental expression of growth hormone receptor gene in tissues of broiler chickens divergently selected for growth rate or body composition (submitted).

Cogburn, L.A., J. Burnside and C.G. Scanes. 2000. Physiology of Growth and Development. In: *Sturkie's Avian Physiology* (G.C. Whittow, Editor). Academic Press, San Diego, pp. 635-656.

Mao, J.N.C., J. Burnside, L. Li, J-S. Tang, C. Davolos and L.A. Cogburn. 1999. Characterization of unique truncated prolactin receptor transcripts, corresponding to the intracellular domain, in the testis of the sexually-mature chicken. *Endocrinology,* 140:1165-1174.

Mao, J.N.C., J. Burnside, M.C. Postel-Vinay, J.D. Pesek, J.R. Chambers and L.A. Cogburn. 1998. Ontogeny of growth hormone receptor gene expression in tissue of growth-selected strains of broiler chickens. *J. Endocrinol.,* 156:67-75.

Cogburn, L.A., Sofer, L. and J. Burnside. 1997. Molecular cloning and sequence analysis of chicken type I deiodinase cDNA: Expression in normal and dwarf broiler chickens. *Biochem. Biophys. Res. Comm*., 241:459-464.

Cogburn, L.A., J.N.C. Mao, and J. Burnside. 1997. The Growth Hormone Receptor in Growth and Development. In*: Perspectives in Avian Endocrinology* (S. Harvey and R.Etches, eds.), J. of Endocrinology Press, Bristol, UK, pp.101-116.

Burnside, J., S.K. Agarwal, and L.A. Cogburn. 1997. Intracellular Mechanism of Growth Hormone Signaling. In*: Perspectives in Avian Endocrinology* (S. Harvey and R.Etches, eds.), J. of Endocrinology Press, Bristol, UK, pp.359-373.

Mao, J.N.C., L.A. Cogburn and J. Burnside. 1997. Growth hormone (GH) down-regulates GH receptor (GHR) mRNA in chickens but developmental increases in GHR mRNA occur independently of GH action. *Mol. Cell. Endocrinol.,* 129:135-143.

Harvey, S. and L.A. Cogburn. 1996. Cryptic peptides of prepro-TRH antagonize TRH-induced GH secretion in chickens at extrapituitary sites. *J. Endocrinol.,* 151:359-364.

McMurtry, J.P., W. Tsark, L. Cogburn, R. Rosebrough, and D. Brocht. 1996. Metabolic responses of the turkey hen (*Meleagris gallopavo*) to an intravenous injection of chicken or porcine glucagon. *Comp. Biochem. Physiol*., 114C:159-163.

DOHMS, JOHN E., Ph.D., Professor

Discipline: Immunology of Infectious Diseases.

Research: Molecular mechanisms of avian mycoplasma colonization and the nature of the host immune

response against these organisms. Projects involve 1) Study of the *Mycoplasma allisepticum* cytadhesin with the goal of understanding the role of the cytadhesin in pathogenesis, 2) Determining if a subunit vaccine, constructed from expressed portions of the cytadhesin, is effective in stimulating protective mucosal immunity, 3) Using avian and mammalian mycoplasma cytadhesin sequences to develop improved diagnostic strategies. I have also been interested in immunosuppressive diseases of domestic animals. In particular, there are ongoing studies of the effects of the infectious bursal disease virus on the immune system of the fowl.

Publications:

Whetzel, P., and J.E. Dohms. Development and characterization of a transposon generated *Mycoplasma gallisepticum* mutant library. In preparation.

Dohms, J.E. Studies of *Mycoplasma gallisepticum* outbreaks in the Delmarva Peninsula. In preparation.

Hnatow, L.L., C.L. Keeler, Jr., K. Czymmek, and J.E. Dohms. Functional characterization of *mgc1*, a cytadhesin of *Mycoplasma gallisepticum*. In preparation.

Hnatow, L.L., C.L. Keeler, Jr., L. Tessmer, K. Czymmek, and J.E. Dohms. 1998. Characterization of MGC2, a *Mycoplasma gallisepicum* cytadhesin with homology to *Mycoplasma pneumoniae* 30-kilodalton protein P30 *and M. genitalium* P32. Infect. Immun. 66:3436- 3442.

Dohms, J.E. 1998. Avian Botulism. In: *The Merck Veterinary Manual*, Eighth Edition, Merck Co., Inc., Rahway, NJ. pp. 1969-1970.

Dohms, J.E. 1991. Botulism. In: *Diseases of Poultry*. B.W. Calnek, Barnes, J.J. Beard, C.W., Reid, W.M., and H.W. Yoder Jr. ads. 9th Ed. Iowa State University Press, Ames, Iowa, pp. 271-276.

Hnatow, L.L., C.L. Keeler, Jr., L. Tessmer, and J.E. Dohms. Identification of a *Mycoplasma galliseptcum* Gene with Sequence Homology to the *Mycoplasma pneumoniae* P30 cytadhesin gene. (submitted).

Keeler, C.L., L,. Hnatow, P.L. Whetzel, and J.E. Dohms. 1996. Cloning and Characterization of a Putative Cytadhesin Gene (mgc1) from *Mycoplasma gallisepticum. Infect. Immun.*, 64:1541-1547.

Sharma, J.M., J. Dohms, M. Walser, and D.B. Snyder. 1993. Presence of Lesions without Virus Replication in the Thymus of Chickens Exposed to Infectious Bursal Disease Virus. *Avian Diseases*, 37:741-748.

Dohms, J.E., L.L. Hnatow, P. Whetzel, R. Morgan and C.L. Keeler, Jr. 1993. Identification of the Putative Cytadhesin Gene of *Mycoplasma gallisepticum* and its use as a Diagnostic Probe. *Avian Diseases*, 37:380-388.

Dohms, J.E. and A. Metz. 1991. Stress-mechanisms of Immunosuppression. *Vet. Immunol. and Immunopath.*, 30:89-109.

Dohms, J.E. 1991. Mechanisms of Immunosuppression. *Vet. Immunol. and Immunopath.*, 30:19-30.

DYER, ROBERT M., V.M.D., Ph.D., Associate Professor

Discipline: Veterinary Medicine, Production Medicine, Large Animal Immunology

Research: Respiratory diseases of cattle and swine. Major interests include mechanisms of viral-bacterial synergy in the lung that predispose the virus-infected lung to secondary bacterial colonization and infection. Areas of work include viral inhibition of T lymphocyte function, direct inhibition of alveolar macrophage and neutrophil effector functions by respiratory viruses. Other areas of interest include mechanisms of the immune response that control *Neospora caninum* infection in bovines. Major area of interest is the role of cellular and humoral immunity in controlling the expression of *Neospora caninum* in asymptomatically infected carriers.

Publications:

J. A. Mills[*], D.S. Zarlenga[†], P. Habecker[††], R.M. Dyer[*1]Age, Region and Inflammation Affect Cytokine, Growth Factor and Receptor Expression in the Epidermis and Dermis of the Bovine Claw .

(submitted J. Dairy Sci, 2008)

J. A. Mills[*], D.S. Zarlenga[†], R.M. Dyer[*1]Coroneete Keratinocyte colony formation is supported by epidermal-dermal interactions in the bovine claw. (submitted J. Dairy Sci, 2008)

R. M. Dyer[‡], N. K. Neerchal[†], U. Tasch[§], Yukon Wu[†], P. Dyer[§], P. G. Rajkondawar[*].Relationship of Locomotion Score to the Magnitude of Vertical Limb Movement Variables in Dairy Cows.

R.M Dyer. Reproductive workshop for producers. TAI Programs, Conception Failure and Early Embryonic Death. Dover Delaware. 2007. Titles within this series included:

- Bovine Virus Diarrhea Virus and Infertility in Lactating Dairy Cattle: Control the Persistent Infection.
- Leptospira Infertility in Lactating Dairy Cattle: Control of the Persistent Infection
- The Role of Nutrition and Metabolic Controls in Subfertility of Lactating Dairy Cattle.
- Ovulation Synchronization and Fixed Time Artificial Insemination in Dairy Cows: Low Conception Rates and Poor Follicle Welfare.
- Sustaining Reproductive Fertility in Dairy Cattle: The Role of Artificial Insemination

R. M. Dyer, N. K. Neerchal, U. Tasch, Yukon Wu, P. Dyer, P. G. Rajkondawar. Objective Determination of Claw Pain and Its Relationship to Limb Locomotion Score in Dairy Cattle J Dairy Science 90-: 4592-4602, 2007.

D. Zhang, D. Arola, R. Reprogel, W. Zheng, U. Tasch and R. M. Dyer, A Method for Characterizing the Mechanical Behaviour of Hoof Horn, Journal of Materials Sci, 42: 1108-1115, 2007.

P. G. Rajkondawar, M. Liu, R. M. Dyer, N. K. Neerchal, U. Tasch, A. M. Lefcourt, B. Erez, and M. A. Varner. Comparison of Models to Identify Lame Cows Based on Gait and Lesion Scores, and Limb Movement Variables J. Dairy Sci. 2006 89: 4267-4275.

J. A. Mills[*] and R. M. Dyer[*] ,Keratinocyte stem cell expression is supported by epidermal-dermal cell interactions in the bovine sensitive lamina in vitro. Lameness in Ruminants, 14th International Symposium, November 8-11, 2006, Colonia, Uroquay,

Mills, JA, Campanicki, JE and RM Dyer. Pro-and anti-inflammatory cytokine responses in endotoxin challenged bovine macrophages. J Dairy Sci 87, supp 1, 406, 2004. Abstract # 714.

THE ROLE OF LESION AND GAIT ANALYSES IN MODELS OF BOVINE LAMENESS R.M. Dyer[1*], P.G. Rajkondawar[2], N. Neerchal[3], U. Tasch[4], A.M. Lefcourt[4], M.A. Varner[5]13th International Conference on Ruminant Lameness, Moribar, Slovania. February 11-15, 2004

THE MECHANICAL BEHAVIOR OF BOVINE HOOF HORN. RM Dyer, D Arola, D Zhang, R Reprogel, W Zheng, U Tasch and A Lefcourt. 13th International Conference on Ruminant Lameness, Moribar, Slovania. February 11-15, 2004

Rajkondawar P. G., U. Tasch, A.M. Lefcourt, B. Erez, R.M. Dyer, M.A. Varner. *"A System for Identifying Lameness in Dairy Cattle"* ASAE *Appl Eng Agric* 18 (1), 87-96, 2002.

Rajkondawar P.G., A.M. Lefcourt, N.K. Neerchal, R.M. Dyer, M.A. Varner, B. Erez, U. Tasch. *"The Development of an objective Lameness Scoring System for Dairy Herds-Pilot Study"Trans ASAE*, Appl Eng Agric 45 (4), 1123-1125, 2002

Rajkondawar P. G., Neerchal N., Varner M., Lefcourt A., Erez B., Dyer R. and Tasch U. (2002), *"Development of a Objective Bovine Lameness Index using Reaction Force detection Device"*. This paper was presented at 12th International Symposium on Lameness in Ruminants, Orlando, Florida, January 2002.

EMARA, MARLENE G., Ph.D., Associate Professor

Discipline: Avian Immunology

Research: The long-term goal of this laboratory is to identify genes that influence immune response and disease resistance of chickens to avian pathogens. Our laboratory is currently investigating the genetics

of resistance to Marek's disease, an economically important disease of chickens that causes T cell cancer in birds. Collaborative studies are also underway to evaluate coccidiosis, a protozoan disease of the chicken intestinal tract. In the laboratory, there is an emphasis on the major histocompatibility complex, a gene complex whose products influence T lymphocyte function, as well as other chicken genes throughout the genome. We routinely use microsatellite DNA markers to genotype chickens and search for genes affecting immune response and disease resistance. In addition, we are focusing on a region of chicken chromosome 1 that appears to contain a chromosomal breakpoint (genetic mutation). Current research involves evaluating this mutation and its frequency in Marek's disease tumors.

Publications:

Bliss, T. W., J. E. Dohms, M. G. Emara, and C. L. Keeler, Jr. 2005. Gene expression profiling of avian macrophage activation. Vet Immunol Immunopathol. 105:289-99.

Kim, H., C. J. Schmidt, K. S. Decker, and M. G. Emara. 2003. A double-screening method to identify reliable candidate non-synonymous SNPs from chicken EST data. Anim Genet. 34:249-54.

Emara, M. G., and H. Kim. 2003 Genetic markers and their application in poultry breeding. Poult Sci. 82:952-7.

Zhu, J. J., H. S. Lillehoj, P. C. Allen, C. P. Van Tassell, T. S. Sonstegard, H. H. Cheng, D. Pollock, M. Sadjadi, W. Min, and M. G. Emara. 2003. Mapping quantitative trait loci associated with resistance to coccidiosis and growth. Poult Sci. 82:9-16.

Emara, M. G., H. Kim, J. Zhu, R. R. Lapierre, N. Lakshmanan, and H. S. Lillehoj. 2002. Genetic diversity at the major histocompatibility complex (B) and microsatellite loci in three commercial broiler pure lines. Poult Sci. 81:1609-17.

Emara, M. G., R. R. Lapierre, G. M. Greene, M. Knieriem, J. K. Rosenberger, D. L. Pollock, M. Sadjadi, C. D. Kim, and H. S. Lillehoj. 2002. Phenotypic variation among three broiler pure lines for Marek's disease, coccidiosis, and antibody response to sheep red blood cells. Poult Sci. 81:642-8.

GELB, JACK, JR., Ph.D., Professor

Discipline: Avian Virology

Research: Respiratory disease viruses of poultry. Assessment of antigenic and pathogenic variation of strains of avian coronavirus infectious bronchitis virus (IBV) by serologic and sequence analysis. Development of improved PCR tests for IBV identification. Development and evaluation of avian viral vaccines, novel vaccine potentiators and delivery systems for disease control.

Publications:

Gelb, J., Jr., B. S. Ladman, M. J. Licata, M. H. Shapiro, and L. R. Campion. Evaluating Viral Interference between Infectious Bronchitis Virus and Newcastle Disease Virus Vaccine Strains Using Quantitative Reverse Transcription Polymerase Chain Reaction. *Avian Diseases.* 51:924-934. 2007.

Ladman, Brian S., Alison B. Loupos, and Jack Gelb, Jr. Infectious Bronchitis Virus S1 Gene Sequence Comparison is a Better Predictor of Challenge of Immunity in Chickens than Serotyping by Virus Neutralization. *Avian Pathology* 35:127-33. 2006.

Gelb, J., Jr., Y. Weisman, B. S. Ladman, and R. Meir. S1 Gene Characteristics and Efficacy of Vaccination Against Infectious Bronchitis Virus Field Isolates from the United States and Israel (1996-2000). *Avian Pathology* 34:194-203. 2005.

Bayry, Jagadeesh, Mallikarjun S. Goudar, Prashant K. Nighot, Supriya G. Kshirsagar, Brian S. Ladman, Jack Gelb, Jr., Govind R. Ghalsasi, and Gopal N. Kolte. 2005 Emergence of a nephropathogenic avian infectious bronchitis virus with a novel genotype in India, *J. Clin. Microbiol.*, 43:916-918.

Bijlenga, Gosse, Jane K. A. Cook, Jack Gelb, Jr. and J. J. de Wit. Development and use of the H strain of vian infectious bronchitis virus from The Netherlands as a vaccine: A Review. 2004. *Avian Path.*, 33:550-557.

Ziegler, A. F., B. S. Ladman, P. A. Dunn, A. Schneider, S. Davison, P. G. Miller, H. Lu, D. Weinstock, M. Salem, R. J. Eckroade, and J. Gelb, Jr. 2002. Nephropathogenic infectious bronchitis in Pennsylvania chickens 1997-2000, *Avian Dis.*, 46:847-858.

Ladman, B. S., C. R. Pope, A. F. Ziegler, T. Swieczkowski, and J. M. Callahan, and J. Gelb, Jr. 2002. Protection of chickens following live and inactivated virus vaccination against challenge with nephropathogenic infectious bronchitis virus PA/Wolgemuth/98, *Avian Dis.*, 46:938-944.

HOOVER, DALLAS G., Ph.D., Professor

Discipline: Food Microbiology

Research: Food microbiology and food safety.

Publications (last 5 years):

Black, E.P., P. Setlow, A.D, Hocking, C.M. Stewart, A.L. Kelly, and D.G. Hoover. 2007. Response of spores to high pressure processing. Comp. Rev. Food Sci. Food Safety *In press.*

Grove, S.F., A. Lee, T. Lewis, C.M. Stewart, H. Chen, and D.G. Hoover. 2006. Inactivation of foodborne viruses of significance by high pressure and other processes. J. Food Prot. 69: 957-968.

Guan, D., R.D. Joerger, K.E, Kniel, K.R. Calci, D.T. Hicks, L.F. Pivarnik and D.G. Hoover. 2006. Effect of high hydrostatic pressure on four genotypes of F-specific RNA bacteriophages (f2, GA, Q and SP). J. Appl. Microbiol. 102: 51-56.

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Guan, D., K. Kniel, K.R. Calci, and D.G. Hoover. 2006. Response of four types of coliphages to high hydrostatic pressure. Food Microbiol. 23(6): 546-551.

Black, E., K. Koziol-Dube, D. Guan, D. Cortezzo, D.G. Hoover, and P. Setlow. 2005. Studies on the triggering of germination of *Bacillus subtilis* spores by action of high hydrostatic pressure on nutrient germinant receptors. Appl. Environ. Microbiol. 71: 5879-5887.

Chen, H., D. Guan and D.G. Hoover. 2005. Sensitivity of foodborne pathogens to high hydrostatic pressure. J. Food Prot. 69(1): 130-137.

Chen, H., D.G. Hoover, and D.H. Kingsley. 2005. Temperature and treatment time influence high hydrostatic pressure inactivation of feline calicivirus, a norovirus surrogate. J. Food Prot. 68(11): 2389-2394.

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Kingsley, D.H., D. Guan, and D.G. Hoover. 2005. Hydrostatic pressure inactivation of hepatitis A virus in strawberry purees and sliced green onions. J. Food Prot. 68(8):1748-1751.

Solomon, E.B., and D.G. Hoover. 2004. Inactivation of *Campylobacter jejuni* by high hydrostatic pressure. Lett. Appl. Microbiol. 38(6):505-509.

Chen, H., and D.G. Hoover. 2004. Use of Weibull model to describe and predict pressure inactivation of *Listeria monocytogenes* Scott A in whole milk. Innov. Sci. Emerg. Technol. 5(3): 269-276.

Chen, H., R.D. Joerger, D.H. Kingsley, and D.G. Hoover. 2004. Pressure inactivation kinetics of phage 8CI 857. J. Food Protect., 67(3):505-511.

Hoover, D.G., and H. Chen. 2004. Bacteriocins with potential for use in foods. *In* Antimicrobials in Foods, 3rd edition (P.M. Davidson & A.L. Branen, eds.), pp. 389-428. Marcel Dekker, Inc., New York.

Kingsley, D.H., H. Chen, and D.G. Hoover. 2004. Hydrostatic pressure application to selected picornavirus. Virus Res., 102:221-224.
Chen, H., and D.G. Hoover. 2003. Modeling the combined effect of high hydrostatic pressure and mild heat on the inactivation kinetics of *Listeria monocytogenes* Scott A in whole milk. Innovat. Food Sci. Emerg. Technol., 4:25-34.
Chen, H., and D.G. Hoover. 2003. Pressure inactivation kinetics of *Yersinia enterocolitica* ATCC 35669. Int. J. Food Microbiol., 87(1-2):161-171.
Chen, H., and D.G. Hoover. 2003. Bacteriocins and their food applications. Comp. Rev. Food Sci. Food Safety, 2(3): 81-100.
Hoover, D.G. 2003. Remarks on food safety in dealing with genetically modified foods. Richmond J. Law Technol., 10(2):7, at *http://law.richmond.edu/jolt/article7.pdf*.
Kingsley, D.H., D.G. Hoover, E. Papafragkou, and G.P. Richards. 2002. Inactivation of hepatitis A virus and a calicivirus by high hydrostatic pressure, J. Food Protect., 65(10):1605-1609.
Paidhungat, M., B. Setlow, W.B. Daniels, D.G. Hoover, E. Papafragkou, and P. Setlow. 2002. Mechanisms of induction of germination of *Bacillus subtilis* spores by high pressure, Appl. Environ. Microbiol., 68(6):3172-3175.
IFT Expert Report: Emerging microbiological food safety issues: Implications for control in the 21st Century. 2002. With others, on IFT website www.ift.org.

JOERGER, ROLF, Ph.D., Associate Professor

Discipline: Microbial Genetics and Physiology

Research: Microbiological studies related to food production and food safety, with emphasis on poultry and poultry products. Use of molecular techniques for the detection of microbes. Study of the mechanisms by which microorganism impact food quality and safety.

Publications:

Higgins, J., Hohn, C., Hornor, S., Frana, M., Denver, M., and Joerger, R. 2007. Genotyping of Escherichia coli from environmental and animal samples. J. Microbiol. Methods. Doi:10.1016/jmimet.2007.04.009
Joerger, R. D. 2007. Antimictobial films for food applications: an analysis of quantitative results. Packaging Science and Technology. Published Online: 24 Apr 2007 DOI: 10.1002/pts.774
Guan D**,** Joerger RD, Kniel KE, Calci KR, Hicks DT, Pivarnik LF and Hoover DG. 2006. Effect of high hydrostatic pressure on four genotypes of F-specific RNA bacteriophages (f2, GA, Qβ and SP) J. Applied Microbiology. In press.
Joerger, R. D, H. Chen, and K. E. Kniel. 2006. Characterization of a spontaneous, pressure-tolerant *Listeria monocytogenes* Scott A *cts*R deletion mutant. Foodborne Pathogens & Disease. 3:196-202.
Joerger, R. D. and T. Ross. 2005. Genotypic diversity of *Escherichia coli* isolated from cecal content and mucosa of one- to six-week-old broilers. Poult. Sci. 84:1902-1907.
Chen, H. Q., R. D. Joerger, D. H. Kingsley, and D. G. Hoover. 2004. Pressure inactivation kinetics of phage lambda cI 857. J. Food Prot., 67:505-511.
Zhu, X. Y, and R. D. Joerger. 2003. Composition of Microbiota in Content and Mucus from Cecae of Broiler Chickens as Measured by Group-specific, 16S rRNA-targeted Oligonucleotide Probe Hybridization. *Poult. Science*, 82:1242-1249.
Joerger, R. D. 2003. Alternatives to Antibiotics: Bacteriocins, Antimicrobial Peptides and Bacteriophages.*Poult. Science*, 82:640-647.

Strapp, C. M., A. E. H. Sheares, and R. D. Joerger. 2003. Survey of Retail Alfalfa Sprouts and Mushrooms for the Presence of *Escherichia coli* O157:H7, *Salmonella* and *Listeria* Using BAX, and Evaluation of this PCR-Based System with Experimentally Contaminated Samples. *J. Food*

Prot., 66:182-187.
Zhu, X. Y. T. Zhong, Y. Pandya, and R. D. Joerger. 2002. 16S rRNA-Based Analysis of Microbiota from the Cecum of Broiler Chickens. *Appl. Environ. Microbiol*., 68:124-137.

KEELER, CALVIN L., JR, Ph.D., Professor

Discipline: Molecular Genetics, Virology, Avian Disease

Research: Although there is a great need to understand better the involvement of mucosal immunity in disease protection in all animal systems, that holds especially true in the avian system due to the high cost of respiratory disease. Infectious laryngotracheitis (ILT) is a herpesvirus induced acute respiratory disease of world-wide importance to the poultry industry. The primary focus of this laboratory is to understand the molecular basis of infectious laryngotracheitis virus (ILTV) pathogenicity and immunity. This is based on the belief that one aspect of a rational approach to the control of viral infections require an understanding of the host's immune response to infections with the virus, the identification of viral antigens responsible for eliciting that response, and the mechanisms of their interactions with the immune system. Using ILTV as a model, we hope to enhance our understanding of nononcogenic viral immunity in the avian system. Our group is also involved in evaluating the biological function of ILTV structural glycoproteins and is developing novel poultry viral vaccines and vectors. We envision ILTV as a candidate vector which will target antigens to the upper respiratory tract and which may be particularly well suited to heightening the host's cell-mediated immune response.

Publications:

Lavric, M., M.N. Maughan, T.W. Bliss, J.E. Dohms, D. Bencina, **C.L. Keeler, Jr.** and M. Narat. (2007) Gene expression modulation of chicken macrophages infected by *Mycoplasma synoviae* or *Escherichia coli.* Veterinary Microbiology (in press).

Lillehoj, H.S., **C.L. Keeler, Jr.** and C.-H. Kim. (2007) Immunogenomics approach to study host innate immunity against intestinal parasites. Poultry Science. **86:**1491-1500.

Keeler, C.L., Jr., T.W. Bliss, M. Lavric and M.N. Maughan. (2007) A functional genomics approach to the study of avian innate immunity Cytogenetic and Genome Research. **117:**139-145.

Dalloul, R.A., T.W. Bliss, Y.-H. Hung, I. Ben-Chouikha, D.W. Park, **C.L. Keeler, Jr.** and H.S. Lillehoj. (2007) Unique responses of the avian macrophage to different species of *Eimeria.* Molecular Immunology **44:**558-566.

Thureen, D.R. and **C. L. Keeler, Jr.** (2006) Psittacid herpesvirus 1 and infectious laryngotracheitis virus: Comparative analysis of two avian alphaherpesviruses. Journal of Virology. **80:**7863-7872.

Bliss, T.W., J.E. Dohms, M.G. Emara and **C.L. Keeler, Jr.** (2005) Gene expression profiling of avian macrophage activation. Veterinary Immunology and Immunopathology **105:**289-299.

Whetzel, P.L., L.L. Hnatow, **C.L. Keeler, Jr.** and J.E. Dohms. (2003) Transposon mutagenesis of *Mycoplasma gallisepticum*. Plasmid **49:**34-43.

Underwood, R.M., R.J. Crockett, R.R.Roth, **C.L. Keeler, Jr.** and M.S. Parcells. (2002) A comparison of flow cytometry and the polymerase chain reaction (PCR) as sexing techniques. Journal of Field Ornithology **73:**239-245.

Nix, W.A., D.S. Troeber, B.F. Kingham, C.L. Keeler, Jr. and J. Gelb, Jr. 2000. Emergence of subtype strains of the Arkansas serotype of infectious bronchitis virus in Delmarva broiler chickens. *Avian Dis.*, (in press).

Keeler, S.J., C.M. Boettger, J.G. Haynes, K.A. Kuches, M.M. Johnson, D.L. Thureen, C.L. Keeler, Jr. and S.L. Kitto. 2000. Acquired thermotolerance and expression of the HSP100/ClpB genes of lima bean. *Plant Physiology,* 123:1121-1132.

Kingham, B.F., C.L. Keeler, Jr., W.A. Nix and J. Gelb, Jr. 2000. Identification of avian infectious bronchitis virus by direct automated cycle sequencing of the S-1 gene. *Avian Diseases,* 44:325-335.

KNIEL, KALMIA E., Ph.D., Assistant Professor

Discipline: Food Microbiology; Food Virology and Parasitology

Research: Dr. Kniel is a food microbiologist who specializes in virology and parasitology. Her research concentrates on pathogens that contaminate fruits and vegetables. She has conducted research with waterborne and foodborne viruses, protozoa, and bacteria. Much of her work has involved studies analyzing non-thermal treatments as alternatives to traditional pasteurization technologies with protozoan parasites such as *Cryptosporidium parvum* and *Cyclospora cayetanensis*. Dr. Kniel's virology work has included determinations of viable and inactivated virions. The work with viruses began at the USDA Animal Parasitic Diseases Laboratory where she first used raccoon pox virus as a surrogate for smallpox to study survival along with the development of rapid detection assays. She has received funding from the USDA-National Research Initiative and the College of Agriculture and Natural Resources, University of Delaware to study the inactivation of human viruses in foods using high pressure, ultraviolet light, and ozone. She has expertise in mammalian cell culture and has optimized cell culture infection assays for studying protozoa and viruses.

Publications:

Kniel, K.E., Shearer, A.E.H., Cascarino, J.L., Wilkins, G.C., and Jenkins, M.C. High hydrostatic pressure and ultraviolet light treatment of produce contaminated with *Eimeria acervulina* as a *Cyclospora cayetanensis* surrogate. 2007. J. Food Protection. *Submitted*.

Sharma, M., Kniel, K.E., Derevianko, A., Ling, J., and Bhagwat, A.A. Sensitivity of Escherichia albertii, a potential foodborne pathogen, to food preservation treatments. Appl. Environ. Micro. 2007. 8:259-268.

Shearer, A.E.H, Wilkins, G.C., Jenkins, M.J., Kniel, K.E. Effects of High Hydrostatic Pressure on *Eimeria acervulina* Pathogenicity, Immunogenicity and Structural Integrity. Innovative Food Science and Emerging Technologies. 2007. 8:259-268.

Kniel, K. Rapid diagnostic methods in food safety: protozoa & parasites. Wiley Encyclopedia of Biotechnology. 2007. *In Press*

Guan, D., Joerger, R., Kniel, K., Calci, K.R., Hicks, D.T., Pivarnik, L.F., Hoover, D.G. Effect of high hydrostatic pressure on four genotypes of F-specific RNA bacteriophages. J. Applied Microbiology. 2007. 102(1): 51-6.

Guan, D., Joerger, R., Kniel, K., Calci, K.R., Hicks, D.T., Pivarnik, L.F., Hoover, D.G. Response of four types of coliphages to high hydrostatic pressure. Food Microbiology. 2006. 23:546-551.

Joerger, R., Chen, H., Kniel, K. Characterization of a spontaneous, pressure-tolerant *Listeria monocytogenes* Scott A ctsR deletion mutant. Foodborne Path. Dis. 2006. 3(2):196-202.

Kniel, K.E. Survival of racoonpox virus in water. In J.A. Higgins (author), "Threat agents and water biosecurity." 2005. J. Wiley Encyclopedia of Water.

Kniel, K.E. and Jenkins, M.C. Detection of *Cryptosporidium parvum* oocysts on fresh vegetables and herbs using antibodies specific for a *C. parvum* viral antigen. J. Food Prot. 2005. 68(5): 1093-1096.

Kniel, K.E., Sumner, S.S.,Golden, D.A. Lindsay,D.S., Hackney, C.R., Pierson, M.D., Zajac, A.M., and Fayer, R. Effect of Effect of Ozone Treatment on *Cryptosporidium parvum* Viability in Fruit Juices. Foodbrn. Path. Dis. 2005

Kniel, K.E., Sumner, S.S., Pierson, M.D., Zajac, A.M., Hackney, C.R., Fayer, R., and Lindsay, D.S. Effect of Hydrogen Peroxide and other Protease Inhibitors on *Cryptosporidium* Excystation and *in vitro* Development. J.Parasitol. 2004 Aug:90(4): 885-888.

Kniel, K.E. and Jenkins, M.C. U.S. Patent. USDA-ARS 2004, A sensitive antibody-based method for detecting *Cryptosporidium parvum* oocysts in water. S.N. 10/863,939

Jenkins, M., Higgins, J., Kniel, K., Trout, J., and Fayer, R. Protection of Calves against Cryptosporidiosis by Oral Inoculation with Gamma-Irradiated *Cryptosporidium parvum* Oocysts. J. Parasitol. 2004 Oct: 90(5):1178-1180.

Kniel, K.E., Higgins, J.A., Trout, J.M., Fayer, R., and Jenkins, M.C. Characterization and use of a *Cryptosporidium parvum* viral antigen for detecting *C. parvum* oocysts in water. J. Microbiol. Meth. 2004 Aug: 58(2): 189-195.

Kniel, K.E., Sumner, S.S., Lindsay,D.S., Hackney, C.R., Pierson, M.D., Zajac, A.M., Golden, D.A., and Fayer, R. Effect of Organic Acids and Hydrogen Peroxide on *Cryptosporidium parvum* Viability in Fruit Juices. J. Food Protect. 2003 Sept; 66:1650-7.

Kniel, K.E., Lindsay D.S., Sumner, S.S., Hackney, C.R., Pierson, M.D., Dubey, J.P. Examination of attachment and survival of Toxoplasma gondii oocysts on raspberries and blueberries. J. Parasitol. 2002 Aug; 88(4):790-3.
Seeman, B.K., Sumner, S.S., Marini, R., Kniel, K.E. Internalization of *Escherichia coli* in Apples under Natural Conditions. DFES. 2002 Sept: 667-673.

Patent

Kniel, K.E. and Jenkins, M.C. 2003. A Sensitive Antibody-Based Method for Detecting *Cryptosporidium parvum* Oocysts in Water. USDA-ARS, S.N. 10/863,939.

KUNG, LIMIN, JR, Ph.D., Professor

Discipline: Dairy Cattle (Ruminant) Nutrition and Microbiology

Research: Ruminants are fascinating animals because microorganisms in their gut provide them with a significant amount of nutrients. My lab focuses on improving the efficiency of milk and meat production by ruminants by manipulating forage quality and/or by improving rumen fermentation. Research is based on using a combination of techniques in biochemistry, microbiology and nutrition. Major research areas include using novel bacteria to prevent the growth of yeasts and molds in silages and altering rumen fermentation. Collaborative research is currently using PCR technology to help with identification of microorganisms.

Publications:

Kung, Jr., L., B. M. Moulder, C. M. Mulrooney, R. S. Teller and R. J. Schmidt. 2008**.**
The effect of silage cutting height on the nutritive value of a normal corn silage hybrid compared to brown midrib corn silage fed to lactating cows. Accepted Nov, 2007. J. Dairy Sci. In press.
Mulrooney, C. N., and L. Kung, Jr. 2008. The effect of water temperature on the viability of silage inoculants. J. Dairy Sci. J. Dairy Sci. 91:236–240.
Schmidt R. J., M. Emara, and L. Kung Jr. 2008. The use of a quantitative real-time polymerase chain reaction assay for identification and enumeration of *Lactobacillus buchneri* in silages. Accepted Dec., 2007.
Kizilsimsek, M., R. J. Schmidt, and L. Kung, Jr. 2007. Effects of a mixture of lactic acid bacteria applied as a freeze dried or fresh culture on the fermentation of alfalfa silage. In press J. Dairy Sci. 90:5698–5705.
Reddish, M. A., and L. Kung, Jr. 2007. The effect of feeding a dry enzyme mixture with fibrolytic activity on the performance of lactating cows and digestibility of a diet for sheep. J. Dairy Sci. 90:4724–4729.
Hu, Wenping, Limin Kung Jr., and Michael R. Murphy. 2007. Relationships between dry matter intake and acid–base status of lactating dairy cows as manipulated by dietary cation–anion difference. Anim. Feed Sci. Technol. 136:216-225
Kung, L**.,** Jr., R. J. Schmidt, T. E. Ebling and W. Hu. 2007. The effect of *Lactobacillus buchneri* 40788 on the fermentation and aerobic stability of ground and whole high moisture corn. J. Dairy Sci. 90:2309-2314.
Kleinschmit, D. H. and L. Kung, Jr. 2006. A meta-analysis of the effects of *Lactobacillus buchneri* on the fermentation and aerobic stability of corn, grass and small grain silages. J. Dairy Sci. 89: 4005-4013.

Kleinschmit, D. H. and L. Kung, Jr. 2006. The effects of *Lactobacillus buchneri* 40788 and *pediococcus pentosaceus* R1094 on the fermentation of corn silage during various stages of ensiling. J. Dairy Sci. 89: 3999-4004.
Kleinschmit, D. H., R. J. Schmidt, and L. Kung, Jr. 2005. The effects of various antifungal additives on the fermentation and aerobic stability of corn silage. J. Dairy Sci. 88:2130-2139.
Ebling, T. L., and L. Kung , Jr. 2004. A comparison of processed conventional corn silage to

unprocessed and processed brown midrib corn silage on intake, digestion, and milk production by dairy cows. J. Dairy Sci. 87:2519-2527.

Kung, L., Jr., C. L. Myers, J. M. Neylon, C. C. Taylor, J. A. Lazartic, J. A. Mills, and A. G. Whiter. 2004. The effects of buffered propionic acid-based additives alone or combined with microbial inoculation on the fermentation of high moisture corn and whole-crop barley. J. Dairy Sci., 87: 1310-1316.

Neylon, J. M., and L. Kung, Jr. 2003. Effects of cut height and maturity on the nutritive value of corn silage for lactating cows. *J. Dairy Sci.,* 86:2163-2169.

Kung, L., Jr., K. A. Smith, A. M. Smagala, K. M. Endres, C. A. Bessett, N. K. Ranjit, and J. Yaissle. 2003. Effects of 9,10 anthraquinone on ruminal fermentation, total tract digestion and blood metabolite concentrations in sheep. *J. Anim. Sci.,* 81:323-328.

Ranjit, N. K., C. C. Taylor, and L. Kung, Jr. 2002. Effect of Lactobacillus buchneri 40788 on the fermentation, aerobic stability, and nutritive value of maize silage. Grass and Forage Sci. 57:1-9.

Kung, L., Jr., M. A. Cohen, L. M. Rode, and R. J. Treacher. 2002. The effect of fibrolytic enzymes sprayed onto forages and fed in a total mixed ration to lactating dairy cows. J. Dairy Sci., 85:2396-2402.

Taylor, C. C., N. J. Ranjit, J. A. Mills, J. M. Neylon, and L. Kung, Jr. 2002. The effect of treating whole- plant barley with Lactobacillus buchneri 40788 on silage fermentation, aerobic stability, and nutritive value for dairy cows. J. Dairy Sci., 85:1793-1800.

J. A. Mills and L. Kung, Jr. 2002. The effect of delayed filling and application of a propionic acid-based additive on the fermentation of barley silage. *J. Dairy Sci*., 85:1969-1975.

Taylor, C. C., and L. Kung, Jr. 2002. The effect of Lactobacillus buchneri 40788 on the fermentation and aerobic stability of high moisture corn in laboratory silos. *J. Dairy Sci.,* 85:1526-1532.

MORGAN, ROBIN W., Ph.D., Dean, Professor,

Discipline: Molecular Biology

Research: Our interests center on the molecular biology of Marek's disease virus, a herpesvirus that causes infectious T-cell lymphomas in chickens. Specific research projects include understanding the molecular mechanisms that lead to transformation of T-cells by Marek's disease virus, examining the immunological responses that result in vaccine- Induced protection from lymphoma formation, and developing vaccines to control Marek's disease. Microarray technology is being used to understand host responses to infection.

Publications:

Niikura, Masahiro, T. Kim, H. D. Hunt, J. Burnside, R. W. Morgan, J. D. Dodgson, and H. Cheng (2007) Marek's disease virus up-regulates major histocompatibility complx class II cell surface expression in infected cells. *Virology* 359: 212-219.

Burnside, Joan and R. W. Morgan. 2007. Genomics and Marek's disease in: *Cytogenetics and Genome Research*, S. Karger. Vol. 17, pp 376-387.

Carre, W., X. Wang, T.E. Porter, Y. Nys, J. Tang, E.L. Bernberg, R.W. Morgan, J. Burnside, S.E. Aggrey, J. Simon, and L.A. Cogburn. 2006. Chicken genomics resource: sequencing and annotation of 35,407 ESTs fron single and multiple tissue cDNA libraries and CAP3 assembly of a chicken gene index. *Physiological Genomics* 25:514-524.

Burnside, Joan, E. Bernberg, A. Anderson, C. Lu, B. Meyers, P. Green, N. Jain, G. Isaacs, and R. Morgan (2006) Marek's disease virus encodes microRNAs that map to meq and the latency-associated transcript. *Journal of Virology* 80:8778-8786.

Lupiani, Blanca, Lee, Lucy F., Cui, Xiaoping, Gimeno, Isabel, Anderson, Amy, Morgan, Robin W., Silva, Robert F., Witter, Richard L., Kung, Hsing-Jien, and Sanjay M. Reddy (2004) Marek's disease virus-encoded Meq gene is involved in transformation of lymphocytes but is dispensable for replication. *Proc. Natl. Acad. Science* (USA) 101: 11815-11820.

Cogburn, Larry A., W. Carre, X. Want, T. E. Porter, Y. Nys, J. Tang, Erin Bernberg, Robin W. Morgan, and Joan Burnside. 2004. Chicken gene discovery: sequence and CAP3 analysis of 42,870 ESTs from single and multiple tissue cDNA libraries. Physiological Genomics (manuscript submitted).

Lupiani, B. M. , X. Cui, L. F. Lee, I. Gimeno, Robin W. Morgan, R. Silva, R. Witter, H.-J. Kung, S. M. Reddy. 2004. Marek's disease virus encoded Meq gene is involved in transformation of lymphocytes but dispensable for early cytolytic infection. Proc. Natl. Acad. Science (USA), 101: 11815-11820.

Cogburn, Larry A., Robin Morgan, and Joan Burnside. 2003. Expressed sequence tags, DNA chips technology and gene expression profiling. In: Poultry Breeding and Biotechnology, William M. Muir and S. E. Aggrey (eds). Cambridge, MA: CABI Publishing, pp. 629-646.

Liu, Hsaio-Ching, Hsing-Jin Kung, Janet E. Fulton, Robin W. Morgan, Hans H. Cheng. 2001. Growth hormone interacts with Marek's disease virus SORF2 protein and is associated with disease resistance in chickens. PNAS 98:9203-9208.

PARCELLS, MARK, Ph.D., Associate Professor

Discipline: Molecular Virology

Research: Dr. Parcells' research is focused on Marek's disease virus (MDV), a lymphoma-causing herpesvirus of chickens. Dr. Parcells' uses molecular biological as well as cell culture, immunological, genomic and bioimaging techniques to study the functions of MDV gene products. The two main emphases of his research are identifying the mechanisms contributing to cellular transformation by MDV and determining the means by which MDV strains evolve in the field to become more virulent. MDV represents a powerful model for the study of lymphoma development and progression and lessons learned from MDV may provide insight into the control of human malignancies such as Hodgkin's lymphoma. Since MDV has evolved in the field in the face of vaccines that prevent tumor formation, understanding how these field strains persist and overcome vaccine-induced immunity may provide insight into future vaccine development.

Publications:

Parcells, M.S., and S. C. Burgess. 2008. Immunological aspects of Marek's disease virus (MDV)-induced lymphoma progression: Immune suppression and modulation. Chaper 11 in Selected Aspects of Cancer Progression: Metastasis, Apoptosis and Immune Response, H.E. Kaiser (eds.), Springer Verlag Publishing, p. 169 - 191. (in press)

Anobile, J., V. Arumugaswami, D. Downs, K. Czymmeck, M. S. Parcells and C. J. Schmidt**.** 2006. Nuclear Localization and Dynamic Properties of the Marek's Disease Virus Oncogene Products Meq and Meq/vIL8. J. Virool 80:1160-1166.

Santin, E. , C.E. Shamblin, J. T. Prigge, V. Arumugaswami, R. L. Dienglewicz and M.S. Parcells. 2006. Examination of a Naturally-occurring Mutation in Glycoprotein L (gL) on Marek's Disease Virus Pathogenesis. Avian Dis. 50:96 - 103.

Trapp, S., Parcells, M.S., J.P. Kamil, D. Schumacher, B. K. Tischer, P. M. Kumar, V. K. Nair, and N. Osterrieder. 2006. A virus-encoded telomerase RNA promotes malignant T cell lymphomagenesis. J. Exp. Med. 203:1307-1317.

Parcells, M.S. and S. C. Burgess. 2005. Immunological Aspects of NeoplasticProgression in Marek's Disease. Chapter 14, in Vol. 5 of Cancer Growth and Progression. Dr. Hans E. Kaiser, ed. Kulwer Academic Publishing, Dordrecht, The Netherlands, in press.

Burgess, S.C., J. R. Young, B. J. G. Baaten, L. Hunt, L. N. J. Ross, M. S. Parcells, P. M. Kumar, C. A. Tragaskes, L. F. Lee and T. F. Davison. 2004. Marek's disease is a natural model for lymphomas overexpressing Hodgkin's disease antigen (CD30). PNAS USA 101:13879-13884.

Prigge, V. Majerciak, H. D. Hunt, R. L. Dienglewicz, and M. S. Parcells. 2004. Construction And Characterization of Marek's Disease Viruses (MDVs) Having Green

Fluorescent Protein Expression Tied Directly Or Indirectly To Phosphoprotein 38 (pp38) Expression. Avian Dis., 48:471-487.
Shamblin, C.E., N. Greene, V. Arumugaswami, R. L. Dienglewicz, and M. S. Parcells. 2004. Comparative Analysis of Marek's Disease Virus (MDV) Glycoprotein-, Lytic Antigen pp38- and Transformation Antigen Meq-encoding Genes: Association of Meq Mutations with MDVs of High Virulence. Vet. Microbiol., 102:147-167.
Levy, A. M., Y. Izumiya, P. Brunovskis, L. Xia, M. S. Parcells, S. M. Reddy, L. Lee, H. W. Chen, and H. J. Kung. 2003. Characterization of the chromosomal binding sites and dimerization partners of the viral oncoprotein Meq in Marek's disease virus-transformed T cells. J. Virol., 77:12841-51.
Rath, N. C., M. S. Parcells, H. Xie, and E. Santin. 2003. Characterization of a spontaneously transformed chicken mononuclear cell line. Vet Immunol Immunopathol., 96:93-104.
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POPE, CONRAD R, D.V.M., Senior Scientist

Discipline: Veterinary Pathology and Histology. Emphasis on Avian Disease Histopathology and Avian Histology.

Research: (1) Histopathology of Avian Infectious Diseases with Emphasis on the Lymphoid System and (2) Diagnostic Avian Histopathology.

Publications:

E. Spackman, C. R. Pope, S. S. Cloud, and J. K. Rosenberger. 2003. The Effects of Avian Leukosis Virus Subgroup J on Broiler Chicken Performance and Response to Vaccination. *Avian Dis.*, 47:618-626.
Isaac R. Rodriguez-Chavez, John K. Rosenberger, Sandra S. Cloud, and Conrad R. Pope. 2002. Characterization of the Antigenic, Immunogenic, and Pathogenic Variation of Infectious Bursal Disease Virus due to Propagation in Different Host Systems (bursa, embryo, and cell culture). III. Pathogenicity. *Avian Pathol.*, 31:485-492.
Ladman, B. S., C. R. Pope, A. F. Ziegler, T. Swieczkowski, J. M. Callahan, S. Davison, and J. Gelb, Jr. 2002. Protection of Chickens Followoing Live and Inactivated Virus Vaccination Against Challenge with Nepthropathogenic Infectious Bronchitis Virus PA/Wolgemuth/98. *Avian Dis.*, 46:938-944.
E. Spackman, S. S. Cloud, C. R. Pope, and J. K. Rosenberger. 2002. Comparison of a Putative Second Serotype of Chicken Infectious Anemia Virus with a Prototypical Isolate I. Pathogenesis. *Avian Dis.*, 46:945-955.
Emara, M. G., M. A. Abdellatif, D. L. Pollock, M. Sadjadi, S. S. Cloud, C. R. Pope, J. K. Rosenberger, and H. Kim. 2001. Genetic Variation in Susceptibility to Marek's Disease in a Commercial Broiler Population. *Avian Dis.*, 45:400-409.
Pope, C. R. 1996. Lymphoid System. Avian Histopathology. C. Riddell, editor. The American Association of Avian Pathologists, 2nd edition: 17-44
Morgan, R. W., J. Gelb, Jr., C. R. Pope, J. A. Sondermeijer. 1993. Efficacy in Chickens of a Herpes Virus of Turkeys Recombinant Vaccine Containing the Fusion Gene of New Castle Disease Virus: Onset of Protection and Effect of Maternal Antibodies. *Avian Dis.*, 37:1032-1040.
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Pope, C. R. 1991. Pathology of lymphoid organs with emphasis on immunosuppression. *Vet. Immunol. and Immunop.*, 30:31-4.

SAYLOR, WILLIAM W., Ph.D., Associate Professor

Discipline: Poultry Nutrition

Research: . Nutritional Strategies to Minimize Environmental Impact of Poultry Production. We are investigating the use of numerous dietary modifications to reduce the impact of animal production, especially poultry production, on soil and water quality. Specifically, we are looking for ways to change dietary nutrient concentrations or improve nutrient utilization to minimize excretion of those nutrients into the environment. Our target nutrient at this time is phosphorous, and we are looking for methods to enhance the utilization of dietary phosphorous in poultry so that the excretion of undigested phosphorous is minimized. We are also investigating nitrogen and sulfur metabolism, utilization and excretion. In another area, we are developing a scheme for evaluating xenobiotic metabolism using an embryonating egg as a model system.

Publications:

Mullins, T. M., P. T. Luu and W. W. Saylor. 2007. Embryonic development of the cardiovascular system, hemopoiesis, and the Bursa of Fabricius in a hypoxic incubation environment. Poultry Sci. (accepted).

Mullins, T. M. and W. W. Saylor. 2007. Right ventricular disease and ascites formation in response to embryonic hypoxia in broilers fed a high-fat diet. Poultry Sci. (accepted).

Hester, P. Y., C. Z. Alvarado, S. F. Bilgili, J. H. Denton, A. M. Donoghue, A. Giesen, B. M. Hargis, J. W. Kessler, F. N. Madison, G. W. Malone, P. Mavrolas, S. L. Noll, A. J. Pescatore, C. A. Ricks, F. E. Robinson, R. B. Shirley, M. Sifri, M. O. Smith, R. H. Stonerock, J. L. Wilson, M. J. Wineland, M. M. Beck, and W. W. Saylor. 2006. The 2006 – 2010 Strategic Plan for the Poultry Science Association. Poultry Sci. 85:1-7.

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McGrath, J. M., J. T. Sims, R. O Maguire, W. W. Saylor, C. R. Angel and B. L. Turner. 2005. Broiler diet modification and litter storage: Impacts on phosphorus in litters, soils, and runoff. *J. Environ. Quality*. (in press).

Applegate, T. J., J.T. Sims, W. Saylor, J. McGrath, W. Powers, and R. Angel. 2005. Phytase in Poultry Diets: Further evidence for reducing water-soluble phosphorus in the environment. *Proceedings of the Multi-State Poultry Conference*. May 24-26, 2005.

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phytase addition to poultry diets on phosphorus forms and solubility in litters and amended soils. *J. Environ. Quality* 33: 2306-2316.

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Ringer, R. K., L.R. Miller and W.W. Saylor. 1999. Minor Use Drug Program – A national agricultural program to approve animal drugs for minor uses and species. *JAVMA*., 214:1636-1637.

Sherwood, T. A., R. L. Alphin, W. Saylor and H. B. White III . 1993. Folate metabolism and deposition in eggs by laying hens. *Arch. Biochem. Biophys.,* 307:66-72.

Hough-Goldstein, J. A., J. Geiger, D. Chang and W. Saylor. 1993. Palatability and toxicity of the Colorado Potato Beetle (Coleoptera: Chrysomelidae) to domestic chickens. *Ann. Entomol. Soc. Am.,* 86(2):158-164.

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Saylor, W.W. and J. V. Downer. 1986. Copper and Zinc Distribution in the Liver and Oviduct of Estrogen- and Testosterone-Treated Hens (*Gallus domesticus*). *Nutr. Res.*, 6:181-190.

Saylor, W.W. 1986. Evaluation of Mixed Natural Carotenoid Products as Xanthophyll Sources for Broiler Pigmentation. *Poultry Science*, 65:1112-1119.

Benore-Parsons, M., L. Yonna, L. Mulholland, W. W. Saylor and H. B. White, III. 1988. Transport of Riboflavin-Binding Protein to the Hen Oocyte: Bound Vitamin is not Required for Protein Deposition. *Nutr. Res.*, 8:789-800.

SCHMIDT, CARL J., Ph.D., Assistant Professor

Discipline: Molecular Biology

Research: Molecular biology of oncogenic avian viruses. DNA chip technology is being used to understand the responses of host cells to infection by these viruses. In addition, we are studying the role of specific virus proteins using a variety of methods including the yeast two hybrid system and confocal microscopy.

Publications:

Anobile, J., Arumugaswami, V., Downs, D., Czymmek, K., Parcells, M., and Schmidt, C.J. (2006) Nuclear Localization and Dynamic Properties of the Marek's Disease Virus Oncogene Products Meq and Meq-vIL8. J. Virology 80 1160-1166.

Jin, L., Steiner, K., Schmidt, C.J., Situ, G., Kamboj, S. Kay T. Hlaing, Morgan Conner, Heebal Kim, Marlene Emara, and Keith S. Decker (2005) "A Multiagent Framework to Integrate and Visualize Gene Expression Information" IEEE-ICDM Workshop on Multiagent Data Warehousing and Multiagent Data Mining, pp. 1-7.

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S. Khan, G. Situ, K. Decker, and C.J. Schmidt. 2003. GO-Figure: a tool to visualize automated Gene Ontology annotation, *Bioinformatics*., 12:2484-2485.

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Decker, K., Khan, S., Schmidt, C.J. Situ, G., Makkena, R., Michaud, D. 2002. Biomas: A multi-agent system for genomic annotation. *International Journal of Cooperative Information Systems*, 11: 265-292.

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SNIDER, O. SUE, Ph.D., Professor and Extension Food Safety and Nutrition Specialist
Discipline: Food Safety and Nutrition
Publications:

Schmidt, J., Vickery, C.E., Cotugna, N.A., Snider, O.S. 2005. Health Professionals Hold Positive Attitudes Toward Biotechnology and Genetically Engineered Foods. J. Environ. Health 67(10):44.

Delaware Cooperative Extension Fact Sheets:

Apostolou, M. and Snider, S. 2003. Fats.

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