

## **Proposed Closing of the USDA/ARS Avian Diseases and Oncology Laboratory A Perspective from the US Poultry Industry's Stakeholders**

The FY2009 budget proposed the closure of the USDA/ARS Avian Diseases and Oncology Laboratory (ADOL) in East Lansing Michigan, and termination of the Avian Tumor Viruses and the Genomics and Immunogenetics CRIS research programs. These are highly relevant, research programs and vital to the future well-being of the U.S. poultry industry. According to the USDA's Economic Research Service (AIS-86, December 2008) poultry meat and eggs added \$36.7 billion to the U.S economy. The poultry industry is the second largest food animal industry in the U.S. Poultry meat and eggs are one of the most popular and economic sources of protein for American consumers and trade partners around the world. In the U.S. alone, the consumption of chicken meat is at least 80 lbs per capita (higher than any other meat product). In addition, approximately 70% of the worldwide commercial poultry industry depends on poultry breeding stock supplied by primary breeding companies in the U.S.

Currently ADOL employs 33 employees including seven scientists and support personnel; it has an appropriated FY-09 budget of \$3,405,440, plus approximately \$1,190,529 in additional grant funding and agreements from USDA-NRI, the poultry industry and the U.S. Poultry and Egg association (only \$407,687 of the grant funding will remain in the laboratory because of existing obligations for cooperative agreements with other institutions and procurement of specialty reagents). Since its establishment in 1939, the scientists at ADOL have made numerous and significant contributions to the prevention of tumor causing diseases, production and quality assurance of vaccines, and development of diagnostic procedures and genetic selection strategies aimed at improving disease resistance. ADOL is a unique, world renowned research institution conducting basic science projects not being conducted elsewhere in the world. Furthermore, ADOL also provides valuable and highly specialized diagnostic services for the commercial egg, broiler and turkey industries.

### **Avian Tumor Viruses**

Avian tumor viruses are a severe, expensive and ongoing threat for the poultry industry. These viruses can cause different forms of cancer and leukemia in poultry. Marek's disease virus (MDV), avian leukosis virus (ALV) and reticuloendotheliosis virus (REV) have the potential to cause devastating losses and endanger the production of wholesome and economic products entering the food chain. Marek's disease (MD) is currently controlled by vaccination (original vaccine developed by ADOL that resulted in \$200+ million estimated savings by reducing bird condemnations and increased egg production), but the virus continues to evolve into more virulent strains in the field. ADOL monitors the virulence of these viruses, provides new virus isolates for vaccine efficacy trials, genetic selection and vaccine development. Recently ADOL developed a new recombinant MD vaccine that, in the initial trials, showed better protection against field challenge than the currently available commercial vaccines.

Avian leukosis virus (ALV) is a continuous threat, particularly for the poultry primary breeding industry. All breeding stock must be ALV free. Like MD, ALV viruses have the ability to mutate and recombine in the field. A new subgroup (known as ALV-J) was identified in the early 1990's which caused severe outbreaks leading to mortality in adult broiler breeders and immunosuppression and performance problems in their broiler progeny. These outbreaks threatened the viability of the entire broiler breeder industry (responsible for almost 9 billion chickens / year for the U.S. market and exports). The team at ADOL isolated, characterized the causing virus, and developed the detection assays used to eradicate it from the primary broiler breeding stock. More recently a new recombinant ALV was found as a contaminant in live commercial poultry vaccines. ADOL developed the detection system and provided information to the Center for Veterinary Biologics (CVB) to update detection and quality assurance protocols. The poultry primary industry must be able to detect these viruses and prevent their spread in order to produce virus free breeding stock. Failure to detect these viruses could result in disease, financial claims and loss of global export markets.

### **Genomics and Immunogenetics**

The genomic sequence for the chicken was produced by NIH in 2004. This has been an incredible resource for the entire poultry research community, and has fueled research within the poultry breeding sector on identification of genes for production traits, disease resistance, feed efficiency and waste reduction. The sequence was produced utilizing the existing chicken map developed by ADOL. ADOL scientists have been at the core of chicken genomic research. In particular, they have developed tools and resources for understanding genetic resistance to disease. The Blueprint for USDA Efforts in Agriculture Animal Genomics 2008-2017, specifically mentions:

1. the importance of identification of genes and gene products that affect disease resistance
2. the interaction of host and microbial genomes
3. the importance of solid infrastructure including genomic maps and centralized animal populations and
4. the importance of training and education.

All of these functions are being provided by ADOL, and it is the only ARS program providing all of these functions for poultry.

The value of the ADOL program is that it successfully integrates research in virus causing tumor diseases and the genetic resistance of the chicken. This is the only program within the USDA that is focused on the genetic resistance to diseases. The multi-disciplined research team includes immunologists, molecular biologists, geneticists and veterinary pathologists.

### **Closure of ADOL**

Closure of ADOL and termination of their research programs will have severe negative consequences for the future of the U.S. poultry industry. Over the past decade, funding increases to ADOL have been minimal, and have not kept up with the increasing costs in salaries, research materials and animal care costs. As a result, ADOL is rapidly losing its ability to serve the research needs of the U.S. poultry industry with regards to avian tumor diseases and genetics of disease

resistance. There is currently only one veterinary pathologist on staff, and he is within retirement age. There are insufficient funds to replace the last pathologist that retired in 2002. Due to lack of funds, the recently trained DVM/PhD pathologist at ADOL will be leaving once his training time is completed in May 2009. The current funding level excluding the cost of poultry feed and other items directly associated with maintaining ADOL chicken lines provides only \$17,000 per scientist for research. This is well below the USDA minimum of \$25,000 per scientist.

ADOL is in the unusual position of supporting the unique genetic lines required for disease and genomics research. Support of these lines utilizes a significant proportion of their overall budget. These lines are not available elsewhere and are utilized by industry and academia.

The potential closure and currently insufficient funding of this facility leaves several very important questions that the industry needs to have answered.

1. This is the World Animal Health Organization (OIE) Reference Laboratory for Marek's disease.
  - a. Where will OIE establish a new laboratory, within the US?
  - b. Where will the poultry industry go to get new field isolates tested for virulence?
  - c. Where will the poultry industry go to get new field isolates to utilize in poultry genetic selection programs?
  - d. Where will the next generation of Marek's disease vaccines be developed?
2. This is the national and international Center of Excellence for Avian Tumor Virus Research.
  - a. Where will industry go when ALV recombines and the new virus affects broiler meat breeding production?
  - b. Who will provide the knowledge and expertise to CVB (Center for Veterinary Biologics) to develop new and more sensitive tests to detect contamination with new recombinant viruses in vaccines?  
Supplemental Assay Method (SAM) 405 for USDA-APHIS-CVB was recently revised based on research done at ADOL.
3. ADOL has Specific Pathogen Free (SPF) facilities necessary for tumor viral disease research. Where will SPF facilities be available to continue tumor viral disease research?
4. ADOL is an integrated program involving immunologists, veterinarians and geneticists. Where else within the USDA is there a similar group of scientists that can integrate these three fields to deal with the complex problem of increasing viral virulence in poultry, and determine genetic control of viral pathogenicity?
5. ADOL is the lead laboratory for genomics and immunogenetics in poultry.
  - a. Who will continue to develop genomics tools to investigate the chicken genome for genes involved with disease resistance?
  - b. Who will develop the genetic lines required for testing genetic resistance?

- c. Who will develop the genetic lines required for vaccine manufacturing and testing?
6. ADOL is the home of 37 unique and highly specialized poultry lines essential for the vaccine manufacturing industry, the identification of genes that confer genetic resistance, and the development of tumor cell lines. The significance of these lines was recognized in 2002 by the National Animal Germplasm Program of the USDA and is included in The National Registry of Genetically Unique Animal Populations.
  - a. Where will these lines be maintained?
  - b. Who has the knowledge and expertise to continue these genetic lines so that they will be available for research?
  - c. Where are the SPF facilities that can keep these lines under the conditions required for disease research studies?
  - d. Where are the facilities and expertise to develop new lines for further studies?

In 2002, the president's budget proposed to end ALV research, and move the MDV and genomics programs to other ARS facilities. The poultry industry held a stakeholders workshop to discuss USDA poultry research priorities. This workshop resulted in an executive summary in which several specific points were addressed.

1. Stakeholders need to be involved with decision making on closure or changes of research programs.
2. Continued research is needed for tumor viruses and genomics within ARS
3. Disease and genomics research needs to be conducted at the same location in order to ensure relevance and synergy.
4. ADOL research needs to be funded at an appropriate level for continuation. This needs to be addressed now as the program is starting to become less effective due to insufficient funding and support.
5. ARS infrastructure is deteriorating and is increasingly unable to serve the needs of the poultry industry.
6. Location of the research is secondary to maintaining the program at appropriate funding levels.

The research programs and services conducted at the USDA/ARS Avian Diseases and Oncology Laboratory (ADOL) in East Lansing, Michigan are extremely relevant and critical to support the future production and safety of poultry products. The lab has had a long standing and positive relationship with the poultry breeding and veterinary vaccine industry. Without this centralized core capability, these industrial partners will need to establish these relationships elsewhere, and most likely overseas. ADOL has and must continue to fulfill the USDA/ARS mission to support one of the largest U.S. agricultural industries. It is essential that its research programs be continued and that funding be increased to maintain research capabilities, staff and expertise. As requested in 2002, it is essential that industry stakeholders (poultry companies, primary poultry breeders and vaccine manufacturers) be involved in future discussions and decisions regarding this research institution.