



FINAL REPORT

Avian Biosciences Grant Program

Award Recipient Carl Schmidt

Department Animal and Food Sciences

Date of Award 2007-2008

Title *Copy Number Variations in the Chicken Genome*

Summary of Findings Copy number variation in gene content was assessed in 12 lines, including:

- **Ancestral:** Red Jungle Fowl
- **Broilers:** Ross708, Illinois Heritage, French Fat, French Lean, French high growth, French low growth (the last four were from Dr. Larry Cogburn).
- **Layers:** White Leghorn, Wingless-2
- **Exotics:** Silkie, Blue Hen, Araucana

Genomic DNA was extracted from the blood of 36 different birds selected from the above lines. DNA was then sent to Nimblegen Corporation for hybridization to their Gallus Comparative Genomic Array. This yielded a total of 10 gigabytes of data, which we (Drs. Schmidt and Cogburn) are still analyzing. However, our initial analysis revealed:

- Extensive sequence variation was noted in all lines across the entire MHC region of the genome. While this is not surprising given the variable nature this region, it was gratifying to see that the method is sensitive enough to detect these differences.
- Gain in copy number of two genes in the Silkie line that affects melanocyte survival. This is interesting given the black skin and dark viscera of this line, which apparently results from aberrant migration and survival of melanocytes.
- Several gain of copy number regions unique to Layers including segments of Chromosomes 1, 5, 6 and 12. Two of these regions contain genes: Regulator of G-protein signaling 10 (Chr6) and Dedicator of Cytokinesis-3 (Chr12).

- Several loss of copy number regions unique to Layers, including segments of Chromosomes 1, 2, 4 and 5. One of these includes a region containing the thiamin pyrophosphokinase 1 gene, a gene responsible for the activation of the vitamin thiamin.
- Multiple gain and loss loci in the Broiler line on Chromosomes 1,2,3,4, 5.

Following completion of data analysis, we will verify these results with quantitative PCR.

Publications Resulting From Research None at this point. However, we anticipate at least one submitted to a genomics journal in early 2009

Additional Grant Support Received as a Result of ABC Grant: None at this point, but I have not yet used this data as part of a grant proposal. _____