

## **GENE EXPRESSION AND PROTEIN PROFILES OF *C. ELEGANS* DURING AGING**

Tom E. Johnson (P), Pat Tedesco, Jim Lund, Nate Kahn, Shane Rea, and Deqing Wu

Institute for Behavioral Genetics, Univ. of Colorado at Boulder, Boulder, CO, USA

We have long been interested in just what changes during aging, the last 90% of the worm's life. The short answer is almost everything, but many in fairly subtle ways. For example whole-transcriptome analyses (Lund et al., 2002) showed that surprisingly little changed during aging, only 164 genes changed when we normalized to total mRNA. This is in large contrast to the number of genes that change in abundance during the first 10% of the worm's life (> 10,000) and is another reason that development and aging can be seen to be different types of processes. At the protein level, now "classical" studies (Johnson and McCaffrey 1985) confirm that during the adult life, few new proteins are being made or turned off. However, these changes are detected in large populations and when individual nematodes are examined at these levels a different story is beginning to emerge with large amounts of individual "stochastic" variation beginning to emerge as a dominant theme (Golden and Melov, 2004). Does this mean that as in humans, individual worms have different causes of death?

In other species, different answers have tended to emerge; in *Drosophila* for example, (Pletcher et al., 2002) thousands of genes change with age. A possible reason for this discrepancy is the difference in platforms (we used cDNA while the *Drosophila* work was done using Affymetrix chips). The Affy methods would be more sensitive to absolute abundance of mRNA being detected rather than assessing it as a fraction of total mRNA. We found (Fabian and Johnson, 1995) that the mRNA fraction decreases 23 – 43% over the life of the worm. We also saw large differences in total RNA among various "wild" (non-Age) strains. As whole-genome studies continue to emerge and technology continues to develop ever more general and sensitive methods, additional details can be added to these initial and early studies and new questions will continue to emerge.

*(Supported by the NIA and the Ellison Medical Foundation.)*