

Keeping America's sheep healthy and productive while expanding the market for wool and lamb is the goal of Agricultural Research Service (ARS) scientists who are matching the animals' physical traits to the genes that underpin their expression.

The scientists are pursuing this research mainly at three ARS locations: the Animal Diseases Research Unit (ADRU) in Pullman, Wash.; the U.S. Sheep Experiment Station in Dubois, Idaho; and the Roman L. Hruska U.S. Meat Animal Research Center in Clay Center, Neb.

At Dubois, the team led by Gregory Lewis is investigating reproductive efficiency, mineral retention and other traits. Michelle Mousel, an ARS geneticist at Dubois, has also created a bank of frozen tissue specimens from the station's on-site flock of 6,000 lambs, ewes and rams in support of that work, as well as data analysis and genotyping efforts.

At Pullman, ARS scientists Lynn Herrmann-Hoesing, Stephen White and Donald Knowles, who leads ADRU, are using the tissue samples to study whether ovine progressive pneumonia virus levels are affected by specific sheep immune response genes. Their goal is a molecular test with which to measure the levels of such infectious agents in sheep. Scrapie, a degenerative neurological disease of sheep, is another concern.

At Clay Center, ARS microbiologist Michael Heaton and colleagues used DNA analysis and genotyping procedures to identify sheep with 21 prion gene alleles (alternate forms of a gene) that influence genetic resistance to scrapie. The advance has given rise to faster, better and cheaper methods of detecting scrapie susceptibility in sheep and eliminating their predisposition to the disease through selective breeding.

Parallel studies under way at Clay Center and Dubois focus on the so-called myostatin mutation in Texel sheep. Through conventional breeding, researchers eventually may be able to harness the mutation to increase the size of lamb chops without adversely affecting tenderness.

Read more about this and related research in the August 2008 issue of Agricultural Research magazine, available online at:  
<http://www.ars.usda.gov/is/AR/archive/aug08/genomics0808.htm>