IDENTIFICATION AND CHARACTERIZATION
OF THE AGOUTI GENE IN LIVESTOCK

M.D. Johansen, R.R.R. Rowland, and N.H. Granholm
Department of Biology/Microbiology
South Dakota State University
Brookings, SD 57007

ABSTRACT

The agouti gene has been identified in humans and mice. The primary role of the agouti gene in mice is to produce black and/or yellow pigment. In the mutant yellow mouse (Ay/a), the gene is overexpressed and results in the lethal yellow syndrome, a collection of defects which includes obesity, diabetes, infertility, cancer, and immune deficiencies. The objective of this study was to confirm that livestock possess an agouti gene and to characterize that gene.

The cattle genomic DNA was isolated and prepared from liver cells. We used Southern Blot hybridization to identify an agouti gene in cattle by hybridizing cattle genomic DNA that was cut by various restriction enzymes to mouse agouti cDNA containing the coding region of the gene (exons 2-4). Polymerase chain reaction (PCR) was used to amplify part of the coding of the agouti gene for sequencing. Primers for PCR were designed to complement the 5' and 3' ends of exon 2.

Southern blot hybridizations indicate that cattle have an agouti gene. PCR results indicate that a region approximately the same size as the human agouti exon 2 has been amplified. We speculate this could be cattle agouti exon 2. These data provide preliminary evidence that an agouti gene is present in cattle. This information could ultimately have a significant impact on overall health, growth rate, feed efficiency, and other production traits of cattle. Funded by SDSUAES-HD089, Eagles' Ehrmann Cancer Fund, and NIH (AR42757)