

Study to Find the Gene for the Dominant Form of Curly Hair in the Horse: Update Sept 26, 2006

From: Dr. E. Gus Cothran, Texas A&M University, College Station, TX
Relayed to ICHO by Dr. Loretta L Nielsen, ICHO Research Director

In 2004, a preliminary genomic scan was undertaken by my Master's degree student, Ms. Diane Strong, to attempt to find a genetic marker associated with the dominant form of curly coat in horses. Blood samples were collected from Curly horses (breeders associated with the ICHO). The samples were from stallions that had produced both curly-haired and straight-haired offspring and from as many of these offspring as possible. A total of 78 horses were included in the initial study. Some additional families were obtained later but these horses were not obtained until after the initial laboratory work.

The study first focused upon two genes known to be associated with curly or wavy hair in mice. The genes are EGFR (Epidermal Growth Factor Receptor) most likely located on horse chromosome 4 (ECA4) and TGF- α (Transforming Growth Factor-Alpha) most likely found on ECA15. Eight markers that were predicted from comparative genomic analysis to be closely linked to these genes in horses were tested in all samples. No statistical evidence for association of either of these markers with the curly hair trait was observed. These results effectively eliminated the two proposed candidate genes as the cause of the dominant curly hair trait in horses. In addition to the eight marker systems above, most samples were tested for an additional 18 to 20 other markers, but no analysis of the data was conducted at the time. All data is currently in a database in my possession at Texas A&M University.

I am now prepared to conduct a full genomic scan to look for association of a genetic marker with the curly trait in these horses. Additional samples are stored at the University of Kentucky and should be available on request. (*Note from LN: Tina Estridge has authorized UK to release these samples to Dr. Cothran for future research*). At the

present time, due to limited resources to cover the cost of genomic typing for the curly trait gene, my intention is to combine testing of the curly horse families with testing of other horse groups in studies of other traits. At least two other such studies are about to be started in the very near future (possibly as soon as the second week of October 2006). This will make more efficient use of the funds that are available.

E. Gus Cothran

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The current status and future plans for the Curly Gene Isolation Project were discussed at the ICHO annual general meeting in Wisconsin on Sept. 30, 2006. The members present decided that Andrea and myself would use the DNA parentage maps generated for several Curly horse families (including both curly- and straight-coated horses) to try and narrow-down potential curly gene locations among all horse chromosomes. The results of this analysis will be used as the basis for future actions on this project.

Respectfully submitted,

Loretta L Nielsen, Ph.D.