Beef Up on Cattle DNA: What It Reveals About Human History

Monday, Sept. 16, 2013 - 3:30 p.m.

Curators Professor Jerry Taylor

Stotler Lounge, Memorial Union North
Dessert reception to follow

The tenth annual 21st Century Corps of Discovery Lecture at the University of Missouri features Jerry Taylor, Curators Professor of Genetics and Animal Sciences and Wurdack Chair in Animal Genomics at the College of Agriculture, Food and Natural Resources.

Heralded as one of the world's top experts in cattle DNA, Taylor will discuss the impact of humans on the shaping of the bovine genome since cattle were domesticated 10,000 years ago. Taylor specializes in the sequencing of and analysis of genomes, a branch of molecular and population genetics.

"I'm fascinated by the idea that a scientist can use the DNA sample of a living animal to shed light on thousands of years of history for that particular species," says Taylor, adding that early human

migration patterns can be traced through cattle genetics.

Humanity has left an indelible mark on the genomes of cattle. Once a wild species, cattle are now entirely domesticated and have been partitioned into a smaller number of groups called breeds. In North America, there are approximately 80 different breeds. Gene mutations found in domestic cattle are either indirectly selected to allow adaptation to the environment, or they are directly selected for increased milk production, docile temperament and other traits beneficial to humans.

Taylor has a great interest in the potential of genomics to help humans as technology becomes cheaper and more powerful. He collaborates with veterinarians, physicians and other MU scientists who take a “one medicine/one health” approach to understanding and conquering diseases that affect humans as well as agricultural and companion animals.

“Genomics is species agnostic,” Taylor says. “It is a way of studying the organization, structure and function of genes across species. Generally, genes in closely related species are very similar.”

Taylor says bovine research not only improves food production and the health of farm animals, but it allows researchers to establish the relationship between genes and phenotypes (an organism’s observable characteristics) in ways that may not be possible in humans. For example, variation in the gene called neurobeachin in Angus cattle underlies docility, but other variants in this gene found in humans result in forms of extreme behavior linked to autism spectrum disorders.

One of Taylor’s major strengths is his innovative approach to genomics and his application of that knowledge to the cattle industry. His instrumental role in developing the Bovine50K SNP chip to determine the breeding value of beef and dairy cattle made it possible for scientists to examine large numbers of cattle DNA markers simultaneously and serves as an example of his ability to creatively apply genomics in practical ways. The chip revolutionized the quality of research results in cattle genetics around the world within a year of its availability. Now SNP technology is applied in most livestock species and in nearly all crop species focused on DNA-based genetic improvement.

Taylor started his career at the James Cook University of North Queensland, Australia, as an

assistant professor of biometrics and animal production. He began teaching genetics and animal science in the United States at Texas A&M University in 1987. After spending two years in the private sector, Taylor joined the Mizzou faculty in 2002. He holds five patents, has published 185 refereed journal articles and has authored a book and five book chapters. To date, he has attracted $39 million in grant funding and $5.6 million in private support for his research.

“Dr. Taylor has directed 57 graduate and postdoctoral students,” says William Lamberson, associate director of MU’s Animal Sciences division. “It is fair to say that through his research and training of students, Jerry may have already had a greater impact on genomics in the U.S. than any other single individual.”

Taylor earned bachelor’s degrees in mathematics and mathematical statistics at the University of Adelaide, Australia, and a doctorate in quantitative genetics at the University of New England, Australia.

The annual 21st Century Corps of Discovery Lecture features an outstanding MU faculty member to commemorate the contributions of the Lewis and Clark expedition and to inspire and unite the university community. Reinforcing “discovery,” one of the university’s core values, the lecture is intended to represent MU’s diverse academics in science, art, humanities, law, medicine, engineering, education, journalism and business.