



** This news release from K-State Research and Extension is available online at <https://ksre-learn.com/livestock-genetic-modifications>

Released: March 11, 2025

K-State Cattlemen's Day: Geneticist outlines promise of gene editing

New technology could help shorten time needed to improve cattle genetics

By Pat Melgares, K-State Research and Extension news service

MANHATTAN, Kan. – An animal geneticist at the University of California-Davis told Kansas cattle producers recently that a gene editing technique more common in plant genetics is also a safe option for shortening the time it takes to improve cattle genetics.

[Alison Van Eenennaam](#) led off the program for [Kansas State University's 112th annual Cattlemen's Day](#) on March 7 in Manhattan. Her talk was titled, 'Genetic Modifications in Livestock.'

"Often when people hear the expression 'genetic modification' what comes to mind is the whole GMO debate and scary memes on the Internet, or that if you eat GMOs something bad will happen to you," Van Eenennaam said. "That narrative has been very hard to correct."

Van Eenennaam's research team at UC-Davis is working to perfect a technique in which scientists take a look at the vast cattle genome, identify the DNA pairs that define various traits, and – literally – edit targeted genes to produce a more desired trait.

Gene editing has taken root in plant breeding, leading to numerous advances in plant-based foods. K-State scientists, for example, have used gene editing to reduce the presence of gluten-coding genes in wheat, a breakthrough that one day may allow people with celiac disease to again enjoy wheat-based products.

"In 2009, we were able to define the entire sequence of the cattle genome, which gave us a look at the genetic variation that exists between cattle breeds," Van Eenennaam said. "In the case of cattle, that's about 3 billion base pairs of DNA that make up the cattle genome."

Conventional breeding focuses on identifying and using genetically superior animals that possess desired traits, and avoiding those with less desired traits. Improving cattle genetics in this manner is a long process, often taking three or four generations – or about a dozen years.

Van Eenennaam said gene editing can inactivate genes that lead to undesired traits in a more targeted fashion. The technique involves inactivating genes that define a particular trait. Genetic improvements in the cattle herd can occur within a single generation.

“You can inactivate a gene, or basically knock it out,” Van Eenennaam said. “That’s useful in cattle genetics if you’re targeting a gene that creates something you don’t want, such as susceptibility to disease.”

Beneficial gene variants can also be added to the cattle genome, using a cattle DNA template, to introduce useful traits “such as the polled allele that results in hornlessness into horned breeds of cattle,” Van Eenennaam said.

In the swine industry, gene editing is being used successfully to improve pig’s resistance to Porcine Reproductive and Respiratory Syndrome, a devastating disease that costs that industry about \$1.2 billion per year in the United States alone.

Van Eenennaam said that while gene editing research is being conducted in many food animals, the technology still faces regulatory hurdles in the U.S., as well as the need to overcome perceptions among countries that buy U.S. beef.

“It’s a new-ish technology and the regulations are just kind of catching up,” she said. “So we haven’t really gotten a lot of products on the market yet.”

Van Eenennaam’s complete talk is available online from K-State’s Department of Animal Sciences and Industry, at <https://www.asi.k-state.edu/events/cattlemens-day>. That website also includes videos by other presenters at this year’s event, as well as reports from research conducted at K-State in the past year.

-30-

FOR PRINT PUBLICATIONS: Links used in this story
112th annual Cattlemen’s Day, <https://www.asi.k-state.edu/events/cattlemens-day>

Alison Van Eenennaam (UC-Davis), <https://animalscience.ucdavis.edu/people/faculty/alison-van-eenennaam>

K-State Research and Extension is a short name for the Kansas State University Agricultural Experiment Station and Cooperative Extension Service, a program designed to generate and distribute useful knowledge for the wellbeing of Kansans. Supported by county, state, federal and private funds, the program has county extension offices, experiment fields, area extension offices and regional research centers statewide. Its headquarters is on the K-State campus in Manhattan. For more information, visit www.ksre.ksu.edu. K-State Research and Extension is an equal opportunity provider and employer.

Story by
Pat Melgares
melgares@ksu.edu