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Forget “Frankenfish.” UC Davis scientist explains the real benefits of genetically engineered animals

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By **Madeline McCurry-Schmidt**

You can’t find a Golden Retriever in nature. Golden Retrievers, like Bulldogs and Poodles, were created by humans through artificial selection. What was once a wolf became a golden retriever after generations of selective breeding. Humans have used artificial selection to breed dogs, cats, cattle, pigs, chickens and many more species for companionship or food.

Manipulating a genome by selecting animals with favorable traits is acceptable. Manipulating a genome through modern DNA technology, also called genetic engineering, is controversial.

During a guest lecture last fall at Oregon State University, animal scientist Alison Van Eenennaam explained how public perception has affected the development of genetically engineered animals. Eenennaam is an extension specialist from UC Davis known for her work in animal biotechnology and genomics. In her OSU lecture, Van Eenennaam explained that even when the science has proven safe, people are still hesitant.

“While science has shown we can do it, society is unsure if we should,” said Van Eenennaam.

A famous example of science vs. public perception is the AquaAdvantage salmon, a fish produced through genetic engineering to grow to market size in half the time as wild salmon. Approval for consumption of the AquaAdvantage fish has languished in FDA review for 16 years.

The way Van Eenennaam explained it, genetic engineering is not some huge revolution. Humans have produced animals through artificial selection for years. We’ve just got new technology to help us do it more effectively.

Consider Belgian Blue cattle, a breed created through traditional breeding by selecting cattle with a genetic mutation that causes “double muscling.” It’s a breed with pros and cons. Belgium Blue cattle produce more meat than cattle without double muscling, but their stocky builds means calves must be delivered through C-section. Van Eenennaam does not see the difference between acceptability of the artificially selected Belgian Blue cattle and genetically engineered animals.

Another example of traditional breeding vs. genetic engineering is in the acceptance of cloned animals.

“Nature has been cloning for years without any regulatory oversight,” said Van Eenennaam. These natural clones are called twins. “Livestock breeders took a page from nature’s book and started using this technique to produce clones.”

Since the 1980’s, cattle breeders have cloned animals by splitting developing embryos to create twins.



*UC Davis extension specialist
Alison Van Eenennaam*

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Many of these twins, which are genetically identical clones of each other, are the high-value bulls used as breeding stock worldwide. If you eat meat, you've eaten an animal produced through artificial selection. Yet no animals produced through GE have ever been approved for human consumption.

There's some about the term "genetic engineering" that scares people off.

Part of the problem, Van Eenennaam said, is how GE animals are represented. For example, the GE AquAdvantage salmon is nicknamed the "Frankenfish." During the lecture, Van Eenennaam showed a slide of a photo she found when Googling "AquAdvantage salmon" – it was a Photoshopped image of Frankenstein's monster combined with a dolphin.

"How can you have a rational discussion after calling something 'Frankenfish'?" asked Van Eenennaam.

Van Eenennaam tackled the problem of public perception by explaining the benefits of GE in terms anyone can understand. If people understand the science and the benefits of genetically GE animals, perhaps they won't leap to sci-fi conclusions.

In her lecture, Van Eenennaam explained how engineering chickens that do not transmit avian influenza could save human lives. She said the last time avian influenza passed to humans and gained the ability to be transmitted human to human was in 1918. That outbreak killed 20 million people.

"That was in the days when we had very little air travel and very little international commerce," said Van Eenennaam.



Google images result for "AquAdvantage salmon"

A disease like the 1918 avian flu virus would probably spread faster today, but geneticists have found a way to stop it. Last year, a team of scientists from Scotland and England reported that they had genetically engineered chickens that could not transmit avian flu, but meat or eggs from these chickens are far from entering the food supply.

The technology is there, Van Eenennaam said, we just need public perception to catch up.

You can watch Van Eenennaam's lecture on YouTube: http://www.youtube.com/watch?feature=player_detailpage&v=cN1w7EionA4

Lecture slides and study guide by Oregon State University: <http://oregonstate.edu/orb/fft/2011/animalethics>

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