

# New gene may offer clues to infertility in both cows and women

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A newly identified gene that controls embryo development in cows may someday offer clues into the cause of infertility in women.

A team of researchers from Michigan State University led by George Smith, associate professor of animal science, has discovered that the new egg-specific gene, JY-1, is necessary for embryonic development in dairy cows. The research is reported in the Oct. 29 online issue of the *Proceedings of the National Academy of Sciences*.

Besides potentially offering the dairy industry more solutions for the infertility problem that costs it more than \$1 billion per year, the new gene provides clues into the egg's role in embryo development and may ultimately provide new options for the more than 9.3 million women treated annually for fertility problems.

According to Smith, cows are a better model for human fertility research than the standard mouse model. Like women, cows usually release a single egg and give birth to one offspring at a time. Mice, in contrast, release multiple eggs and give birth to litters of pups.

"Our research focus is infertility in dairy cows," said Smith. "We want to understand the role of egg quality in infertility and create new solutions for dairy producers to manage their biggest problem. But there could certainly be human implications."

Smith and his team, which includes former students Anilkumar

Bettegowda, a PhD student in Smith's lab, and Jianbo Yao, a fellow in the MSU Center for Animal Functional Genomics, know the bovine chromosome where the JY-1 gene is located. A similar gene is located on the matching chromosome in humans but does not appear to be functional.

"There may be other related genes in humans that perform the same function as JY-1," Smith said. "We know this gene is necessary for cow embryos to develop, so it makes sense that humans have a related gene with a similar function."

Infertility and other reproductive problems are one of the dairy industry's biggest concerns. Dairy cows must become pregnant to produce milk. So if a cow can't get pregnant or can't maintain a pregnancy, the farmer suffers not only the loss of the milk, but the loss of the animal and the cost of replacing her.

"We now know the JY-1 gene is required for embryo development in dairy cows," Smith said. "Our next steps are to determine how the gene is regulated and how different levels of the protein affect fertility. There are still a lot of unknowns, but this is the first piece of the puzzle."

Source: Michigan State University

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