Study shows male erectile dysfunction drug enhances fetal growth in female sheep

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A joke among two Texas AgriLife Research scientists later turned into a fully-funded study found Viagra can aid fetal development in female sheep. Female sheep (ewes) are an agriculturally important species, which can serve as an excellent animal model for studying the physiology of human pregnancy, the researchers said.

Viagra (sildenafil citrate), which is used to treat male erectile dysfunction, enhanced blood flow in pregnant female sheep, helping send vital amino acids and other nutrients needed in fetal development. The study's results not only will assist with solving fetal development problems in other livestock, but possibly in humans, said Dr. Guoyao Wu, AgriLife Research animal nutritionist and Senior Faculty Fellow in the Department of Animal Science at Texas A&M University.

"Because 5 percent to 10 percent of infants are born as low birth-weight babies worldwide, and because fetal-growth retardation is also a significant problem in livestock species, our findings have important implications for both human health and animal agriculture," Wu said.

The findings appear in a recent edition of *The Journal of Nutrition*.

The study originated in 2003 after a chat between Wu and fellow AgriLife Research scientist Dr. Tom Spencer when they were working with pregnant ewes.

"We made a joke that many men are now using Viagra and that women

may also have a need for it," Wu said. "Interestingly, one week later, we saw that Pfizer Inc. announced an international request for research proposals on Viagra."

The team submitted a proposal to Pfizer, using pregnant sheep as an animal model for evaluating Viagra's potential role in enhancing fetal growth. The research team would also evaluate both adequate or inadequate maternal intakes of nutrients from the diet, Wu said.

Pfizer selected the proposal and work began.

"Viagra acts like nitric oxide to relax smooth muscle cells of blood vessels and, in turn, allow for increased uterine blood flow," Wu said.

The drug is a synthetic medicine that can be used to stimulate blood flow in humans and animals.

"For pregnant mammals, Viagra can enhance the supply of nutrients from the mother to the fetus via utero-placental blood flow," he said.

The study revealed Viagra increased the blood supply to the fetus in female sheep, supplying amino acids - a major fuel for fetal growth. Approximately 60 ewes were mated to rams at the Texas A&M University Sheep Center. Pregnant females were randomly selected and treated with or without sildenafil citrate.

Results of the study indicated long-term use of Viagra enhanced fetal weight in both "adequately fed and nutrient-restricted female sheep." Greater concentrations of amino acids and polyamines in fetal blood and placental fluids were found, leading the researchers to suggest that Viagra alters the trafficking of nutrients from the female sheep to the fetus.

It was also observed that Viagra did not affect changes in maternal weight, body condition score, maternal liver mass or muscle weight, Wu said.

"We were surprised that Viagra enhanced ovine fetal growth under the conditions of either adequate or inadequate maternal intakes of nutrients from the diet. The results of our study indicate that augmenting systemic blood flow may be a novel and effective strategy to prevent fetal growth retardation in humans and livestock species without affecting maternal health."

Wu said the team would like to extend its research into future studies involving other mammalian species, including pigs, cows and humans.

More information: http://www.nutrition.org/

Provided by Texas A&M AgriLife Communications

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