Injected prostaglandins have different effects on early horse embryo development depending on embryo age

What is this research about?
Pregnancy failure due to miscarriage is a costly problem for horse breeders, and it can be difficult for scientists to study what causes this pregnancy failure naturally. Scientific experiments have thus been developed to study the issue in a carefully controlled environment. There are two requirements for pregnancy to move forward in a mare (female horse): the release of progesterone from the corpus luteum and the formation of a temporary capsule around the blastocyst. Treating a mare with prostaglandins (molecules derived from fat) stops progesterone release by disturbing the corpus luteum (luteolysis) and is one method that this lab group uses to study failed pregnancies. This study takes an in-depth look at the effects of luteolysis on the development of the embryo.

What did the researchers do?
A total of thirty mares were artificially impregnated (sperm inserted directly into the mare) over the course of six breeding seasons. The conceptus (embryo and surrounding tissues) was monitored using ultrasound from Day 11.5 post-impregnation until pregnancy termination. On Day 12.5, 14.5, 16.5, or 18.5, one group of mares was injected with a type of prostaglandin, while a second ‘control’ group was given a harmless saline solution; any differences between the groups would be due to the presence of prostaglandins. Conceptuses were recovered from the mares 3 or 4 days after treatment and analyzed in terms of growth and development.

How can you use this research?
Veterinary scientists can use this research method to better study pregnancy failure in horses.
Veterinarians can use this research to better understand early embryo development and embryo loss in horses.

Keywords:
Horses, equines, pregnancy, miscarriage, embryo, corpus luteum, progesterone, prostaglandins
What did the researchers find?
The effects of prostaglandin treatment changed with length of the pregnancy. When prostaglandin was given before Day 16.5, the form and structure of the embryo was minimally affected (i.e., similar to those from the saline-injected ‘control’ mares). If given at Day 18.5 however, there were significant changes to the embryo’s development. Changes were primarily due to the luteolysis and consequent loss of progesterone and not the prostaglandin itself. Injecting pregnant mares with prostaglandins around Day 18 was found to be the most effective method of studying pregnancy failure in horses, because it consistently and quickly caused embryo loss.

What you need to know:
Prostaglandin treatment leading to luteolysis adversely affects embryo development. The effects are particularly harmful when pregnant mares are injected around 18 days after impregnation, which is after the embryo has fixed onto the uterus wall. Prostaglandin treatment is a useful technique for scientists studying natural pregnancy failure in horses.

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