



PROSTAGLANDINS

Patrick M. McCue

DVM, PhD, Diplomate American College of Theriogenologists

Prostaglandins are in a class known as fatty-acid hormones. They are produced by many tissues in the body, but in equine reproduction we are concerned primarily about the type produced by the uterine lining or endometrium. In the non-pregnant, cycling mare, prostaglandins are produced and secreted in pulses by the endometrium from approximately day 13 to 15 post-ovulation. Uterine prostaglandins enter the blood stream and are eventually transported to the ovaries where they cause destruction or lysis of the corpus luteum. Progesterone production decreases and the mare returns to estrus in 3 to 4 days. In the pregnant mare, prostaglandin production is prevented and consequently the corpus luteum is spared and it continues to produce the progesterone required for maintenance of pregnancy.

Indications for administration of prostaglandins in broodmare management are primarily to cause destruction of a corpus luteum (luteolysis) or to stimulate uterine contractions. The products most commonly used in horses are Lutalyse[®] and Estrumate[®]. While both products are effective in inducing luteolysis, Estrumate[®] has less of a tendency to cause side effects such as mild sweating and abdominal discomfort.

Prostaglandins are commonly administered to 'short-cycle' mares in a timed breeding

program or after having missed a breeding opportunity. It should be noted that prostaglandins are only effective in bringing mares back into estrus if a mature corpus luteum is present. A corpus luteum can be effectively destroyed by prostaglandins beginning approximately 5 days after ovulation. Administration of a single intramuscular dose of prostaglandins is usually sufficient to cause complete luteolysis. An important concept to be remembered is that prostaglandins do not directly cause a mare to come into heat. Prostaglandins cause luteolysis and a rapid decline in progesterone production. Return to estrus is dependent on subsequent follicular development and estrogen production. Prostaglandins will have no effect in indirectly bringing a mare into estrus when administered in the absence of a corpus luteum (i.e. during seasonal anestrus, the spring transition period or to non-cycling mares during the breeding season).

The interval from administration of prostaglandins to ovulation is dependent on the size of the existing follicles at the time of treatment and ranges from 6 to 10 days. It is not an exact science, but if you want to try to avoid a weekend semen collection, administer prostaglandins on a Wednesday to a mare with a mature follicle and *tentatively* plan on breeding the mare between Tuesday and Friday the following week.

Synchronization of estrus in 2 or more mares for the purpose of embryo transfer or timed breeding may be accomplished by administration of 2 injections of prostaglandins 14 days apart. Prostaglandins may also be used to terminate an unwanted pregnancy or after a mismating. Inadvertent administration of prostaglandins to a pregnant mare is highly likely to cause loss of the pregnancy. However, if the mistake is recognized early, the pregnancy can often be saved by daily administration of progesterone.

In the past several years, prostaglandins have been used as an alternative to oxytocin to expel fluid from the uterus of mares. Prostaglandins have been reported to stimulate uterine contractions for 2 to 4 hours or more. In contrast, oxytocin will cause uterine contractions for 30 to 45 minutes. It is now relatively common to utilize a combination of uterine lavage and either oxytocin or prostaglandins to evacuate retained uterine fluid. Uterine fluid retention is especially common in older mares after breeding and is referred to as persistent mating-induced endometritis. Affected mares are unable to physically clear fluid from their uterus and fluid retention may be associated with a reduction in fertility.

Several recent studies have confirmed that prostaglandins should not be administered to mares *after ovulation* in an effort to clear uterine fluid. Treatment of mares after ovulation will adversely affect development of the corpus luteum, reduce progesterone production and potentially decrease pregnancy rates. Treatment with prostaglandins prior to ovulation does not affect function of the subsequent corpus luteum. Oxytocin does not have any adverse effects on corpus luteum development when administered either prior to or after ovulation. Consequently, prostaglandins or oxytocin may be used to evacuate uterine fluid prior to ovulation, but oxytocin appears to be a better choice for treatment of uterine fluid after ovulation is detected.

Prostaglandins are one of the most widely used hormones in equine reproduction. Adherence to the guidelines provided here and by your equine veterinarian can help ensure the safe effective use of this product.