ANS 3319C Reproductive Physiology and Endocrinology Lab
Take Home Message: Equine Reproductive Mgmt. (20 pts: Spring 2014)

Name: _________________________________

1) In lab next week we will collect semen from the stallion using an artificial vagina (AV).
   a) During collection, the AV mimics two conditions that stimulate ejaculation, which are similar to the effect the mare’s vagina has on the penis during natural mating. What are they (1 pt)?

   It mimics the temperature and the pressure of the vagina of the mare.

   b) The AV is fitted with a container that collects the semen after ejaculation. The collection container is also fitted with a mesh filter. What is the primary function of the filter (1 pt)?

   The filter serves to separate the gel from the fluid portion of the semen. (Note: We do not want the gel to mix with the semen because it causes coagulation of the sample, which will make it impossible to extend the semen.)

   c) Why is a “phantom dummy” used to collect semen from a stallion instead of a “live mare” (1 pt)?

   This is a primarily a safety issue for the mare, stallion, and the animal handlers. The phantom is also to prevent any possibility of the stallion from “accidently” breeding the mare during collection.

   d) What signal should be observed for in the stallion that indicates he has probably ejaculated into the AV? Is this sign 100% accurate? Please explain (1 pt)

   The stallion “flags” his tail as a sign that he has ejaculated but this is not always the case since he can “fake” the ejaculation. You can also feel the urethra and feel the pulses during ejaculation, which provides a “high degree” of certainty that the stallion has ejaculated.

   e) Immediately upon collection of semen, the sample is visually evaluated as part of the processing step. Please list three additional items that semen is evaluated for (3 pts).

   1. Volume
   2. Motility
   3. Concentration

   f) After collection of semen it can be used in an artificial insemination (AI) program. What are four advantages of an AI program in horses (2 pts)

   1. More mares can be inseminated with a single ejaculation.
   2. Increased number of mares serviced by the stallion.
   3. Reduced chance of breeding injuries.
   4. Allows transportation of semen to distant places.
   5. Semen can be evaluated throughout the breeding season.

   g) Regardless of whether the collected semen is used immediately after collection or it is “cooled” to be shipped, it is typically extended. Please describe four functions of extenders (2 pts).

   1. Protect the sperm cell membrane from cold-shock during cooling.
   2. Provides buffers to maintain pH (6.2-7.2).
   3. Contains antibiotics to inhibit bacterial growth.
   4. Provide energy such as glucose for sperm cells.
   5. Maintains osmotic pressure.

   Continued on the back!!!!!
2) When semen is cooled for shipping, it is placed in syringes with a piece of styrofoam between the syringes and cooling packets used to chill the semen. Is this an active or passive cooling method? Please explain your answer and why you think this method is used to chill semen (1 pt).

   This is a passive cooling method as the coolant is not directly in contact with the semen being chilled. Passive cooling prevents the semen from being cold shocked.

a) What is the target temperature (°C) semen should be once it has been chilled (1 pt)?

   The semen is chilled to 4-6 °C

b) What is the life span in hours of the chilled semen (0.5 pt)? Typically 24-48 hours.

c) What are three advantages of using chilled semen (1.5 pts)?

   1. Elimination of the need to ship foals and mares great distances.
   2. Reduces the risk of spreading infectious diseases.
   3. More services per stallion.
   4. Breeding decisions based on genetics rather than geographic convenience.

3) After the semen is extended, it is ready for use in an AI program. However, we need to determine if the mare to be AI is in estrus. This is accomplished by a process known “teasing” or presenting the mare to a stallion. Please describe four behavioral signs that indicate a mare is in “estrus” (1 pt).

   a) Elevation of tail.
   b) Standing quietly in the stallion’s presence.
   c) Eversion of the clitoris or winking.
   d) Urination in the presence of the stallion.

4) What is the duration of estrus (days) in the mare (1 pt)? 2 to 10 days with mean of 7 days

   (Note: Estrus is when the mare is in “heat”. The estrous cycle is the period from one estrus to another and is approximately 21 days long)

5) Because the duration of estrus is so long in horses it is difficult to determine when ovulation is going to occur. Knowing when ovulation is going to occur is important because AI needs to be timed as close to ovulation as possible. What management practice is commonly used to accurately determine if a mare is close to ovulation? Please explain your answer (2 pts).

   The mare can either be palpated or ultrasounded to determine the size of the follicles and how close they are to ovulation. Once a follicle is >35 mm in diameter, the mare is nearing ovulation. You could also determine the amount of edema she has in the uterus, as edema starts to decrease as the mare gets closer to ovulation. You could also palpate for tone or ultrasound and look for fluid accumulation.

   (Note: You can determine that a mare is in estrus but you only have a general idea of where she is relative to ovulation. It is more accurate to palpate/ultrasound and determine follicle development as well as uterine edema, which provides a more accurate estimate of ovulation.)

6) In the mare, where is semen deposited during AI (1 pt)? It is deposited in the uterus.