Colostrum and the Newborn Foal

Newborn foals acquire their immunity through nursing their mare's first milk, which is called colostrum. The colostrum contains a high density of antibodies which are absorbed through a special process across the foal's intestinal wall during the first 16 hours of life. The absorption of these antibodies is critical to providing the immunity that allows the foal to fight infections in its environment, during the first several months of life. After that time the foal will make its own antibodies to fight infections.

Three factors are important in determining whether the absorption of colostrum is adequate:

1. ***Concentration:***
   a. IgG concentration is directly proportional to the Brix % sugar level.
   b. IgG concentration is directly proportional to the Specific Gravity (S.G.) of the colostrum. S.G.>=1.060 is normal.
2. ***Volume:*** How large is the udder?
3. ***Foal Health:*** Sick foals are much less likely to consume sufficient colostrum to get their antibody levels up to ideal levels.

Saving Extra Colostrum for the Colostrum Bank: If the mare's colostrum has a S.G.>1.070 (Refractometer > 25% Brix) with a normal udder it is safe to collect 250 mls. Foals will usually nurse off only one teat when they first nurse. Therefore, collect the colostrum from the opposite teat to the one first suckled by the foal.

Failure of Passive Transfer: Insufficient good quality colostrum may lead to failure of passive transfer. This is a deficiency of sufficient antibodies, which places the foal at a high risk of acquiring an infection during the first few months of life. If IgG < 1.060 (Refractometer < 20% Brix), the density of antibodies within the colostrum is low and it is likely that the foal will not receive sufficient colostrum to elevate his IgG (antibody level) to 400 mg/dl (the minimum required level).

Measurement of Colostrum Specific Gravity

Brix Sugar Refractometer: The Brix Sugar Refractometer is a simple, quick method to estimate the IgG content of a mare's colostrum post foaling. Place a couple of drops of colostrum at 20 degrees C on the refractometer (also stored at 20 degrees C) and read the level. Normal is greater than 20%.

Hydrometer: The small hydrometer requires 70-80 mls of colostrum to work, but is simple and easy to read. The large hydrometer requires 250 mls. Make sure to allow the colostrum to cool to room temperature (20 degrees Celsius: this will slightly increase the Specific Gravity). Colostrum should be placed in a bottle and given back to the foal. Hydrometer should be kept clean and dry, between foaling, to insure accurate readings.

Colostrometer: The cylinder must be filled with distilled water, but the device only requires 5 mls of colostrum. The colostrum and distilled water must be at room temperature and all air bubbles must be expressed from the colostrum chamber. Any excess colostrum must be carefully cleaned off the chamber. The calibration of the device, is very delicate and is easily disturbed by transport and handling. Keep clean and dry.

Diagnosing Failure of Passive Transfer

At foaling: Check colostrum Specific Gravity or Brix Sugar Index. This provides a very accurate prediction of which foals will have problems, and an opportunity to intervene early and save the cost of supplementary plasma later.

At 8 - 16 hours Post Foaling:

IgG < 200: Supplement with colostrum or plasma.

IgG 200 – 400: Supplement with colostrum.

IgG 400 - 800 mg/dl: monitor foal. Supplement if foal shows signs of disease, or weakness.

IgG >= 800: Normal

At > 16 hours Post Foaling:

IgG < 200: Supplement with 2L plasma.

IgG 200 - 400 and a Healthy foal: Supplement with 1L plasma.

IgG 200 - 400 and a Sick foal: Supplement with 2L plasma.

IgG > 800: Normal

IgG Test Methods

ELISA

1. SNAP - A test designed for semiquantitative measurement in the field.
2. Cite Test - This is a good test, provided you have good colour vision. It can be difficult to differentiate the shades of blue, especially in a poor light. The test is best done in a lab at room temperature, not in the tack room.
3. Palm Lab – Spectrophotometer result: more accurate.

Zinc Sulphate

This test provides a good early guess. Takes about 1 hour and under some conditions the test may be misinterpreted.

Gluteraldehyde

Gamma Check E: Gluteraldehyde clot test: Mix blood with glutaraldehyde in a test tube and time how long it takes to form a gel clot.

Radio-Immunodiffusion (RID) – Gold Standard

This is the gold standard (the best test available). However, the test takes 24 hours to run so it is not practical for use in the field.

Colostrum Supplementation

This is the cheapest solution, and has an excellent safety record.

1. If foal is < 12 hours old, feed colostrum from colostrum in the bank. Multiple farms now maintain a colostrum bank. It is recommended to save only colostrum with a Specific Gravity of over 1.070, or a Brix Sugar % of over 25).

2. Bovine Colostrum: Cow colostrum has been shown to work well in supplementing foals. However, cows are not exposed to the same organisms as foals, so they form different specific antibodies. Mild scours and gas may produce some side effects.

Plasma Supplementation

This is the only option after 16 hours (poor chance after 12 hours). However, it is expensive:

Administration of plasma:

The amount needed can be estimated from the IgG level, the size, and the health of the foal. Anaphylactic reactions can occur so the foal must be observed closely for immune reactions (increased respiratory rate, tremors, etc.). Deaths are rare but can occur.