



### What Is Colostrum?

- Colostrum is the **first milk** that is produced by a mare when a foal is born. It forms in the udder during the last 2-4 weeks of pregnancy.
- Compared to normal milk, colostrum is usually very **thick, yellow** in colour.
- Colostrum is high in carbohydrates and protein, and low in fat. It also contains many other things, such as growth factors and lactoferrin, that may be beneficial to neonatal foals.
- Most importantly, **colostrum is loaded with antibodies**. These antibodies come from the bloodstream of the mare, and become highly concentrated in the colostrum just prior to foaling.



### Why Is Colostrum So Important?

- Unlike many other species (such as people), the placenta of a horse does not allow antibodies to pass from the bloodstream of the mare directly into the foal before it is born. Therefore, **foals are born without antibodies** against important viruses and bacteria, which makes them very susceptible to infection.
- Foals are born with a functional immune system, but it takes time for the foal to produce its own antibodies. Antibodies are critical for animals to respond rapidly to infectious pathogens. **Drinking colostrum provides foals with antibodies** from the mare to protect them until they can produce their own antibodies. Without colostrum antibodies, foals are at high-risk of serious infections such as septicemia (bloodstream infection).
- A foal's intestinal tract can only absorb colostrum for a short time after birth, up to 18-24 hours. However, the earlier a foal starts to nurse, the shorter this window gets, so it's very important to make sure a foal ingests enough good colostrum as soon as possible, ideally within the first 1-2 hours after birth.

### How Much Colostrum Does A Foal Need?

- In general, larger foals need to drink more colostrum than smaller foals.
- If the colostrum is poor quality (i.e. the antibody concentration is relatively low), a foal needs to drink a larger volume to get all the antibodies it needs.
- An average-sized foal (45 kg) should drink **at least 1-2 litres** of colostrum within the first 18-24 hours of life, but ideally within the first 8-12 hours of life.



### What Might Prevent A Foal From Getting Enough Colostrum?



- **The mare does not produce any colostrum:** This may happen with mares that foal prematurely, or if the mare dies during foaling
- **The mare produces very poor-quality colostrum:** Some mares produce better (or worse) colostrum than others. A mare may also have poor colostrum if she runs/drips milk prior to foaling, or if she is sick during late pregnancy.
- **The foal is unable to nurse:** This may happen if the foal is rejected by the mare, or if the foal is unable to stand and suckle due to problems with its legs, mouth or drive to nurse.
- **The foal doesn't drink enough:** Weak foals may not drink enough during the first few hours of life, or health problems may prevent a foal from nursing properly. Sometimes the mare may not produce enough colostrum for her own foal.
- **The foal doesn't drink the colostrum soon enough:** If this happens, the foal will not be able to absorb the antibodies from the colostrum, even if it drinks lots of colostrum later. This may occur if the foal is sick or has physical problems that prevent it from getting up to nurse at first, if the mare's colostrum and milk production is delayed, or if the mare rejects the foal.

### How Do I Know If Colostrum Is Good Quality?

- The **appearance of colostrum** can provide some indication of its quality, but this is **not really reliable** - more objective measurement of the antibody level in the colostrum is preferred. Nonetheless, thin, watery colostrum that looks like milk is probably very poor quality with low antibody levels.



- A **colostrometer** is a simple instrument that can be used to measure the protein (antibody) concentration in colostrum. If you have a lot of foals, it may be worth purchasing a colostrometer. If you don't have one, your veterinarian can test the colostrum for you.

## How Do I Know If My Foal Has Had Enough Colostrum?

- The best way to check is to measure the level of antibodies in the foal's blood at approximately 24 hours of age. The test can be performed quickly and easily by your veterinarian. Ideally, all foals should be tested when they are a day old. Although the test is not 100% accurate, it gives a good indication of the foal's status, especially when the results are combined with information about the foal's behaviour and nursing history since birth. The most commonly used foal antibody test is called a "SNAP-test," which gives one of three results:
  - >800 mg/dl: Foals with this antibody level are considered to have received a sufficient quantity and quality of colostrum. It does not mean they will not develop an infection, but it means they got a "normal" amount of antibodies from the mare. This is known as normal "passive transfer."
  - 400-800 mg/dl: This result indicates "partial failure of passive transfer" of the maternal antibodies. These foals would likely benefit from additional antibodies, but in many cases these foals will be fine if they are otherwise healthy and kept in a nice clean environment.
  - <400 mg/dl: These foals have "failure of passive transfer" (FPT) of maternal antibodies, and are at great risk of infection. They require additional antibodies in the form of a plasma transfusion.
- A more accurate antibody-level blood test can be done by a veterinary laboratory, but this type of test is not practical because of the time delay between collecting the sample and getting the results. If a foal has low antibody levels, you and your veterinarian need to act quickly - waiting for test results is not ideal.



## What If My Mare Doesn't Produce Enough Colostrum?

There are a few ways to get colostrums for your foal if the mare does not produce enough (or any) colostrum:

- **Stored colostrum:** Keeping a supply of stored, frozen colostrum on the farm is a idea in case of emergency. Although some mares don't produce enough colostrum for their foals, others produce more than their foals need, and the extra colostrum can be saved frozen for when it is needed. Colostrum should be thawed slowly, never in a microwave, and warmed up to close to body temperature. It can then be fed to the foal by bottle, or, if necessary, your veterinarian can give the colostrum through a stomach tube.
- **Colostrum bank:** In some areas, groups or farms have established colostrum banks that can provide colostrum to people who need it for their foals. If there is such a bank in your area, find out ahead of time if (and how) you can get colostrum from it, if needed.
- **Colostrum from recently foaled mares:** During foaling season, you may be able to find other breeders who have extra colostrum from mares that have recently foaled. However, it can take several hours to track down a source, and if you can't get the colostrum into the foal within a few hours of realizing it's needed, it probably won't be very helpful.
- **Colostrum replacers:** Commercial colostrum replacers are available, but they are a poor substitute for the real thing. Their effectiveness is unclear. Replacers should not be relied on as the sole antibody source for a foal.



- **Plasma:** Plasma also contains antibodies like the ones found in colostrum. Plasma can be given orally to a foal in the same manner during the first 12-24 hours of life, or it can be given intravenously (IV) thereafter. Oral administration may be better when possible, because some of the antibodies may stay in the intestinal tract and help protect it from invasion by bacteria and other pathogens. However, if the foal is too old (more than 24 hours, or less in some cases), it can no longer absorb the rest of the antibodies from the intestine. In these cases, an intravenous plasma transfusion is the only option. Plasma may be expensive, but the antibodies it provides are critically important, and it is still much cheaper than treating a septic foal.

A foal's **antibody levels should always be tested** at 24 hours of age or 8-12 hours after it receives colostrum or oral plasma from *any* source. If a foal receives an intravenous (IV) plasma transfusion, its antibody levels can be tested right away.



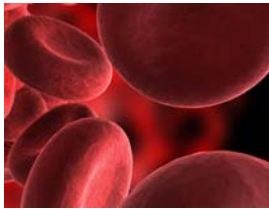
## How Do I Store Colostrum?

- Colostrum can be milked from a mare if she loses her foal before or during foaling, or if she produces more colostrum than her own foal needs. The **extra colostrum can be stored frozen** for future use.
- Mares from which colostrum is collected should be healthy and have no history of having a foal that developed **neonatal isoerythrolysis (NIE)** (also known as jaundiced foals) (see below).
- Before collecting the colostrum, thoroughly wash the udder and the hands of the person milking.
- A colostrometer can be used to measure the quality of the colostrum before storing it.
- Place the colostrum in a tightly sealed container and freeze it promptly.
- Colostrum can be stored frozen for a prolonged period of time, but it is best to use it within 1-2 years because there may be some loss of quality over time.



## How Do I Reduce the Risk of Neonatal Isoerythrolysis (NIE)?

- Neonatal isoerythrolysis (NIE), or jaundiced foal syndrome, is a condition that occurs when there are antibodies in the mare's colostrum that react with the foal's red blood cells.
- Any mare that has ever had a blood or plasma transfusion is at higher risk for having a foal with NIE.



- If a foal will be given colostrum from a mare other than its own, it is ideal to test the colostrum first for the presence of antibodies against the major red blood cell types (blood types) in horses. The two most important red blood cell types are Aa and Qa. If Aa or Qa antibodies are present, the colostrum should not be used, or it should be tested directly against the foal's red blood cells to ensure it will not cause a reaction. This type of antibody testing can be performed at several veterinary laboratories and veterinary hospitals.

