Colostrum saves calves Dr. Tom Schmidt

The transfer of antibodies from cow to calf protects young calves from infectious disease. Those antibodies help the calf ward off infection as it goes from the sheltered environment of the uterus to the outside world where it encounters many bacteria and viruses for the first time.

There is no transfer of antibodies from mother to calf in the uterus. The calf's antibody level depends on the quality and volume of colostrum it drinks, and how many antibodies it absorbs from the colostrum. This is called a passive transfer of immunity.

Calves can experience a partial or total failure of this passive transfer of antibodies, and this occurs about 20 per cent of the time, exposing calves to infectious disease.

Production of colostrum by the cow involves the transfer of antibodies from the cow's bloodstream to the mammary gland. This process begins several weeks prior to calving and reaches a peak one to three days before delivery. It is essential that the cow is in reasonable body condition for this to occur (at least 5 on a 9-point scale). As antibodies are actually protein molecules, care should be taken that the cow receives adequate dietary protein in late gestation.

In the newborn, antibodies are taken up by the individual cells lining the intestine and move into the bloodstream via the lymphatic system. This transfer of antibodies peaks in the first four hours of life, declines rapidly at 12 hours and stops approximately 24 hours after birth. As a result, calves that get colostrum soon after birth will have higher blood antibody levels than calves fed the same colostrum a few hours later. Anything that delays colostrum ingestion reduces the rate of passive transfer. This is why calves that are born weak (difficult delivery) or become weak (chilled) can benefit significantly from a bit of strategic intervention.

Calf esophageal feeders (tube feeders) are the best tool for this job. The thumb rule is that five per cent of body weight should be ingested within the first four hours of life and another five per cent within the next 12 hours. For a 77-lb., 99-lb. and 121-lb. calf, each feeding should be 1.75 litres, 2.25 litres and 2.75 litres respectively.

What to give is another matter. Colostrum can be sourced from the dam, from another cow in the herd, frozen from your own herd, frozen from a dairy herd or from available commercial preparations. An average calf needs approximately 100 grams of colostral antibody for adequate passive transfer.

Most beef cows will provide this in about two litres of colostrum. Dairy cows produce a great volume of relatively dilute colostrum and about four liters are needed to do the same job.

Another disadvantage of using dairy cow colostrum is that you may inadvertently infect your calf with Johne's disease. Johne's is more common in dairy herds and one of the important means of transferring infection is from cow to calf via an infected cow's colostrum.

Biosecurity issues aside, the cows in your herd will produce colostrum that provides protection against the bacteria and viruses that already exist in your herd. Many producers freeze and bank colostrum from their own herd. Colostrum is best saved from only the first milking, if there appears to be some extra. It is best frozen in good quality Ziploc bags laid flat on cookie sheets. This increases the surface area and greatly speeds thawing. Using a larger number of smaller Ziploc bags speeds thawing even more. Some people freeze colostrum in ice cube trays and store the frozen cubes in bags. Colostrum frozen in any of these ways will thaw in hot tap water in a very reasonable time. I can find no work to definitively state whether microwaving damages the protein molecules or not. But we feel uncertain recommending it in light of the speed of conventional methods.

Commercial products contain anywhere from less than 0.5 grams of antibody per dose to 80 grams per dose. Ask your veterinarian to help you sort through them. They seem to have a role more as a supplement than a replacement.

There are a variety of tests that can be performed by a veterinarian to determine whether a calf's passive transfer has failed or not. Failure of passive transfer means that a calf is at a higher risk of developing disease. On any farm, there is a background or baseline level of sickness and mortality. This level of disease reflects the interaction of management, nutrition, hygiene, environment, antibody level and specificity and virulence of infectious organisms. Increasing colostrum ingestion above an already adequate level will not reduce calf mortality below this baseline level.

Calves with adequate passive transfer can easily succumb to disease if they are in a contaminated environment, stressed enough and/or exposed to highly virulent organisms. Also, low serum antibody levels do not guarantee disease if the calf lives in a relatively clean environment and is not exposed to highly pathogenic organisms. Hopefully a bit of thought, planning and occasionally intervening with regards to colostrum will enable you to nudge up your calf survival.