Technical Bulletin

Colostrum: absorption of immunoglobulins

The absorption of sufficient immunoglobulins (IgG's) in the first hours and days of life is of vital importance for a newborn calf. In practice, we still see many calves with health problems caused by the absorption of an insufficient amount of immunoglobulins in the blood or failure passive transfer (FPT) of immunity.

Open connection between intestines and bloodstream of newborn calves

Immediately after the birth of a calf, the connection between the intestinal wall and the bloodstream is wide open to allow IgG's from colostrum to be absorbed directly into the blood.

The permeability of the intestinal wall decreases quickly after birth and will be closed after 24 to 48 hours. The more IgG's the calf absorbs in the blood, the higher its passive immunity in the first weeks of life and a quick start to its active immunity. FPT of immunity occurs when a calf is unable to absorb a sufficient amount of IgG's into the blood, causing its immune system to face major challenges.

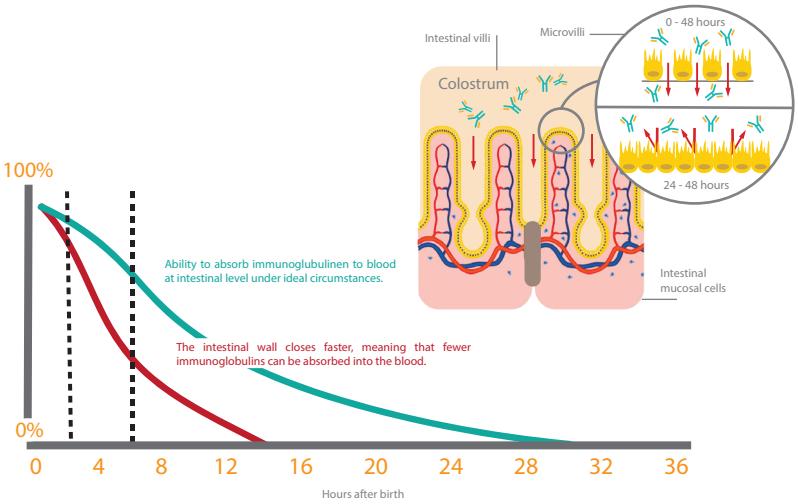

Figure 1: Schematic representation of the closure of the intestinal wall in newborn calves. Under good conditions the intestinal wall remains open between 24 and 48 hours after birth to absorb immunoglobulins into the blood. Under certain circumstances, the intestinal wall can close more quickly, resulting in fewer immunoglobulins being absorbed into the blood, failure passive transfer of immunity FPT.

Causes of FPT of immunity

Poor colostrum hygiene (Technical Bulletin 23.8):
Feeding colostrum with a high plate count ensures that the intestinal wall closes faster (figure 1). In addition, bacteria bind to IgG's so they can no longer be absorbed by the intestinal wall.

Figure 2: Newborn calf drinking colostrum

Insufficient amount of IgG's offered:
If an insufficient amount of IgG's is offered in the first hour of life, the calf is no longer able to absorb the optimal total amount of IgG's in the blood. This may be a combination of and/or colostrum with a low value of IgG's per liter or the intake of too few liters of colostrum in the first hour of life.

Offering colostrum too late:
If the calf is not offered colostrum in the first hour of life, but for example, 6 hours after birth, the calf is no longer able to absorb all the IgG's that are offered into the blood because the permeability of the intestinal wall quickly decreases in the hours after birth (figure 1).

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Poor start immunity irreversible

If a calf is unable to absorb a sufficient amount of IgG's into the blood, this can have major consequences for its passive immunity. The reduction in permeability and the closing of the intestinal wall is an irreversible process.

An insufficient absorption of IgG's in the blood also has consequences for the start of active immunity and resistance levels in the further rearing period and later as a dairy cow.

Calves that have absorbed an insufficient amount of IgG's have an increased risk of mortality and diarrhea in the first weeks of life. Several weeks or even months after the birth of a calf, the absorption of IgG's still influences immunity. Insufficient intake of IgG's can result in disappointing growth but also an increased risk of respiratory problems. Problems during the rearing period lead to a later first calving age and reduced performance as a dairy cow.

Blood level immunoglobulins

To check whether calves have absorbed sufficient IgG's blood samples can be taken, by the veterinarian, from young calves between 2 and 5 days of age. The value of the IgG content (IgG/L) in the blood can be determined and evaluated (figure 3).

The result of the blood test gives an indication of the absorption level of IgG's in the blood. At the farm level, we see enormous differences, with dairy farms where 80% of the calves receive a sufficient or good score for IgG levels, but also farms where this only concerns 5% of the calves.

We talk about FPT of immunity when the blood result is equal to or lower than 10 g IgG per liter of blood. If the results of the blood test at the couple level are insufficient (>50% scores <18 g/L) or too low (≥25% scores <10 g/L), it is advisable to improve colostrum and calf management to prevent FPT of immunity.

IgG's blood check

Interpretation of the results in calves

Individual calves

IgG (g/L)	
< 5	Very bad
< 10	Insufficient
10 - 18	Sufficient
18 - 20	Good
> 20	Very good

Couple level

IgG (g/L)	
≥ 25% scores <10 g/L	Improve colostrum management
> 50% scores <18 g/L	Optimize colostrum management
≥ 75% scores >18 g/L	Colostrum management is good

Figure 3. Immunoglobuline blood check in calves. Interpretation of the results. Results < 10: Failure passive transfor of immunoglobulinen.

Prevent FPT of immunity in calves

- Good colostrum hygiene!
- Monitor colostrum quality and intake.
- Supplement colostrum with Turbo Colostrum
- Optimal hygiene around the newborn calf.
- Milk cow immediately after calving to prevent the loss of colostrum quality by dilution.
- 1st colostrum within 1 hour after birth.
- Minimum intake of the first colostrum feeding: 200 IgG's; The more IgG's, the better...

Let the calf consume as much colostrum (1st and 2nd colostrum and transition milk) as possible during the first days of life.

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