

# A global approach to the critical transition period in dairy cows

For dairy cows, the transition period of 6-8 weeks around calving is critical: 75% of health problems in dairy cows occur during this time. Economic consequences of these troubles are huge, due to resulting losses in production and impaired reproduction (see Table 1).

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This period also has important consequences on the expression of lactation peak and on milk production during the whole lactation: about 10-15% of herd dairy potential depends on feeding before calving, and 20-30% on feeding until the lactation peak. This period is really a highly critical point for dairy farmers.

## Holistic approach required

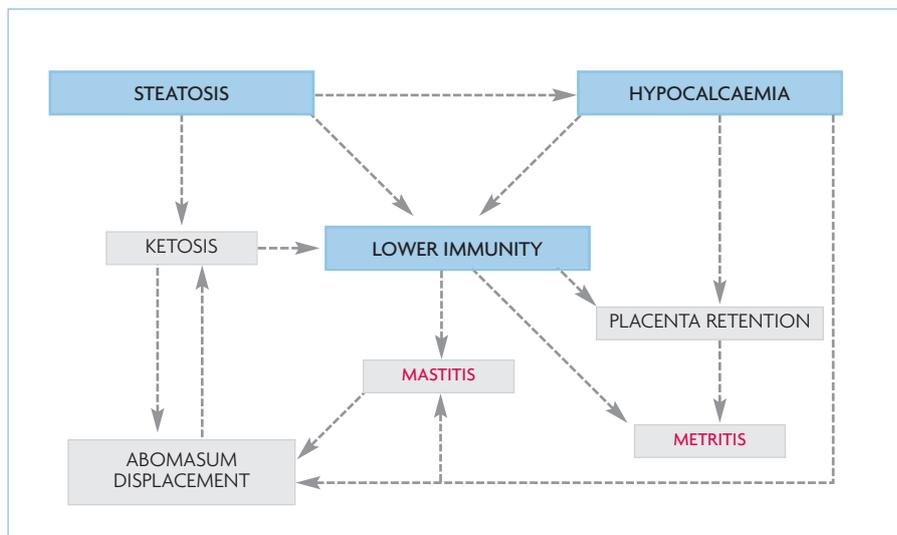
The different metabolic troubles affecting transition cows have strong and complex interrelationships (see Fig. 1).

They cannot be seen independently. This period is an important moment of metabolic changes and stress for the dairy cows.

External factors, such as housing and group management, strongly affect the levels of stress encountered by the cows. A holistic

**Table 1. Average cost of metabolic diseases for dairy cows in the US (from Liang et al., JDS, 2017).**

Clinical disease	Total cost (US\$)
Hypocalcaemia	246
Ketosis	181
Lameness	333
Left abomasum displacement	639
Mastitis	426
Metritis	263
Placenta retention	313



**Fig. 1. Diagram of some of the relationships between metabolic troubles in transition cows (from O. Salat).**

approach, taking into account the global period and the main metabolic challenges is required.

## Many metabolic challenges

We can consider the following five main metabolic challenges for transition cows as follows:

### ● Adaptation of the rumen:

Nutrient requirements increase sharply after calving, leading to much more concentrated diets. A low energy density of the dry cow ration is accompanied by a reduction in the absorption area of ruminal papillae, which can be up to 50%.

However, it takes 3-4 weeks to modify the fermentation profile of the rumen microflora, due to slow development of bacteria using lactate and at least five weeks to regain a full development of ruminal papillae.

A diet modification too abrupt to quickly cover the rise in nutritional requirements can therefore lead in the rumen to the accumulation of volatile fatty acids or of lactate and cause ruminal acidosis with severe consequences on appetite and digestive function.

### ● Decrease of immunity and limitation of oxidative stress:

Decrease of immunity is a natural response of mammals to parturition. Production of pro-oxidant molecules increases after calving in relation to stress. A strong imbalance between pro and antioxidant factors is a major cause of metabolic diseases.

### ● Inflammation:

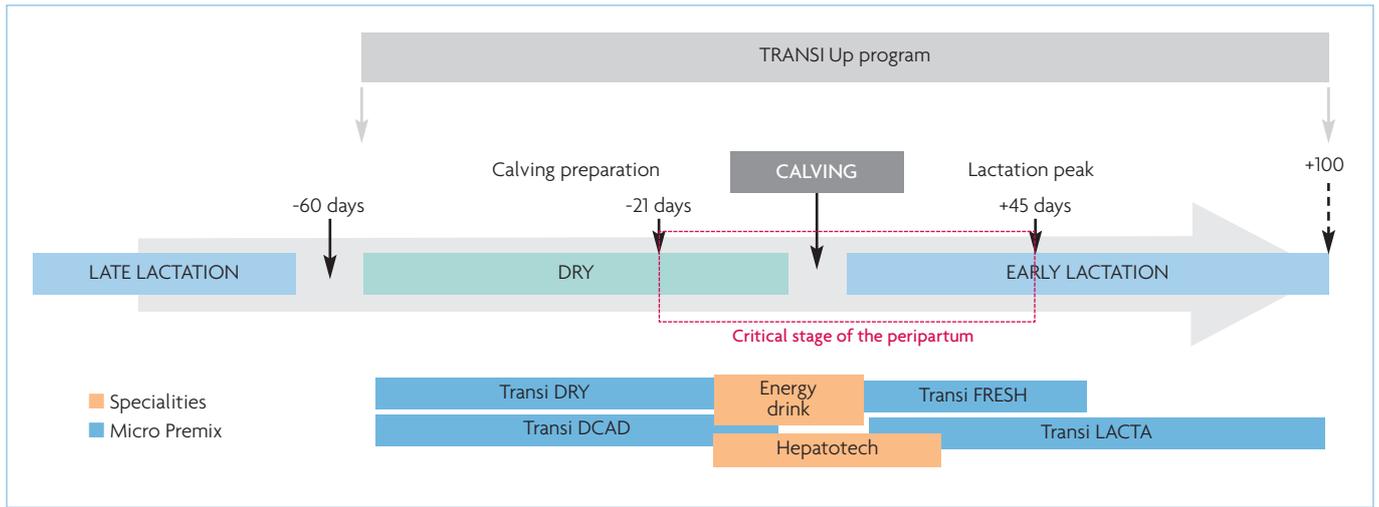
Inflammation is commonly a response of the immune system to an infection. However, a systemic inflammatory response occurs immediately after calving even without any pathology or infection. Inflammation leads to an increase of maintenance needs from 10-30%, increasing energy deficiency of the cows.

### ● Management of negative energy balance:

An increased intake after calving is delayed and as important as the increase of the energy requirements, leading to negative energy balance (NEB) for most of the transition dairy cows.

Elevated blood concentrations of NEFA (>0.6mEq/L) and BHBA (>10mg/dl) have been associated with excessive NEB and an increased risk of metabolic disease.

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**Fig 2. The Transi Up program.**

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● **Prevention of hypocalcaemia:**

Another major cause of metabolic disease is a disruption of mineral balance, primarily calcium balance, after calving.

Milk and colostrum synthesis place a large demand on calcium homeostasis mechanisms so that almost all cows develop some degree of hypocalcaemia at parturition.

When plasma calcium concentration drops too low to support nerve and muscle function, parturient paresis, or milk fever, develops.

**Nutritional solutions for transition cows**

An integrated approach to manage transition cows is needed to deal effectively with these challenges. That is why Wisium have launched Transi Up, a specific nutritional program for peri-partum cows, to improve health status and optimise milk potential (Fig. 2).

Premix, nucleus and specialties are designed with specific ingredients to meet the high requirements of the dairy cows in this period.

This program includes various nutritional solutions, such as Powerjet a patented combination of three active molecules

issuing from two plants, recognised for their abilities to modulate intestinal mucosa inflammation and the associated oxidative stress.

In a study made on a commercial farm in France, blood analysis was taken in 25 dairy cows before and after calving. Haptoglobin concentration was measured to evaluate the inflammation and d-ROM as an oxidative stress marker.

The results, shown in Fig. 3, indicate a moderation of the inflammation for the cows that received Powerjet, combined with a reduction of oxidative stress.

The improved immune response allowed an increase in milk production of 2.3kg of milk per cow and per day. Negative dietary anion cation difference (NDACD) applied to the diet during the close up phase helps the cow to mobilise body calcium after calving more efficiently. Thus, it prevents post calving hypocalcaemia.

It also leads to an increase of performance in parous cows: higher dry matter intake and milk production (1.1kg/day).

A powerful technique to provide essential nutrients to the fresh cow is the technique of voluntary drenching.

Energy Drink consists of a soluble powder to be mixed at the rate of 1.5kg powder in 30 litres of warm water. Administration should be done once per cow immediately after calving.

Four main benefits can be expected for the farmer from this technique:

- Quick recovery of the cow after calving.
- Stimulation of appetite.
- Reduction of the risk of displaced abomasum.
- Easy to use.

**Monitoring performance of transition cows**

● A good management of transition cows requires precise monitoring of the herd performance and sanitary issues. Comparison of frequency of metabolic troubles with achievable targets provides highly valuable information concerning the way this critical period is managed in the herd.

● Evolution of milk production and milk quality, and variability of lactation peaks gives a good indication of the effectiveness of the transition program, especially levels and ratios of milk fat and milk protein.

Transition cows are facing many metabolic challenges, which can have very costly consequences if not properly managed. The use of monitoring tools is very useful to adapt the nutritional strategy for this period. Improvement of the immune system and higher milk production will justify the use of a specific program. ■

**Fig. 3. Effect of Powerjet on intestinal mucosa inflammation, oxidative stress and milk production.**

