

What is Ruminant Gut Health and Why Does it Matter?

Article Provided By:



The ruminant digestive system is as complex as it is important to beef and dairy production. Understanding how it works and what to do when it's compromised can contribute to better overall gut health in cattle. After all, a healthier gut helps improve performance, prevent leaky gut and mitigate stress — all of which lead to healthier cows and profits.

Understanding the GI tract

The function of the gastrointestinal (GI) tract — primarily the villi in the small intestine — is to digest and absorb nutrients, defend against harmful pathogens, prevent harmful compounds from entering the host and maintain a balanced microbiome. Leaky gut occurs when a compromised GI tract lining allows harmful substances to be absorbed into the bloodstream, resulting in a variety of health implications.

A healthy gut:

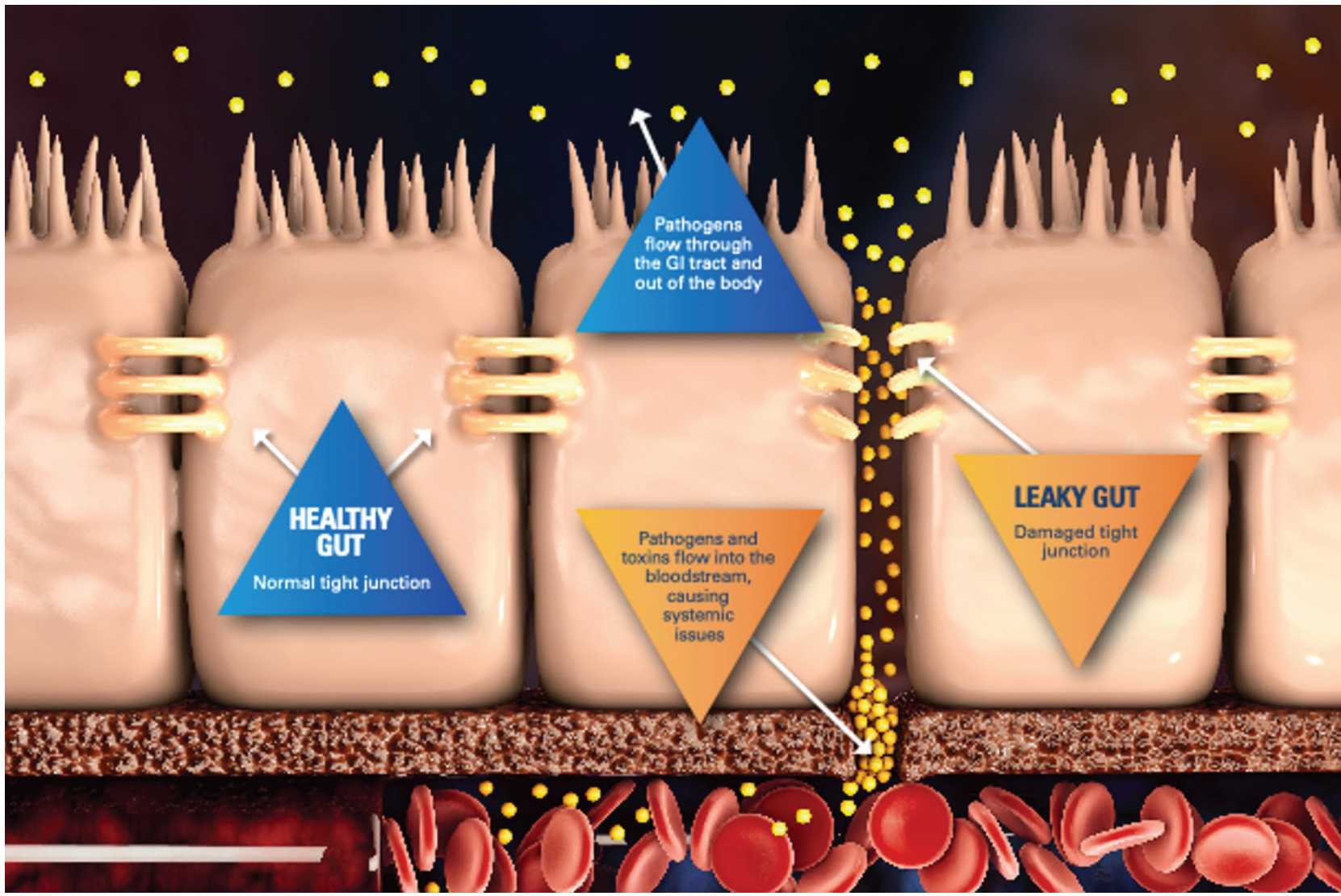
- Breaks down nutrients for optimal absorption
- Promotes and maintains immune system health
- Maintains structural intestinal integrity
- Preserves the balance of microflora

A damaged GI tract, or leaky gut, could result in:

- An unbalanced microbiome, leading to a higher prevalence of enteric pathogens
- Reduced digestive and absorptive capacity
- Decreased intestinal integrity of the gut, allowing harmful pathogens and toxins to enter into the host, which can lead to both intestinal and systemic inflammation
- A compromised immune system

Stressors impacting gut health in cattle

Just as exposure to pathogenic bacteria in the environment is inevitable, so are animal stress events. Under stress, both the mucosal layer and the tight junctions are negatively impacted, often leading to inflammation and reduced integrity of the intestinal barrier.¹ Reduced intestinal integrity indicates there is a breakdown in the tight junctions between the epithelial cell membranes, allowing for intestinal permeability.



Without these tight junctions, pathogenic organisms like clostridia, Salmonella and Escherichia coli can cross the intestinal barrier and into the bloodstream, resulting in an immune response that makes cattle more susceptible to diseases that can reduce their performance and your profitability.²

All cows endure stressors daily, and some are unavoidable. To ensure your cattle are set up for optimal health and productivity, it's important to identify which stressors you can alleviate, and which ones you need to mitigate with a direct-fed active microbial.³

EVERYDAY STRESSORS

Pathogens	Weaning
Heat or cold stress	Mold and mycotoxins
Diet changes	Overcrowding
Handling and transportation	Metabolic and production demands

Choosing a microbial

Not all probiotic products are active microbials, and not all active microbials are the same. When evaluating active microbial solutions to fight against intestinal-compromising pathogenic bacteria, consider the following factors:

Why mode of action matters

By now you know why gut health in cattle is important, so why does the mode of action matter? By understanding how the active microbial works the ruminant digestive system, one can better predict how the host will respond to the product once it is fed. This helps create confidence in the product, as it has gone through the rigorous testing and research to prove the mode of action.

Targeting pathogens with precision.

CLOSTAT® from Kemin contains a proprietary, patented strain of *Bacillus subtilis* PB6. Kemin selected *B. subtilis* PB6 — a unique, naturally-occurring and spore-forming probiotic — because it helps maintain the balance of microflora in the GI tract in an array of animals, including beef and dairy animals. What's more, the *B. subtilis* PB6 in CLOSTAT has been shown to have multiple modes of action:

SELECTION CRITERIA FOR MICROBIALS

- ✓ Proven modes of action

✓ Specificity against the disease-causing pathogens of interest

✓ Controlled evaluation to document response benefits in the target host

✓ Strain safety
- ✓ Acid and bile stability

✓ Maintenance of beneficial gut bacteria

✓ Speed of growth within the gut

✓ Suitability for use with other antimicrobials

✓ Stability in pelleting conditions

B. SUBTILIS PB6 MODES OF ACTION AT A GLANCE

Bacillus subtilis PB6

1

PATHOGEN INHIBITION
B. subtilis PB6 has been found to secrete multiple biocidal proteins that are inhibitory towards certain strains of pathogenic bacteria.

2

REDUCED GUT INFLAMMATION
B. subtilis PB6 has been found to secrete cyclic lipopeptides surfactins through normal metabolism, which inhibit PLA₂.

3

QUORUM QUENCHING
B. subtilis PB6 has been found to prevent the initiation of infection, colonization and disease progression, known as quorum sensing, by producing a lipopeptide called fengycin.

References

1. Williams, J. M., et al. (2015, May). Epithelial cell shedding and barrier function: A matter of life and death at the small intestinal villus tip. *Veterinary Pathology*. 52(3):445-455.
2. Chakaroun, R. M., L. Massier and P. Kovacs. (2020, April). Gut microbiome, intestinal permeability, and tissue bacteria in metabolic disease: Perpetrators or bystanders? *Nutrients*. 12(4):1,082.