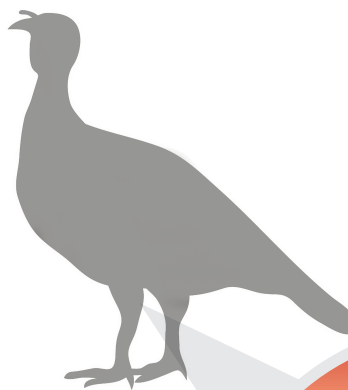




GUT HEALTH
SOLUTIONS

ButiPEARL[®] Z

Encapsulated source of butyric acid and zinc



GUT HEALTH

The gastrointestinal (GI) tract is a highly complex system including the structural integrity of the intestine, the balance of microflora and the status of the immune system.

Key Factors Impacting Gut Health:

1. Microbiota:

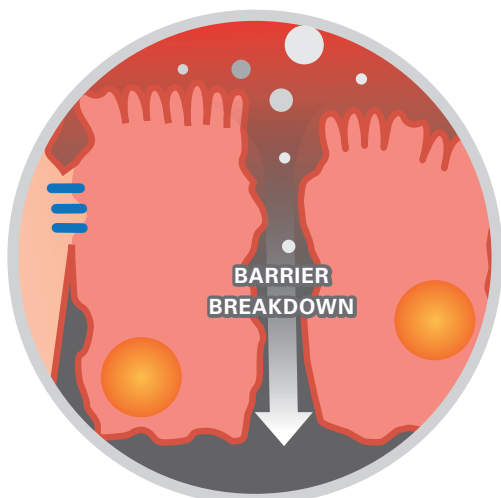
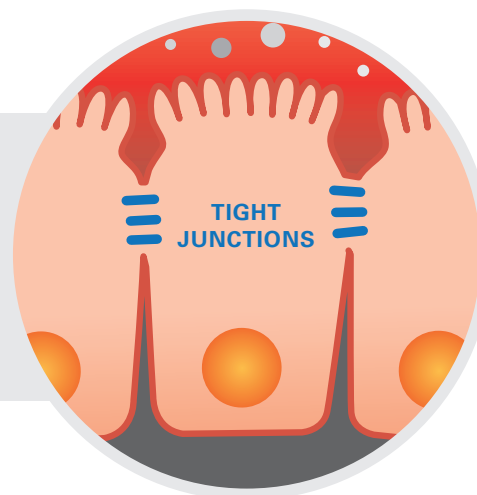
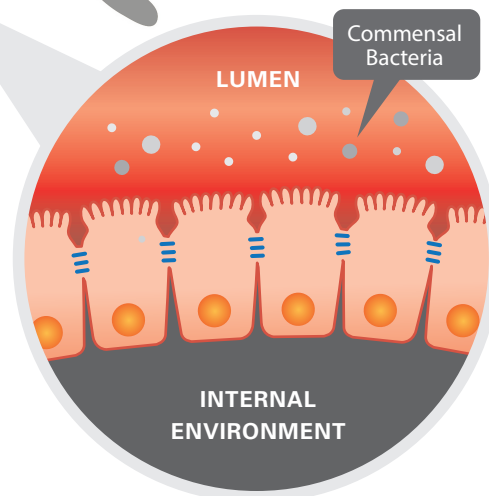
- A diverse population of microbes contributing to intestinal digestive function:
- Influences epithelial physiology
- Stimulates intestinal immunity
- Protects against pathogens

2. Intestinal barrier:

- A single layer of epithelial cells separating the host from the intestinal lumen and critical for fluid and electrolyte secretion.
- Absorbs nutrients and excludes harmful compounds.
- Exposed to up to 10 trillion microorganisms.

3. Tight junctions are multi-protein complexes tightly binding epithelial cells together to regulate paracellular permeability. Tight junctions are crucial for the integrity of the epithelial barrier.

The dissociation of tight junctions leads to the breakdown of the intestinal barrier (i.e. leaky gut), allowing for harmful molecules and compounds to pass through. The breakdown of the intestinal barrier results in losses of animal production and efficiency.



Causes of intestinal barrier breakdown:

- Parasites, viruses, toxins
- Environmental stresses
- Intestinal inflammation

The loss of the epithelial barrier results in:

- Reduction in nutrient absorption
- Increase in bacterial translocation
- Intestinal and systemic inflammation
- Increased disease
- Performance losses



ButiPEARL[®] Z

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ZINC

An essential nutrient with a pivotal role in many key biological processes affecting the health and performance of livestock and poultry.

- Serves as a structural role in DNA replication⁶
- Cofactor for metabolic enzymes⁷
- Cofactor for wound healing enzymes⁸
- T-cell development⁹
- Cofactor for antioxidants¹⁰

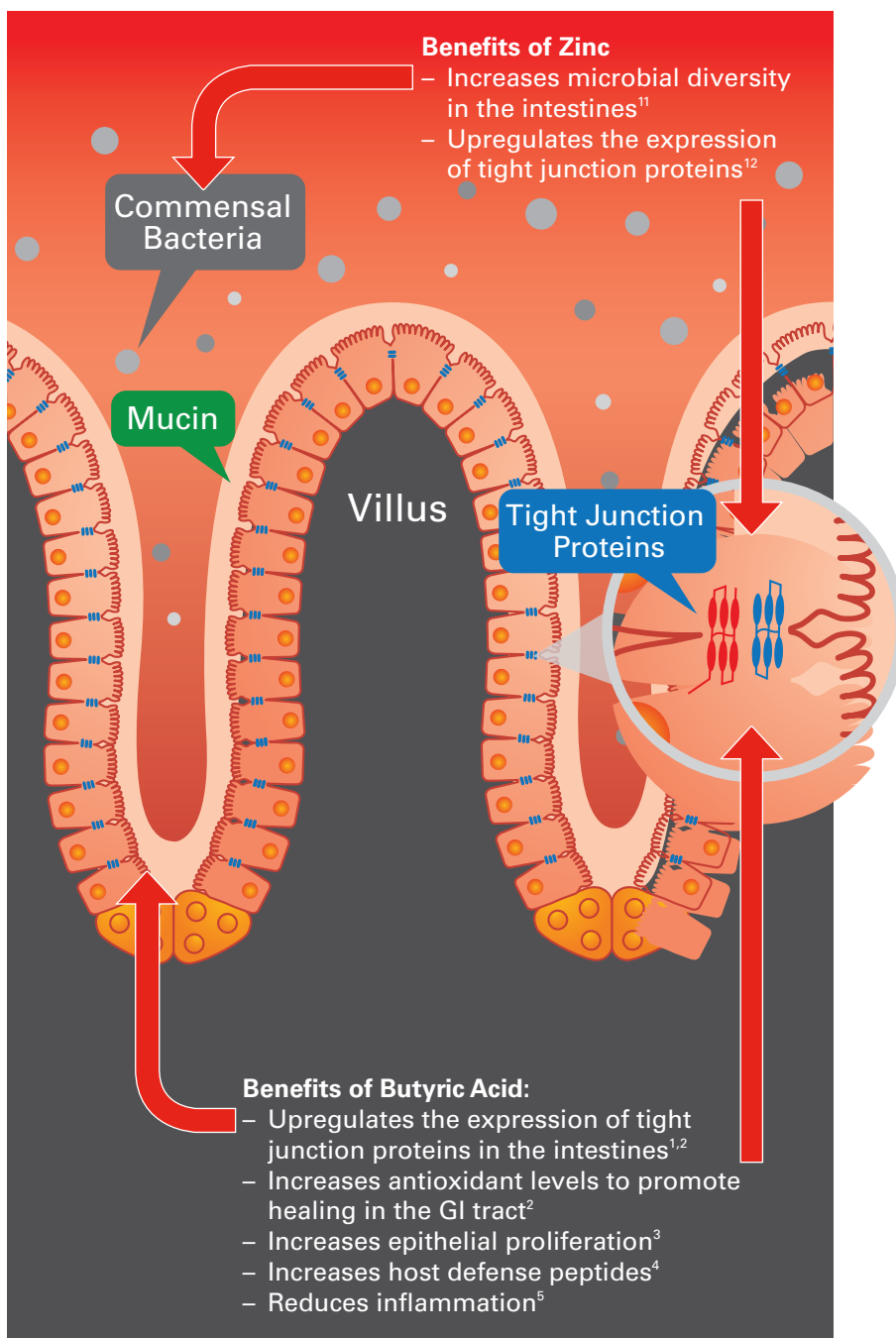
BUTYRIC ACID

An integral short-chain fatty acid acting as an energy source for epithelial cells. Butyric acid improves gut health through development of the intestinal epithelium.

ButiPEARL® Z

A feed additive combining two powerful molecules – butyric acid and zinc – to improve intestinal health and performance in livestock and poultry.

- A unique encapsulated form of butyric acid and zinc
- MicroPEARLS® spray freezing technology
- Allows for slow release throughout upper and lower GI tract
- Superior handling by reducing odor and dust



1. Peng L, et al. Butyrate Enhances the Intestinal Barrier by Facilitating Tight Junction Assembly via Activation of AMP-Activated Protein Kinase in Caco-2 Cell Monolayers. 2009. J. Nutr. 139: 1619-1625; 2. Ma X, et al. Butyrate promotes the recovering of intestinal wound healing through its positive effect on the tight junctions. J Anim Sci. 2012. 90: 266-268; 3. Kotunia A, et al. Effect of sodium butyrate on the small intestine development in neonatal piglets fed by artificial sow. J Physiol Pharmacol. 2004. 55: 59-68; 4. Guilloteau P, et al. From the gut to the peripheral tissues: the multiple effects of butyrate. 2012. Nutr Res Rev. 23: 366-84; 5. Guilloteau P, et al. From the gut to the peripheral tissues: the multiple effects of butyrate. 2012. Nutr Res Rev. 23: 366-384; 6. Stefanidou M, et al. Zinc: a multipurpose trace element. 2006. Arch Toxicol. 80: 1-9; 7. McCall, KA, et al. Function and Mechanism of Zinc Metalloenzymes. 2000. J. Nutr. 130: 1437S-1446S; 8. Lansdown ABG, et al. Zinc in wound healing: Theoretical, experimental, and clinical aspects. 2007. Wound Rep Reg. 15: 2-16; 9. Wellinghausen N, et al. The significance of zinc for leukocyte biology. 1998. J. Leukoc. Biol. 64: 571-577; 10. Sahin K, et al. Role of dietary zinc in heat-stressed poultry: A review. 2009. Poult. Sci. 88: 2176-2183; 11. Katouli M, et al. The effect of zinc oxide supplementation on the stability of the intestinal flora with special reference to composition of coliforms in weaned pigs. 1999. J of Applied Microbiology. 87: 564-573; 12. Zhang B, et al. Zinc prevents Salmonella enterica serovar Typhimurium-induced loss of intestinal mucosal barrier function in broiler chickens. 2012. Avian Pathology. 41: 361-367.