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Dr. Torri Maxwell- *Gastrointestinal Health- Leaky Gut Syndrome and Dysbiosis in the Equine*

A clear modern understanding of the health of the equine gastrointestinal tract, (GI) is necessary to appreciate and utilize the large body of research on the equine patient that is currently being released. Current terminology including equine microbiome, a community of microorganisms (such as bacteria, fungi, and viruses) that inhabit a particular environment. Metabolome, the analysis of the metabolites produced by a cell, tissue, or organism. Exposome, a collection of environmental factors, such as stress and diet, to which an equine is exposed and can have an effect on nutrigenomics.

General digestive that is optimal also has far-reaching health implications in significant areas including immunity and allergic response, reproduction, neurology and cognition, endocrinology and skeletal integrity. There is an understanding that the relative health of the microflora that inhabit the equine gut can either be a benefit or a detriment to the health of the horse. Nurturing the essential microflora through nutrition and management may be a key to unlocking health benefits.

Functional nutrition is the foundational way that what the horse consumes affects his body on the cellular level. It's likely that the metabolomic changes — from both bacterial population changes and changes in bacterial gene expression — play an important role in altering health. This is especially true for the gut as an estimated 70% or more of the total immune system is a continuum through the intestinal tract. Quite simply, loss of these metabolites can lead to disease in the horse. One such instance of cause and effect being investigated is the use of antibiotics, non-steroidal anti-inflammatories and other common medications that are being shown to alter the microbiome and potentially disrupt its balance.

Dysbiosis also known as “leaky gut syndrome” occurs when the GI tract barrier environment and the cells experience a breakdown of tight gap junctions. Disruption of the intestinal barrier allows damaging substances, such as toxins or pathogenic pathogens, to cross the GI barrier and be absorbed into the bloodstream.

Stressors that can damage the barrier of the GI tract include dietary changes, heat stress, training, travel, environmental toxins. Especially concerning are drug therapies of non-steroidal anti-inflammatories and anti-biotics that can dramatically alter the gut microbiome. Pathogens such as *Clostridia*, *Escherichia coli* and others can also cause the GI barrier junctions to weaken and become more permeable to these pathogens which gain access to the blood stream and become systemic.

Past studies have focused on the hindgut fermentation process and the results of microbial imbalances or shifts, known as dysbiosis. The results of this shift can result in such discord as acute colitis, equine grass sickness and laminitis. Due to technical advancements and bioinformatics, more recent focus such as the Microbiome Study has moved forward into actual microbial identification and composition, which lend understanding as to which specific strains are in abundance or lacking in healthy horses compared to those with disease states. Research on the microbiome is an exciting frontier that focuses on the genes that microbial cells contain and the numerous clinical influences it may have. Although still in its infancy, this newly-illuminated path that leads prebiotics, probiotics and functional nutrition to achieve optimal health and disease reduction, or even possible elimination.