

## SYMPOSIUM: Barrier function and systemic response of the gastrointestinal tract to the aspects of management and nutrition: Introduction

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The epithelium that lines the gastrointestinal tract (GIT), in conjunction with the mucosa-associated lymphoid tissue, represents the first line of defence against potentially pathogenic microorganisms and antigens present in the intestinal lumen, and is a crucial site of regulation for innate and adaptive immune functions. In states of health, the epithelium forms a semi-permeable barrier that limits the translocation of bacteria, toxins and (or) antigens into the body, thereby minimising potentially chronic inflammatory responses and systemic disease. Sub-epithelial components such as the enteric nervous system and immune cells are intimately involved in the regulation of secretion and absorption under normal and pathophysiologic processes in the GIT, and thus also constitute a critical component of barrier function. Ultimately, the epithelium is also responsible for the efficient digestion and absorption of nutrients and fluid for maintenance and lean tissue growth.

Barrier function in the GIT is adaptable and is regulated in response to a range of internal and external stimuli such as nutrients, cytokines, stressors and (or) pathogenic microbes. The integrity of barrier function is, therefore, an important component of optimal GIT structure and function. However damage to the epithelial barrier, and hence the balance between activation of inflammatory cascades and immunoregulatory responses, can occur if there are exaggerated responses to pro-inflammatory cytokines, such as what can arise for example in the post-weaning period.

The first paper in this symposium, by Dr. Jae Kim and Dr. Bruce Mullan from the Department of Agriculture and Food WA and Professor John Pluske, from Murdoch University, summarises the literature in pigs where changes in barrier function have occurred and its subsequent effects on GIT structure and function. Their paper then examines the influence of a number of different nutritional strategies to minimise impacts of chronic subclinical infection and stressors that impact barrier function, and therefore improve the efficiency of pig production.

The second paper, by Dr Adam Moeser from North Carolina State University, focuses on a description of intestinal barrier function in the GIT with emphasis on the key structural and physiologic components of the mucosal barrier. The paper then discusses how the function of the GIT is impacted by management factors such as weaning and the age at which piglets are weaned; the impacts of post-weaning colibacillosis are also discussed.