

**Abstract Submission No. : 9061**

## **Kidney-Gut Crosstalk in AKI**

**Sang-kyung Jo**

***Korea University Anam Hospital, Korea***

Acute kidney injury (AKI) is an inflammatory condition characterized by the activation of innate and adaptive immune cells, along with endothelial and epithelial injury. Despite progress in understanding the pathogenesis of AKI, the mortality associated with this condition remains high, and additional therapeutic strategies are needed. Emerging evidence has shown that more than 100 trillion microbial cells inhabiting the gastrointestinal tract affect multiple physiologic functions of their mammalian hosts. Because the intestine represents the largest reservoir of immune cells in the human body, the intestine–microbiota interaction has been shown to be important for maintaining immune homeostasis. Recent microbiome research has suggested that gut microbiota alteration, known as dysbiosis, can trigger or aggravate several immune-mediated or metabolic disorders, including diabetes, obesity, and inflammatory bowel disease. Given that immune activation plays an important role in both injury and repair processes AKI, there is a possibility that changes in intestinal microbiota and mucosal immune response have a substantial effect on AKI.

Increase of Enterobacteriaceae, decrease of Lactobacilli, and Ruminococaceae were found to be the hallmarks of ischemia/reperfusion injury induced dysbiosis and were associated with a decreased levels of short-chain fatty acids, intestinal inflammation and leaky gut. Colonizing germ-free mice with post-AKI microbiota worsened ischemia/reperfusion injury severity with exaggerated inflammation in recipient mice compared to colonizing with microbiota from sham operated mice. Microbiota depletion by oral antibiotics protected against ischemia/reperfusion injury and this renoprotective effect was associated with reduced Th 17, Th 1 response along with expansion of regulatory T cells, and M2 macrophages. These data have shown a unique bidirectional relationship between the kidney and the intestine during AKI ; Intestinal dysbiosis, inflammation and leaky gut are consequences of AKI but they also represent an important modifier determining post-AKI severity, suggesting that targeting the intestinal microbiota might provide a novel therapeutic strategy in AKI.

Advances in high-throughput sequencing technology have offered unprecedented insights into the complex microbial communities residing in the mucosal surfaces of the human



**KSN**2021  
FULLY VIRTUAL MEETING  
September 02 (Thu) - 05 (Sun)

body. However, understanding of the complex interplay between intestinal microbiota and immunity in the pathogenesis of AKI still remains primitive. To further develop novel intestinal microbiota-based therapeutics, several key questions need to be addressed. These include (1) gaining a more thorough understanding of the molecular mechanisms underlying microbiota shift-immune dysregulation, (2) identification of causal pathogens, (3) development of novel probiotic strains or metabolites that can exert beneficial effects, and (4) translation of these findings and therapeutic avenues into human models. Developing innovative methodologies and multidisciplinary approaches to answer these questions could substantially advance our understanding of host-microbiota interactions, not only in the field of AKI but also in other disease models.