1. No.

   2020T003

2. Title

   Elucidation of the Role of Microbiome in the Regulation of Brain-Gut Interaction via Enteric Nervous System and Effect of Smoking on the Regulation

3. Period

   2020-2024

4. Summary

   The intestinal tract has its own autonomic nervous system, which functions independently but closely interacts with the body's regulatory system and contributes to the maintenance of homeostasis in the intestinal tract and the whole body. However, when the internal and external environment of the intestinal tract is suddenly changed, there is a dysfunction of the brain-gut axis and disruption of the intestinal regulatory system, and we believe that this leads to the onset and pathogenesis of intestinal diseases. However, the details are not clear.

   To elucidate the regulatory mechanisms of the brain-gut axis by gut microbiota, we induced dysbiosis and examined the "pathway mediated by receptors for substances produced by gut microbiota" and the "pathway mediated by pattern recognition receptors that recognize gut bacteria". During intestinal inflammation, the number of short-chain fatty acid receptors GPR41 increased, as did their proximity to macrophages. Furthermore, nicotine administration further increased GPR41, suggesting that GPR41 is an anti-inflammatory receptor. In addition, it was suggested that intestinal inflammation selectively induces neurogenesis of NO neurons, which suppresses intestinal motility. Furthermore, several TLRs activated intestinal neurons, which in turn produced and released IL-6 to activate dendritic cells. In addition, it has been shown that during antibiotic-induced dysbiosis, TLR4-activated mucosal glial cells produce and release the neurotrophic factor CNTF, thereby contributing to the maintenance of homeostasis in the enteric neural circuit.

   The gut microbiota has a significant impact on various intestinal functions via the enteric nervous system and is also thought to contribute significantly to the maintenance of homeostasis throughout the body via the brain-gut axis.