1. No.
   2020T002

2. Title
   Role of Gut Microbiota and Lifestyle Including Smoking in Brain-Gut Interactions in Irritable Bowel Syndrome

3. Period
   2020-2024

4. Summary
   In this study, we verified our novel hypotheses that gut microbiota play a causative role in pathophysiology of irritable bowel syndrome (IBS). We also hypothesized that smoking is related to brain-gut interactions in IBS. In IBS patients, gut microbiota was altered compared with healthy controls. Regional brain volume correlated with some gut microbiota. We found that oxytocin inhibits activation of corticotropin-releasing hormone (CRH) neurons in the hypothalamus and amygdala caused by colorectal distention in mice. Dynamic changes in gut microbiota, metabolites, and neurotransmitters were detected at exacerbation of symptoms in IBS patients. In an epidemiological survey, IBS individuals showed more smokers than healthy controls. Degree of smoking was dependent on the severity of childhood adverse experience in IBS individuals. In rats, combination of recovered colitis and maternal separation induces visceral hypersensitivity. Administration of CRH-R1 antagonist blocks this visceral hypersensitivity. Thus, low grade inflammation of the gut due to altered gut microbiota, smoking, and earlier life stress may synergistically induce IBS.