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Dietary Gluten and the Balance of Gut Microbiota in the Dextran Sulphate Sodium Induced Colitis Model

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Abstract : Diet influences the composition of the gut microbiota and host's health. Disruption of the balance among the microbiota, epithelial cells, and resident immune cells in the intestine is involved in the pathogenesis of inflammatory bowel disease (IBD). To study the role of gut microbiota in intestinal inflammation, the microbiome of control mice (C57BL6) given a gluten-containing standard diet versus C57BL6 mice given the gluten-free (GF) feed (n=10 in each group) was examined. All mice received the 3% DSS for 5 days. Throughout the study, feces were collected and processed for DNA extraction and MiSeq Illumina sequencing of V4 region of bacterial 16S rRNA gene. Alpha and beta diversities and compositional differences at phylum and genus levels were determined in intestinal microbiota. The mice receiving the GF diet showed a significantly increased abundance of Firmicutes and a decrease of Bacteroides and Lactobacillus at phylum level. Therefore, the gluten free diet led to reductions in beneficial gut bacteria populations. These findings indicate a role of wheat gluten in dysbiosis of the intestinal microbiota.

Keywords : gluten, colitis, microbiota, DSS, dextran sulphate sodium
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