

一般講演 3

Mulberry modulates the gut microbial flora and inhibits the DSS-induced ulcerative colitis

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Introduction:

Mulberry belongs to the genus of *Morus* and is used as a traditional medicine. This fruit has many biological functions such as antioxidant, anti-inflammation, and immune-modulating because of containing rich ingredients such as polyphenols, which including anthocyanin, flavonoid derivatives, and phenolic acids.

Inflammatory bowel disease (IBD) which characterized chronic inflammation and the ulcerative colitis increases worldwide lately. However, the pathogenesis is unclear. Furthermore, the gut microbiota plays a key role in immune homeostasis and autoimmunity, and it is possible reason that the changing of gut microbiota compositions in the IBD patient. Those bacteria may affect some inflammasomes, for example NLRP6 and NLRP3, which alleviate inflammation of colonic epithelial cells by modulating some cytokines expression. Anti-inflammation drugs have been the drug of choice for the treatment of this disease, but it is difficult to use for its side-effects. At present, the development of new drugs and the use of supplements in combination are the important approaches.

Hence, the aim of this study was to evaluate the inhibitory effect of mulberry against the ulcerative colitis and influence to the composition of gut microbiota in Dextran Sulfate Saline (DSS)-induced colitis mouse.

Materials and Method

Male BALB/c mice (7 weeks old) were randomly divided into 6 groups (n=3/group). The diet with (Group 1 to 4) or without (Group 5 and 6) mulberry juice freeze-dried powder (MFP) were daily supplied for 3 weeks. After 3 weeks maintenance, the mice (Group 1, 3, and 5) were supplied water containing 5% (w/v) DSS for 1 week and body weight and fecal condition in mice were daily monitored. At the end of this week, the colon was collected and made hematoxylin-eosin staining specimens for evaluation of the degree of colonic inflammation. The disease activity index (DAI) was calculated according to the loss of body weight and symptoms of disease. The feces were also collected to determine the bacterial composition by RT-qPCR.

Results and Discussion

The severe body weight loss (about 25%) was observed in Group 5 mice, but not in mice with MFP (Group 1 and 3). DAI score in Group 5 mice was indicated at 3.5, whereas DAI score in mice fed with MFP was significantly decreased. Especially, the score in Group 1 mice was observed lower than it in Group 3. The colon length in Group 1 was longer than Group 3. The tissue damages in Group 5 mice were observed severe compared with it in Group 1 mice. The results of real-time qPCR indicated that total bacterial population was 10^{9-10} copies/g in colon. The significantly decrease was observed for *Bifidobacterium* and *Clostridium perfringens* population in both Group 3 and 5 compared with Group 1 mice. On the other hand, the significantly increase was observed for *Bacteroides* spp. population in group 5 compared with Group 3 mice. Furthermore, the significantly decrease was observed for *Bacteroides* spp. population in group 2 compared with mice in both Group 4 and 6.

There is known that *Bacteroides* spp. is as one of factor which leads the severe IBD disease. We observed the decrease of *Bacteroides* population by mulberry treatment. On the other hand, the results in this study indicated that the significantly increase of *Bifidobacterium* population was observed. The bacteria in *Clostridium perfringens* group was also increased in mice fed with MFP. These two bacteria populations were known as good factor by modulating cytokine production and oxidative stress for IBD. These results may indicate that mulberry inhibits the DSS induced ulcerative colitis by a change of gut microbial flora.