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Differential Expression of GABA and Its Signaling Components in Ulcerative Colitis and Irritable Bowel Syndrome Pathogenesis

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Abstract : Background: Role of GABA has been implicated in autoimmune diseases like multiple sclerosis, type1 diabetes and rheumatoid arthritis where they modulate the immune response but role in gut inflammation has not been defined. Ulcerative colitis (UC) and diarrhoeal predominant irritable bowel syndrome (IBS-D) both involve inflammation of gastrointestinal tract. UC is a chronic, relapsing and idiopathic inflammation of gut. IBS is a common functional gastrointestinal disorder characterised by abdominal pain, discomfort and alternating bowel habits. Mild inflammation is known to occur in IBS-D. Aim: Aim of this study was to investigate the role of GABA in UC as well as in IBS-D. Materials and methods: Blood and biopsy samples from UC, IBS-D and controls were collected. ELISA was used for measuring level of GABA in serum of UC, IBS-D and controls. RT-PCR analysis was done to determine GABAergic signal system in colon biopsy of UC, IBS-D and controls. RT-PCR was done to check the expression of proinflammatory cytokines. CurveExpert 1.4, Graphpad prism-6 software were used for data analysis. Statistical analysis was done by unpaired, two-way student`s t-test. All sets of data were represented as mean± SEM. A probability level of $p < 0.05$ was considered statistically significant. Results and conclusion: Significantly decreased level of GABA and altered GABAergic signal system was detected in UC and IBS-D as compared to controls. Significantly increased expression of proinflammatory cytokines was also determined in UC and IBS-D as compared to controls. Hence we conclude that insufficient level of GABA in UC and IBS-D leads to overproduction of proinflammatory cytokines which further contributes to inflammation. GABA may be used as a promising therapeutic target for treatment of gut inflammation or other inflammatory diseases.

Keywords : diarrheal predominant irritable bowel syndrome, γ-aminobutyric acid (GABA), inflammation, ulcerative colitis
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