E Durans Strain M4-5 Isolated From Human Colonic Flora Attenuates Intestinal Inflammation - DTU Orbit (04/08/2019)

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PURPOSE: The aim of this study was to evaluate in vitro and in vivo effects of a unique high-butyrate-producing bacterial strain from human colonic flora, Enterococcus durans, in prevention and treatment of intestinal inflammation. METHODS: A compartmentalized Caco-2/leukocyte coculture model was used to examine the in vitro effects of E durans and its metabolite butyrate on basal and Escherichia coli–stimulated secretion of proinflammatory immune factors (IL-8, IL-6, and TNF-α) and the anti-inflammatory cytokine IL-10. A murine model of dextran sodium sulfate-induced colitis was used to examine in vivo effects of prevention and therapy with E durans on clinical, biochemical, and histologic parameters of inflammation. RESULTS: In the coculture model, treatment with E durans and with butyrate reduced basal as well as E coli stimulated secretion of IL-8, IL-6, and TNF-α and increased secretion of IL-10. In the in vivo murine model, preventive administration of E durans significantly ameliorated clinical disease activity index (weight loss, fecal bleeding, and stool consistency), reduced myeloperoxidase concentration in colon tissue extracts, improved histologic scores of colonic inflammation, and inhibited colonic transcription of proinflammatory immune factors. The effect of therapeutic treatment alone on these parameters was more moderate but still significant. CONCLUSIONS: We conclude that E durans strain M4 to 5 and its metabolic product butyrate induce significant anti-inflammatory effects, mediated by regulation of pro- and anti-inflammatory immune factors as well as preservation of intestine epithelial integrity, suggesting that this novel anti-inflammatory bacterium may be preferentially a useful prophylactic treatment to avoid inflammatory bowel disease.