In the last few years, we explored the possibility to modulate the mucosal immune-response in Inflammatory Bowel Diseases (IBD) by the use of Probiotic Bacteria (PBT) during the remission phase of the disease, or a microbial product (Cholera Toxin B subunit: CTB) during the active phase of the disease. To this end we performed both in vivo studies in experimental murine colitis and in vitro studies involving intestinal tissue from IBD patients. We found that:

- PBT administration over a 3-week period to mice that have recovered from an initial induction of TNBS colitis reduces the severity of a second induction of TNBS-colitis. This protection was associated with the appearance in the lamina propria (LP) of CD4⁺ CD25⁺ regulatory T cells and IL-10 -dependent CD4⁺ Latency Associated Peptide⁺ (LAP) T cells bearing cell-surface TGF-beta in its latent form as observed in normal mucosa after a mild and/or transient breach in epithelial barrier function. CD4⁺ LAP⁺ T cells proved to be the protective cells since LP cell populations from probiotic treated mice depleted of these cells failed to transfer protection from colitis in recipient mice. We then conducted an open-label study, in which patients with ileal pouch-anal anastomosis for ulcerative colitis at different periods from surgery without signs and symptoms of pouchitis were randomized to PBT or no treatment for 12 months. Patients treated with PBT showed a significant reduction in the pouchitis disease activity index score associated with a significant reduction of tissue IL-1 beta, a significant increase in the percentage of mucosal CD4⁺ CD25high and CD4⁺ LAP⁺ cells compared with baseline values.

- Oral administration of CTB was able to prevent and cure TNBS-colitis and this effect is associated with reduction of mucosal IL-12 and IFN-gamma production. We observed similar effects also in tissue cultures of human intestinal specimens obtained from patients with IBD. CTB is also able to reduce IL-12 production by human Monocyte Derived Dendritic Cells (MDDC) and CTB-pretreated MDDC are able to reduce IFN-gamma production of cocultured naïve T cells. In conclusion, probiotic bacteria and microbial products might represent therapeutic options in IBD.