

The Contribution of Polymeric Immunoglobulin Receptor in the Regulation of Intestinal Inflammation Upon Dextran Sulfate Sodium Induced Colitis

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Inflammatory Bowel disease (IBD) is a group of diseases that cause significant morbidity worldwide and have an association in individuals with a partial or total immunoglobulin A (IgA) deficiency. A direct role for IgA in the pathogenesis of IBD has yet to be identified. We have studied the pathogenesis of IBD using a dextran sulfate sodium (DSS) induced colitis model in mice that completely lack IgA (IgA^{-/-} mice) and mice that lack the polymeric immunoglobulin receptor (pIgR^{-/-} mice), and thus possess serum but not secretory IgA. pIgR^{-/-} mice exhibited greater body weight loss during the 10-day DSS-treatment period, as compared to IgA^{-/-} mice and wild type control animals. Signs of severe clinical illness such as tachypnea, ruffled fur and perianal bleeding were evident earlier and manifested to a greater degree in DSS-treated pIgR^{-/-} mice as compared to the other similarly treated animal groups. Histopathological examination of H&E stained colonic sections of DSS treated pIgR^{-/-} mice displayed greater mucosal edema, ulceration, loss of epithelial glands, necrosis and inflammatory infiltrates as compared to similarly treated IgA^{-/-} and wild type animals. Immunohistochemistry of colonic sections from DSS-treated animals demonstrated an increased sub-population of macrophages within the infiltrates of all animals groups, with the greatest numbers in sections from pIgR^{-/-} animals as compared to IgA^{-/-} and wild type animals. There were no significant differences in sub-populations of T-cells, B-cells and granulocytes within the infiltrates. In summary, our results demonstrate an important role for secretory IgA in controlling colonic inflammation during DSS treatment and maintaining intestinal homeostasis. Furthermore, these results suggest that the pIgR and/or free secretory component may play an IgA-independent immunoregulatory role at mucosal surfaces in regulating inflammation and maintenance of the epithelial barrier integrity upon DSS-induced colitis.