

Name of principal applicant and amount requested (1st year) Karen Madsen  
Nom du principal candidat et somme demandée (1<sup>re</sup> année)

\$ 134 623

Simplified/Lay short title of research

**Bacterial DNA and gut homeostasis**

Abstract (Suitable for lay readers) **NO ATTACHMENTS TO THIS PAGE /**

Bacteria found in the gut are clearly important in both the initiation and perpetuation of inflammation in patients with inflammatory bowel disease. However, it is becoming clear that not all bacteria can cause inflammation, and in fact, some strains of probiotic bacteria (*Lactobacillus* and *Bifidobacteria*) can protect against inflammation. Recent studies suggest that the epithelial cells in the intestine can recognize different bacteria as being either friendly or pathogenic, and can respond accordingly. These responses by the intestinal epithelial cells can involve either an activation of the immune system through the release of specific pro-inflammatory cytokines or a suppression of immune cells.

Recently, we have identified a new way that epithelial cells may recognize bacteria, that being the pattern of DNA found in each bacteria. It appears that epithelial cells can “read” bacterial DNA, and respond either in a pro-inflammatory manner by releasing various cytokines, or by suppressing the release of such cytokines. We will use cultured human and mouse cells to examine how epithelial cells relay these messages to cells of the immune system, and whether different kinds of bacterial DNA could be used to manipulate the systemic immune system. We will also test the effects of bacterial DNA in animal models, to determine if bacterial DNA changes the number or function of T cells in the intestine. Finally, we will determine if we could use bacterial DNA to prevent colitis from occurring in an animal model of colitis, and if bacterial DNA treatment will change the way bacteria colonize the gut.

Overall, these studies will help us understand how bacteria and the intestine interact, and may identify new and effective strategies using bacterial DNA for the treatment of inflammatory bowel disease.

Place and date Edmonton, Alberta Oct 27

Signature