

Study showcases potential new oral treatment for IBD

October 29 2015

For patients with inflammatory bowel disease, the possibility of taking a single pill to bring long-lasting relief might seem too good to be true. Scientists at the Lewis Katz School of Medicine at Temple University are on the brink of making that happen, thanks to a recent proof-of-concept study, in which the severity of a form of inflammatory bowel disease in mice was dramatically reduced with one oral dose of a protein isolated from a bacterial biofilm.

The new study, led by Çağla Tükel, PhD, Assistant Professor in the Department of Microbiology and Immunology at the Lewis Katz School of Medicine (LKSOM), is the first to show that the biofilm protein known as curli can effectively relieve intestinal inflammation in animals. The results were published online in the Nature Publishing Group journal *Biofilms and Microbiomes*.

Curli is one of the first biofilm-based products to be investigated specifically for the treatment of [inflammatory bowel disease](#), or IBD - a condition that affects as many as 1.3 million people in the United States but for which few safe treatment options exist. Most IBD therapies suppress the immune system, which reduces inflammation but also increases the risk of severe side effects, including cancer and infection.

According to Dr. Tükel, because biofilms and their products are naturally occurring, they are of emerging interest in the realm of gastrointestinal therapeutics. The aggregates of bacteria that make up biofilms are held together by an extracellular matrix, which enables the

organisms to form thick protective films over surfaces, such those found inside the mouth and in the lining of the intestinal tract. Protective biofilms typically produce and secrete substances that are beneficial to the health of the host. Curli, for example, acts to reinforce the epithelial barrier in the intestinal tract - the disruption of which is the central feature of intestinal inflammation.

In the new study, Dr. Tükel and colleagues discovered that curli helps to maintain immune homeostasis in the epithelial layer of the [intestinal tract](#). In experiments in vitro, they found that the protein activates toll-like receptor 2, which triggers the production of an anti-inflammatory cytokine known as interleukin-10 (IL-10). Following a single oral dose of curli, mice with acute colitis, a form of IBD, had increased IL-10 levels and a significant reduction in intestinal inflammation. The main readouts on pathology and weight gain in mice treated with curli were comparable to those observed with standard antibody therapy for IBD.

"The really remarkable finding is that one dose of curli - not a daily dose, but just a single oral dose - decreased inflammation and disease pathology and altered the cytokine profile," Dr. Tükel said.

The findings open the way for further investigation of curli as a novel immunotherapy for IBD or even development as an oral supplement. Additional study of the mechanism by which curli operates also could lead to the identification of new pathways underlying IBD and [intestinal inflammation](#).

Provided by Temple University

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