WWTF Project LS18-053

Targeting mucosal biofilms in patients with gastrointestinal disorders

Abstract

Inflammatory bowel diseases (IBD) and irritable bowel syndrome (IBS) are chronic gastrointestinal disorders that affect 10-15% of the Western population. These disorders reduce quality of life and result in substantial socioeconomic costs. The underlying disease mechanisms are poorly understood and there is no effective treatment other than symptomatic relief. Recently, we have observed bacterial biofilms in the gastrointestinal tract of IBD and IBS patients, but their disease relevance, function and composition are unknown. This project aims to (i) use proteomic, metagenomic, and transcriptomic biofilm, normal mucosa and stool sample profiles to identify disease-specific biomarkers, (ii) characterise the bacterial biofilms through culture, functional assays and next-generation sequencing techniques, and (iii) develop gut-specific biofilm modulators to explore novel therapeutic strategies. This project brings together experts in gastroenterology, microbiology, proteomics and therapeutic lead discovery to improve treatment for IBD and IBS patients. Innovative aspects include: (i) biomarker discovery, (ii) using gut-stable antimicrobial peptides for safer treatment options, and (iii) antibiotic and dietary screens for rapid translation into the clinic. Expected outcomes include (i) novel information on biofilm composition, growth, formation and disease association, (ii) biomarkers to aid diagnosis and treatment, and (iii) novel therapeutic avenues for IBD and IBS patients.

Scientific disciplines:
302016 - Gastroenterology (40%) | 301305 - Medicinal Chemistry (30%) | 303020 - Medical microbiology (30%)

Keywords:
inflammatory bowel diseases (IBD); irritable bowel syndrome (IBS), bacterial gut biofilm, biomarkers, antimicrobial peptides, chemical biology, venom drug discovery, antibiotics, personalised medicine

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Status: Ongoing (04.02.2019 - 31.01.2022) 36 months

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Further links about the involved persons and regarding the project you can find at
https://archiv.wwtf.at/programmes/life_sciences/LS18-053