Microbiome therapy of recalcitrant chronic rhinosinusitis

Abstract

Background: Chronic or recurrent rhinosinusitis (CRS) is a disease associated with impaired quality of life and substantial societal costs. Many cases present without a clear underlying cause and despite the lack of etiology current treatment protocols dictate intervention with antibiotics, anti-inflammatory drugs or surgery often with poor long-term outcome. Recent studies indicate that commensal bacteria colonize the nasal and paranasal cavities of healthy individuals and that damage to this natural microbiome, either by pathogens or antibiotics, may cause an imbalance that promotes inflammation. Treatments eliminating pathogens without damaging the commensal microbiome, or ideally restoring an imbalanced microbiome, may therefore offer an alternative to current protocols.

Methods:

In study 1, involving healthy subjects, effects of nasal administration of a honeybee lactic acid bacteria (LAB) microbiome was investigated on nasal symptoms and commensal bacteria. Furthermore, whether or not an inflammatory response was produced was examined. In study 2, we investigated effects of a nasal spray containing a honeybee LAB microbiome on nasal symptoms, commensal bacteria and nasal lavage fluid levels of inflammatory markers, in patients suffering from CRS without polyps (CRSsNP). In study 3, we are planning to investigate the anti-microbial properties of a synergistic honeybee LAB microbiome obtained from the honeybee Apis mellifera, and of a normal human nasal microbiome from healthy donors, against pathogens associated with CRS in vitro. In study 4, involving patients suffering from CRSsNP, we are investigating the effects of two weeks' antibiotic treatment followed by one week of repeated transplants of a nasal microbiome from a healthy donor on nasal symptoms, commensal bacteria and inflammatory response.

Results so far: In study 2, we found that the honeybee LAB did not produce any symptoms or other untoward effects. No changes were observed on commensal bacteria by the honeybee LAB and no inflammatory response was detected (c.f. sham).
In study 3, we found that neither symptom scores, microbiological explorations, nor levels of inflammatory products in nasal lavage fluids were affected by LAB (c.f. sham). Two weeks’ nasal administration of a honeybee LAB microbiome to patients with CRSsNP was well tolerated, but affected neither symptom severity nor the microbiological flora/local inflammatory activity.

Significance: The results so far are of significance to evaluating a potential use of a topical honeybee LAB, and other similar measures, in the management of upper respiratory tract conditions such as CRS

Publications:
