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Transplantation of human skin microbiota in models of atopic dermatitis

Ian A Myles

National Institutes of Health, USA

Atopic dermatitis (AD) is characterized by reduced barrier function, reduced innate immune activation and susceptibility to *Staphylococcus aureus*. Host susceptibility factors are suggested by monogenic disorders associated with AD-like phenotypes and can be medically modulated. *S. aureus* contributes to AD pathogenesis and can be mitigated by antibiotics. Recent work has revealed that the skin microbiome differs significantly between healthy controls and patients with AD, including decreased Gram-negative bacteria in AD. However, little is known about the potential therapeutic benefit of microbiome modulation. To evaluate if parameters of AD pathogenesis are altered after exposure to different culturable Gram-negative (CGN) bacteria collected from human skin. CGN bacteria were collected from healthy controls and patients with AD. Impacts on cellular and culture-based models of immune, epithelial and bacterial function were evaluated. Representative strains were evaluated in the MC903 mouse model of AD. We found that CGN bacteria taken from healthy volunteers but not from patients with AD were associated with enhanced barrier function, innate immunity activation and control of *S. aureus*. Treatment with CGN from healthy controls improved outcomes in a mouse model of AD. These findings have led to the formation of a clinical trial using a live-biotherapeutic approach for treatment of patients with AD.

Biography

Ian A Myles works for the National Institutes of Health in Bethesda in USA. His research focus is on the therapeutic use of live bacteria to treat atopic dermatitis. He has also published on the use of cell lysate therapy and various aspects of immuno-nutrition. He is also an Officer with the US Public Health Service Commissioned Corps, assisting in the vaccination trials for Ebola and more recently Zika virus. Overall his work examines how early environmental and nutritional exposures impact the development of immunity.

mylesi@niaid.nih.gov

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