Do strain diversity and/or dietary context determine the pathogenic potential of *Collinsella aerofaciens* in metabolic inflammation?

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Keywords: *Collinsella aerofaciens*, gut microbiota, non-communicable diseases, intestinal permeability, pro-inflammatory activity

Abstract:

Recent studies have highlighted the role of intestinal microbiota alterations in the onset and progression of several non-communicable diseases (NCDs), including metabolic syndrome, metabolic dysfunction-associated steatotic liver disease, cardiovascular disease, and type 2 diabetes. Among gut-associated bacteria, *Collinsella aerofaciens* has emerged as a species consistently enriched in patients with different NCDs and has been associated with increased intestinal permeability, systemic inflammation, and dysregulation of the gut-liver axis. In this project, an in vitro screening of *C. aerofaciens* type strain was performed to characterize its barrier-disrupting potential and pro-inflammatory activity. Caco-2 monolayers were used to assess transepithelial electrical resistance (TEER). In parallel, NF-κB activation was evaluated using a Caco-2 reporter cell line stably transfected with the pNiFty2-SEAP construct, and pattern-recognition receptor signaling was investigated by measuring TLR2- and TLR4-dependent activation in HEK reporter cell lines. The combined readouts from these assays were used to obtain an in-depth functional characterization of the type strain and will serve as a framework to extend this characterization to additional strains within the species, with the aim of delineating divergent host-interaction profiles across *C. aerofaciens* strains.