LS21-007 - Mutanofactin - A molecular adhesive in cariogenic microbial biofilms?

Zusammenfassung

Dental caries is one of the most prevalent global chronic diseases. It is intimately linked to the establishment of a dysbiotic oral biofilm consortium on the tooth surface (dental plaque), in which Streptococcus mutans (Smu) plays a key role. Many proteins produced by Smu supporting biofilm formation have been studied. Mutanofactins were recently identified as small-molecule secondary metabolites of Smu. Only one has been investigated and shown to promote cell adhesion and biofilm formation significantly. It was suggested to increase bacterial cell surface hydrophobicity; however, detailed insights into the molecular mechanism of mutanofactin action are lacking. Our project explores the molecular mechanisms underlying cariogenic biofilm development triggered by Smu-produced mutanofactins. This requires reconstituting biological systems of incrementally increasing complexity using defined components and methods for analysis and monitoring, spanning the range from the molecular level to single- and multi-species-biofilms. Our project features a unique combination of synthetic, microbiological and physicochemical approaches, including de novo syntheses and novel techniques to characterize bacterial cell surface properties and biofilm matrix interactions. Its outcomes will inform innovative, effective anti-cariogenic strategies urgently needed for human health and reducing the global economic burden of tooth decay.

Wissenschaftliche Disziplinen:
104004 (50%) | 104017 (10%) | 106022 (40%)

Keywords:
Biofilm; Cell surface interactions; Dental caries; Oral streptococci; Organic synthesis; Secondary metabolite; Streptococcus mutans

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Weiterführende Links zu den beteiligten Personen und zum Projekt finden Sie unter
https://wwtf.at/funding/programmes/ls/LS21-007/