Degree project or internship available

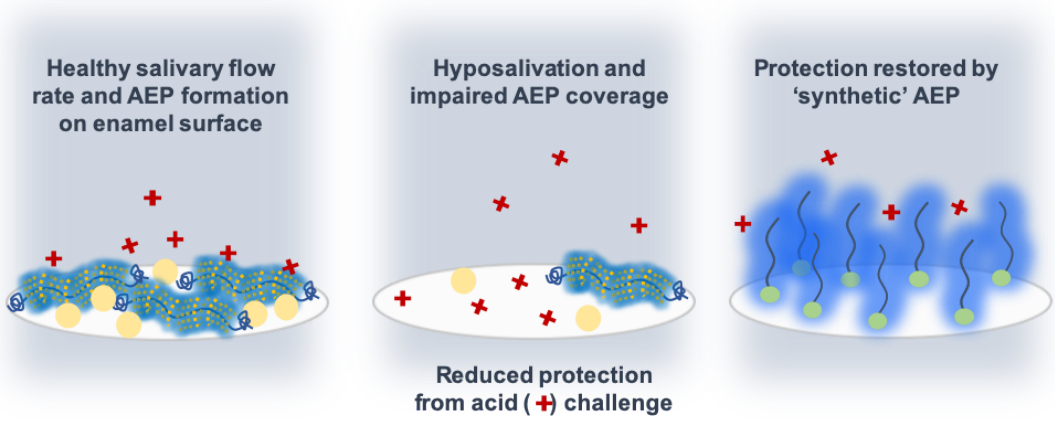
‘A novel approach to artificial saliva’

Context
Between 8 to 42% of the population suffers from oral dryness, a debilitating condition which impedes homeostasis and functioning of the oral cavity. Loss of the lubricative properties conferred by salivary films results in difficulty with speech, food processing, swallowing, and taste perception, thus having serious implications for a patient’s quality of life. Patients also suffer from increased risk of infection and accelerated erosive tooth wear.

It is the lack of an appropriate protein-rich acquired enamel pellicle (AEP) which causes these symptoms. This layer, predominantly composed of salivary constituents, acts as an intermediary layer between the tooth surface, and the damaging mechanical, chemical and biological stresses present in the oral environment.

The currently available ‘artificial saliva’ products on the market are intended to replicate some of the protective and mouthfeel properties of the absent saliva. Unfortunately, their popularity amongst oral dryness sufferers is variable, in part, due to their brief retention time on the oral surfaces, and consequently must be reapplied frequently. There is a clinical need to develop long-lasting AEP mimics which support oral health and ultimately the patient quality of life.

Project aims
You will be exploring a new approach to protect against erosive tooth wear by using polyethylene glycol phosphate (PEG-phosphate) to better mimic the AEP. Phosphate groups are well known to bind to enamel surfaces, and polyethylene glycol is a highly hydrophilic polymer. The aim is to provide a long-lasting film on the tooth surface which mimics some of the properties of natural AEP.



Methodology
You will use bovine enamel blocks as a model tooth surface which you will treat with either PEG-phosphate or natural human saliva. These treated blocks will then undergo cycles of acid challenge to replicate exposure to dietary acids.
The following techniques will be used:

- Profilometry (quantitative method measuring changes in surface morphology)
- Surface microhardness measurements (Knoop hardness test)
- Atomic force microscopy for 2D profile analysis

Environment
You will be hosted in the division of glycoscience, in the School of biotechnology of KTH (Stockholm, Sweden). Our laboratory provides the student with a dynamic, international, and multidisciplinary research team.

Application information
We are looking for enthusiastic, motivated students, who enjoy working as part of a team as well as independently.

Please send us a short description of your relevant work experience, your CV, and your motivation if you are interested in doing a research project in this program for your degree.

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