

## **Master's Thesis Project**

### **Developing new tools for the rapid identification of symbiotic *Clostridia* in the human microbiota**

*Human and Animal Health Unit (HAHU), Swiss Tropical and Public Health Institute*

The human gastrointestinal microbiota plays a crucial role in many chronic diseases such as childhood undernutrition, obesity or cancer. In a diseased state (dysbiosis), specific groups of bacteria are enriched, while others, such as members of the class *Clostridia*, are depleted. Microbiota-targeted interventions aim at shifting the misbalanced microbiota towards a healthier state and encompass administration of live bacteria (probiotics), substances promoting the growth of given bacteria (prebiotics) or transfer of whole microbial communities (fecal transfer). There is especially high interest in so-called next generation probiotics, which are bacterial strains directly isolated from human samples with probiotic potential. Until now, the isolation and use of such bacteria has been slowed by the lack of tools to quickly identify non-pathogenic bacteria.

In clinical microbiology, MALDI-TOF is the new standard for quick and reliable bacterial identification. The method relies on bacterial metabolic profiles, which are compared against a pre-established database. The proposed Master's thesis will focus on the development of a MALDI-TOF spectral database for symbiotic members of the class *Clostridia*.

#### **The candidate will learn and perform the following techniques:**

- Growth assessment of bacteria in different bacteriological media
- Culturing of anaerobic bacteria in an anaerobic tent
- Preparation of MALDI-TOF grids
- Assessment of MALDI spectrograms
- Help with the isolation and identification of *Clostridia* from human feces from Africa using the newly established database

By the end of the project, the candidate will have gained insights into anaerobic culture of bacteria, MALDI-TOF spectroscopy, be familiar in working with clinical samples and confident to perform bacterial identification with Maldi-Tof as well as simple data analysis.

The project is embedded in a larger project, which is funded by the Bill and Melinda Gates Foundation and aims at developing microbiota-targeted interventions for childhood undernutrition. The database established during this Master thesis will be published and made publicly available at the end of the project.

The candidate will work under the direct supervision of Dr. Pascale Vonaesch and in close collaboration with the postdoctoral fellow and the research assistant working on the larger project. The candidate will have her/his own project line that is embedded within the larger project.

#### **Contact:**

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