Universität Zürich[UZH] | Institute of Medical Microbiology

amr applied microbiology research

Apply now! Master Project at UZH

Rapid detection of urinary tract infections by Loop Mediated Isothermal Amplification (LAMP)

Project summary & aim:

Urinary tract infections (UTIs) are one of the **most prevalent infections** globally. However, current **routine diagnostics**, which are based on culturing of the pathogens, **are slow**. Therefore, clinicians often need to rely on empirical antibiotic treatment before results are available. Unnecessary prescriptions of broad-spectrum antibiotics not only can lead to adverse side-effects but also contribute to the emergence of antimicrobial resistance (AMR).

→ This master project aims to **develop and optimize a LAMP-based assay** for rapid detection of a panel of UTI causing pathogens. Unlike PCR, LAMP does not require a DNA extraction step. Therefore, it can be applied directly to urine, yielding results within 40 minutes, including sample preparation. The **project is highly hands-on and clinically relevant**, ideal f**or a student interested in molecular diagnostics and assay development**.

What the student will do:

- **Design LAMP primers** targeting highly conserved and species-specific genes for a set of clinically relevant UTI pathogens.
    - *K. pneumoniae, P. mirabilis, E. faecalis, P. aeruginosa, S. saprophyticus,* and a conserved gene of the human genome for quantification of inflammation/leucocytes/cell damage.
- **Perform a proof-of-concept study** to assess the specificity of the assay and limit of detection.
- **Optimize the assay** to improve limit of detection, decrease turnaround time and reduce false positives and negatives.
- **Assess the performance** on **real clinical urine samples**.
- **Sequence** all the isolates using a long-read rapid sequencing technique (Oxford Nanopore Technology).

Candidate profile:

Motivated student with a bachelor's degree in biology or biomedicine and high interest in molecular microbiology/diagnostics. Team player. Good laboratory practice (rather precise than fast). Ideally, the student should have wet-lab experience.

Supervision:

Direct supervisor: **[Rogenmoser Janis]** | Thesis supervisor: **[Prof. Adrian Egli]** | Location: **[Institute of Medical Microbiology, UZH]**

How to apply:

Send a short CV + cover letter to show motivation to jrogenmoser@imm.uzh.ch (include availability/start date).