BACHELOR'S/MASTER'S THESIS PROJECT IN BIOINFORMATICS AND ANTIMICROBIAL DISCOVERY (ZAMPIERI LAB)

Starting date upon agreement.

We are offering a fully computational bachelor's or master's thesis project focused on identifying anti-tuberculosis compounds with novel modes of action using metabolomics.

About us:
The position is based in the Zampieri Lab in the Department of Biomedicine in Basel. Our group is interested in studying how metabolism mediates adaptation to environmental changes as well as genetic and chemical perturbations. We have established a unique framework that links genetic to drug-induced changes in the metabolome, enabling high-throughput functional annotation of compound libraries.

Project background:
The rapid emergence of antibiotic resistance in *Mycobacterium tuberculosis* poses a major global challenge. Current antimicrobial drug discovery platforms are slow, show limited results, and often lead to the rediscovery of known mechanisms, creating a pressing need for novel methods.
We have combined CRISPRi technology and non-targeted metabolomics to study how *M. tuberculosis* responds to essential gene inhibition and drug treatment. In this project, the student will first analyze the metabolic consequences of genetic knockdowns and chemical perturbations, establishing a reference map of metabolic changes. The student will then compare changes caused by gene inhibition and drug treatment to predict the modes of action of compounds with antibacterial activity.

Your role:
The candidate will work with a large metabolomics dataset and gain valuable hands-on experience in the analysis and interpretation of 'omics' data. We offer a supportive research environment, close mentorship, and an exciting opportunity to work on a real-world, high-impact research problem in antimicrobial discovery.

Desired candidate:
We are searching for a motivated student with a quantitative background, currently pursuing a bachelor's or master's degree in computational biology, systems biology, biotechnology, biology or a related life science field. Familiarity with programming languages such as MATLAB or Python, and proactive attitude toward learning are essential.

Application and contact:
Please send your application consisting of a motivation letter, CV and optionally references by email to terezia.dorcakova@unibas.ch

References:
1. Ortmayr, K., de la Cruz Moreno, R. & Zampieri, M. Expanding the search for small-molecule antibacterials by multidimensional profiling. Nat Chem Biol 18, 584–595 (2022)
2. Anglada-Girotto, M., Handschin, G., Ortmayr, K. et al. Combining CRISPRi and metabolomics for functional annotation of compound libraries. Nat Chem Biol 18, 482–491 (2022)