

Master's Thesis Opportunity: Quantifying GLP-1 Receptor Agonist Exposure

Background and Research Goal of the Thesis

GLP-1 receptor agonists (GLP-1RAs), particularly semaglutide, have become cornerstone therapies for obesity, type 2 diabetes, and emerging indications. Semaglutide's structural modifications (94% homology to native GLP-1 but with albumin binding and peptidase resistance) extend its half-life to ~1 week versus minutes for native GLP-1. Despite its widespread use in Switzerland, dosing remains uniform across patients, even though interindividual variability in tolerability and clinical response suggests a critical role for drug exposure levels. However, semaglutide exposure is rarely quantified, and exposure-response relationships remain poorly characterized. The goal of the master thesis is to quantify semaglutide exposure in patients with different clinical characteristics and treatment doses using blood and urine samples. Quantification of semaglutide in human plasma and urine will be performed using liquid chromatography-tandem mass spectrometry.

This master's thesis will address these gaps by quantifying semaglutide exposure in plasma, whole blood, and urine using LC-MS/MS in samples in a diverse patient sample treated with different doses of semaglutide and establishing dose-exposure-response relationships (e.g., sex, HbA1c, body weight, cardiometabolic markers) using clinical datasets.

The findings will provide important insights into the potential need for personalized dosing strategies in clinical practice.

Tasks and Learning Outcomes

- Gain expertise on the molecular structure and pharmacokinetics of the GLP-1RA semaglutide and methods of quantification in plasma, whole blood (e.g. for microsampling techniques) and urine
- Compare plasma semaglutide concentrations with whole blood quantification using microsampling techniques
- Analyze cross-sectional/longitudinal clinical datasets establish relationships between doses, exposure levels and clinical outcomes

Candidate Profile

We seek a motivated student with:

- Strong interest GLP-1RAs clinical pharmacology and application.
- Enthusiasm for **human translational research** and collaborative teamwork (including collaboration with LC-MS bioanalytical experts).
- Basic proficiency in R or Matlab (or willingness to learn).

Contact details

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