University of Basel

Department of
Biomedical Engineering

University of Basel, Department of Biomedical Engineering, Hegenheimermattweg 167B/C, 4123 Allschwil

Master of Science – Biomedical Engineering
Thesis Proposal

Analysis of high-resolution mass spectrometric data of the exhaled breath from epileptic patients

Therapeutic management of epilepsy remains a challenge, since optimal systemic antiseizure medication (ASM) concentrations do not always correlate with improved clinical outcome and minimal side effects. Therefore, recently we developed a non-invasive, real-time, mass spectrometric method to provide reliable estimations of systemic drug concentrations along with risk estimates for drug response and side effects using exhaled breath [Singh et al., 2021; PMID: 36740603].

In the abovementioned study, we specifically focused on valproic acid (VPA, an ASM). However, we continue to measure epileptic patients taking different combinations of various ASM. As a result, we have large amount of good-quality data ready to be analysed. Therefore, the aim of this master thesis project is to explore available data and ultimately develop and validate machine learning models to predict blood concentration of various ASMs and to predict drug response and side effects. This analysis-based thesis aims to expand the reach of breath based therapeutic management beyond VPA, which might help clinicians to decide how to treat people with epilepsy and to choose appropriate drug doses.

Nature of the Thesis

Programming and data analysis: 80 %
Documentation: 20 %

Specific Requirements

Programming experience in MATLAB.
Familiarity with machine learning models.
Genuine interest in a highly interdisciplinary project.

Supervisor

Prof. Dr. Pablo Sinues
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Contact

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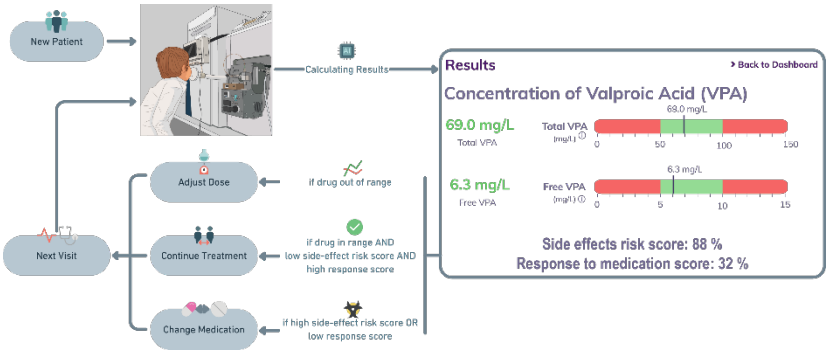

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