



Bachelor-/ Master-/ Semester thesis:

Gene Therapeutics Purification: Advancements in Separation Systems and Innovative Technologies

Keywords: eQCM – Therapeutic Plasmid DNA – Bioseparation - Analytical Techniques – Process Development

Project description

This project aims to enhance a separation system for purifying nucleotide-based gene therapeutics via applied potential on carbon electrodes. To understand the physical interaction principles, a Quartz Crystal Microbalance with Dissipation (eQCM) is used for robust adsorption and desorption studies of therapeutic plasmid DNA. The resulting data will be employed to create simulations and mathematical models to optimize the separation process. Analytical tools such as Zeta potential analysis, Dynamic Light Scattering (DLS), Gel Electrophoresis, and Capillary Electrophoresis (CE) will ensure plasmid integrity and characterize its behavior under various conditions. Furthermore, a flow cell module design for the ÄKTA system (Chromatography) would be a next step regarding the process scalability.

Research objective

- Method establishment for eQCM
- Optimizing conditions (buffer systems, potential, and flow)
- Analytical methods: DLS, Zetapotential CE, Gel electrophoresis, HPLC
- Characterizing & and exploring different coatings of the sensor surface
- Process development & Modeling

Profile

- Structured and independent workflow
- Motivation to familiarize yourself with new topics
- Student in the field of Bioprocess-, Biochemical- Physical- Chemical-, Mechanical-, engineering, or similar

Ideal, but not required:

- Lab experience

Contact

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Start: from now

