

## **BSc/MSc-project**

**Title:** In vitro monitoring of intestinal epithelial cells

**Description:** In bioelectrochemistry, electrochemical impedance spectroscopy (EIS) with 2D Au electrodes has been widely used to detect and quantify cell immobilization, adhesion, proliferation and apoptosis in real-time). With EIS it is for example possible to study the cytotoxicity effects of different chemicals or time and concentration dependent effects of drugs. Pyrolytic carbon electrodes could potentially be used for different applications using electrochemical impedance spectroscopy (EIS) due to their excellent biocompatibility and interaction with cells.

The aim of this project is to investigate the use of pyrolytic carbon microelectrodes for monitoring of drug interaction with Caco-2 cells. This cell line is typically used to evaluate the absorption of drugs in the intestine in the so-called transwell configuration. Here, we would like to explore if EIS could be used to simultaneously monitor changes in the Caco-2 cell monolayer (permeability) and passage of drug molecules. The tasks will involve the development of a cell culturing assay for Caco-2 cells on an existing carbon microelectrode platform and in vitro monitoring before and during administration of drugs.

**Required qualifications:** Basic knowledge in biochemistry (cell assays)

**Responsible institution:** DTU Nanotech

**Contact information:** Associate Professor Stephan Sylvest Keller, Biomaterial Microsystems group, DTU Nanotech, Technical University of Denmark; [stephan.keller@nanotech.dtu.dk](mailto:stephan.keller@nanotech.dtu.dk), Tel: +45 45255846

**Allowed no of students per report:** MSc: 1; BSc: 1-2

**DTU supervisor:** Assoc. Prof. Stephan Sylvest Keller