



Master thesis: Skin models for screening of topical delivery

Project background

Testing of topical formulations, with skin as delivery site, requires reliable skin models. Ex-vivo skin models are widely used, such as ex-vivo human skin (e.g. left-overs after plastic surgery operation) or animal skin (e.g. left-overs after slaughter for food, such as skin from pig ears). These “whole skin” models are popular since they replicate well the barrier function of the skin and its epidermal and dermal layers in their complexity. However, besides the ethical issues that are related to ex-vivo skin models, these models also suffer from limited reproducibility due to their biological variability.

There is hope that a better reproducibility could be provided by in-vitro 3D skin models based on cells grown into three-dimensional structures that have appeared on the market during recent years. These models can replicate different properties of living skin and ex-vivo skin only to some degree and therefore, they are suitable only for studies or specific aspects of topical delivery. More research is needed for finding out more about advantages and limitations of in-vitro skin models based on 3D cell cultures.

Objective of the project

The objective of the master thesis is evaluation of skin models for screening of topical delivery of biological medicines by comparing key features of:

- Ex-vivo pig skin model of in whole and damaged skin
- Commercially available in-vitro skin model based on novel 3D cell cultures of living cells

Work will involve development/optimization of methods for working with these skin models and comparing them in terms of various aspects of delivery of the active:

- Barrier function for penetration/permeation
- Penetration of active into different skin layers
- Permeation of active through different skin layers

During the course of the project you will learn and use several different experimental techniques: conjugation of proteins to fluorophores, fluorescent spectrophotometry (Plate reader), Franz diffusion cells, cryo-microtoming and fluorescent microscopy.

You will work within the research centrum NextBioForm <https://www.ri.se/en/nextbioform> coordinated by Research Institutes of Sweden (RISE), at Drottning Kristinas väg, situated within the main KTH campus in Stockholm, while some experiments will be performed at RISE site in Södertälje. Start date of the project is 2020-01-20.

Welcome with your application!

If you have any questions please contact Dr. Maja Hellsing, RISE Surface, Process and Formulations, + 46 72 561 6038 or Dr. Lubica Macakova, RISE Surface, Process and Formulations, + 46 70 236 1400. Apply through RISE webpage <https://ri.varbi.com/en/what/job/jobID:307053/>. Last day for application is 2020-01-14.

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