

SSPC – The Science Foundation Ireland Centre for Pharmaceuticals (<http://sspc.ie/>)

PhD Position 1 Starting from April – Sept 2020

Principal supervisor(s): Dr. Abina Crean and Dr. Brendan Griffin, School of Pharmacy, UCC

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The objective of the project is to predict the impact of changes in manufacturing (material attributes and process parameters) on drug dissolution in-vitro, and hence in-vivo pharmacokinetic performance. The goal of this modeling approach is to support formulation/process design, inform clinical trial candidate selection and support product release following manufacturing deviations. This project will expand on already established modelling approaches and focus on direct compression formulations of poorly water-soluble drug. The project will focus on predictive modelling of drug dissolution/release and in-vivo performance. Modelling tools will include statistical models such as partial least square regression and PBPK modelling packages. Prior expertise in modelling is not essential but the successful candidates should have good mathematical proficiency.

PhD Position 2 Starting from September 2020

Principal supervisor: Dr. Brendan Griffin, School of Pharmacy, UCC

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This project focuses on designing food-independent formulations for oncology/geriatric patients. Our group recently reported that approximately 40% (67 of 157 products identified; 42.68%) of medicines licensed by the EMA and FDA since January 1st, 2010 display a significant food effect or have been licensed with a label restriction with regard to dosing with or without food. This has a significant knock-on effect in the clinic, and this is particularly problematic in certain patient populations, such as oncology patients, given the likely side effects on cancer chemotherapy drugs. Similarly, in geriatric patient where strict guidance on food labelling can be more challenging given the polypharmacy nature of treatment. Yet food-independent formulation approaches remain largely unexplored, with only a few examples commercially. The focus of this project will be to develop novel food-independent formulations for oncology patient. A review of the chemical and pharmacokinetic properties of recently licensed oral chemotherapy drugs will be conducted. Formulation strategies to eliminate food effect (e.g. lipid-based formulations) will be explored. Strategies to maximise dose loading e.g. lipophilic salts and enhance vivo solubilisation under in vivo conditions reflective of oncology/geriatric patients.

PhD Position 3 Starting from September 2020

Principal supervisor: Dr. Sonja Vucen, School of Pharmacy, UCC

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This project will focus on designing dissolvable microneedle systems (DMN) for enhanced percutaneous absorption and bioavailability of medicines for paediatric population, as well as establishing specific physiologically based pharmacokinetic (PBPK) models for in vivo prediction of drug dermatokinetics. Predictive relationships between in vivo performance and in vitro characterisation using modelling approaches will be developed. The overarching research question is whether DMN drug formulations can be designed and used to address the therapeutic needs of paediatric patients requiring tailored doses and non-invasive appropriate routes of administration? The impact of manufacturing process and formulation variables on DMN physical characteristics and release performance will be investigated, as well as development of PBPK modelling platform for predicting DMN formulation performance in vivo.