Panoz Pharmaceutical Innovation PhD Scholarships

Mechanistic and synthetic studies on integrin ligands in cell stress and bioprocessing

Principle Investigator: Professor John Gilmer, Professor in Pharmaceutical Chemistry, Trinity College Dublin.

Post Summary

To undertake a structured PhD in pharmaceutical innovation under the principal supervision of Professor John Gilmer with co-supervision from Professors Mantalaris and Long (Medicine) and Dr Kiefer Ramberg. The project is directed at the potential involvement of integrins in the cytoprotective effects of bile acids, with elucidation of the underlying mechanisms and potential to harness this with non-bile acid ligands in drug design for degenerative disorders where dysregulated cell death contributes to disease progression. The project will investigate the potential for these cytoprotective effects to be harnessed in the optimal production of therapeutic antibodies from genetically engineered cells that will of interest to the biotech industry.

Standard Duties and Responsibilities of the Post

To undertake biochemical and synthetic studies on integrin ligands to establish the potential of selected integrins in modulating cell stress and cell death. The candidate will need to undertake chemical synthesis and characterisation. So whereas experience in this will be helpful, it is not essential because training can be provided. The candidate will need to establish biochemical assay systems of varying degrees of novelty to measure ligand binding to integrin proteins and monitoring of the effects of this. The candidate will undertake HPLC studies on the impact of integrin modulation on CHO cell antibody production. Again whereas experience in protein measurement by HPLC will be advantageous it is not essential as training will be provided. The post holder will be supported in regular supervision meetings with a very experienced team.

Person Specification

Qualifications

Must have a primary degree in pharmacy, chemistry, medicinal chemistry or biochemistry.

Knowledge & Experience (Essential & Desirable)

Significant wet-lab experimental experience including research project from undergraduate education. Addition internship or summer research experience will be advantageous.

Skills & Competencies

Skill, training and/or experience in one of chemical synthesis, assay development and implementation, HPLC or biophysical characterisation methods is essential.

Capturing, understanding, and directing cellular heterogeneity in the biomanufacturing of cellular therapeutics

Principle Investigator: Professor Sakis Mantalaris, Don Panoz Chair, Professor of Pharmaceutical Biology Trinity College Dublin.

Post Summary

Cell therapy is broadly defined as the transfer of viable cells from one host to another (allogeneic) or into the same individual after storage or manipulation (autologous). One of the most promising types of cells applied are the inducible pluripotent stem cells (iPSCs), which have the capability to differentiate into every human cell type. Though the potential for impact is high, challenges remain; variability in reported patient responses can result from unpredictable heterogeneity of infused cellular therapeutics, highlighting the unmet need for robust and reproducible biomanufacturing. ***Cellular heterogeneity*** is classically characterized in terms of immunophenotype, genotype and transcriptome expression. Defining heterogeneity of similar cell types derived from different sources and how the bioprocess alters output products is critical to creating a robust platform for cellular therapeutics. Currently, "homogeneous" cell populations are defined by immunophenotype and/or limited genotype signatures. Using these current strategies, maturation efficiencies, product quality and clinical outcomes remain variable resulting in failure of cellular therapeutics to gain necessary approvals for more wide-spread clinical use. The dynamic sensitivity of metabolomic responses to environmental and cellular perturbations, including gene editing, results in heterogeneity during culture, is dependent on bioprocess conditions, and these changes impact epigenetic, genetic, and phenotypic qualities of the final output. Metabolomics analysis has the required sensitivity to capture metabolic shifts associated with genetic and immunophenotypic changes before they occur and can help drive the desired function.

The ***aim*** of this PhD studentship is to characterize and direct cellular heterogeneity as a function of metabolism and standardize single cell analysis & metabolomics in the biomanufacturing workflow. To deliver the research aim, 3 tasks have been identified: *T1* establishes the baseline of cellular heterogeneity, *T2* characterizes cellular heterogeneity under different bioprocess parameters, and *T3* constructs multi-omics cell signatures.

The ***expected outcome*** is capturing heterogeneity at single cell level (genotype and immunophenotype) and linking with metabolomic signatures, which will facilitate characterization, optimization and manipulation/control of the bioprocess resulting in robust cellular therapeutics manufacturing strategies with better QA/QC utilizing metabolism as the most dynamic and fundamental defining feature of cellular function.

Standard Duties and Responsibilities of the Post

- Conduct research in cellular heterogeneity, single cell analysis, and metabolism in cellular therapeutics under the supervision of Professors Mantalaris and Panoskaltsis.
- Maintain detailed and orderly records of the work performed, making them available to the supervisors upon request.
- Ensure timely reporting to the research sponsor.

- Disseminate the outcomes of this research in poster and/or podium presentations at regional, national, and international meetings and conferences.
- Prepare manuscripts for publication in top-tier journals.
- Participate fully in the wider research and scholarly activities of the research group pf Professors Mantalaris and Panoskaltsis within the remit and restrictions of the appointed position. Specifically, integrate research activities within the Trinity Translational Medicine Institute (TTMI) and the National Institute for Bioprocessing Research and Training (NIBRT).
- Carry out any other duties within the scope, spirit and purpose of the job as requested by the supervisors.
- Comply with all Trinity College Dublin policies and regulations, including those in relation to Research Ethics and Health and Safety.
- Contribute to the generation of intellectual property.

Person Specification

An enthusiastic, ambitious, self-motivated, responsible, ethical researcher who will be both independent and work well within the research group. The successful PhD student will develop critical thinking skills.

Qualifications

An earned BSc or MSc in Pharmacy, Biomedical Engineering, Cell Biology, or a relevant discipline from an approved degree awarding institution is essential.

Knowledge & Experience (Essential & Desirable)

- Laboratory experience as part of a research project (essential).
- Analysis of research data (essential).
- Experience using LC-MS (essential).
- Cell culture experience (desirable)

Skills & Competencies

- Undergraduate research experience (essential).
- Commitment to research excellence and ability to produce research and scholarship (essential).
- Effective oral and written communication skills: report writing, knowledge transfer and communication skills with the ability to present complex information effectively to a range of audiences (essential).
- Self-motivated and able to work collaboratively as part of a team and independently to an agreed work plan (essential).
- Experience in cell biology, single cell analysis and cellular heterogeneity (desirable).

- Experience in LC-MS (essential).
- Experience working in multidisciplinary research teams (desirable).
- Experience in statistical analysis (desirable)

Optimising Medicines for Older Adults with Intellectual Disability using the OPTIMA-ID Tool

Principle Investigator: Assistant Professor Juliette O'Connell, Professor in Pharmacy Practice, Trinity College Dublin.

Post Summary

Background: Medicines optimisation improves medication appropriateness and reduces medication related adverse effects and harm. A medicines optimisation tool, OPTIMA-ID (Optimising Pharmaco-Therapy and Improving Medication for Ageing with Intellectual Disability) was recently developed by a multidisciplinary team to support medicines optimisation for older (≥40 years) adults with intellectual disability. This research programme aims to refine and test the potential for OPTIMA-ID to be implemented in routine clinical practice. Objectives: To determine the potential of OPTIMA-ID to improve patient outcomes, its usability amongst different professional groups, to explore the feasibility of implementing OPTIMA-ID in clinical practice and to undertake a pilot trial using OPTIMA-ID in clinical practice. Methods: OPTIMA-ID will be applied to medication data collected from participants in the Intellectual Disability Supplement to the Irish Longitudinal Study on Ageing (IDS-TILDA) to describe prescribing quality in IDS-TILDA and its association with patient outcomes. The inter-rater reliability of OPTIMA-ID amongst healthcare professionals (e.g., prescribers/pharmacists) will be established. The feasibility of using OPTIMA-ID will be tested in a proof-of-concept study prior to undertaking a pilot trial in healthcare facilities associated with IDS-TILDA. This will establish utility of OPTIMA-ID in practice and refine methods for future investigation in a large-scale interventional study and subsequent implementation.

Standard Duties and Responsibilities of the Post

The successful candidate will:

- Apply for necessary research ethics approvals
- Develop research protocols for each study within the research programme
- Manage data appropriately and in line with data protection regulations
- Keep up-to-date with relevant national and international literature
- Undertake a pharmacoepidemiology study using the OPTIMA-ID screening tool to determine the priorities for medicines optimisation for patients with ID
- Undertake an inter-rater reliability study using the OPTIMA-ID tool.
- Pilot the use and implementation of the OTPIMA-ID tool in clinical settings.

- Complete taught modules (a minimum of 10 ECTS and a maximum 30 ECTS) as part of the structured PhD program at Trinity College.
- Meet with supervisor team regularly, attend and contribute to research group meetings, communicate research findings at national and international conferences.
- Liaise with other members of our multidisciplinary research team and clinical staff as well as patients.
- Prepare research articles for publication in high impact scientific journals.
- Attend conferences, present research work at conferences.
- Disseminate research findings through research briefs, blogs.

Person Specification

Qualifications

- A minimum of a 2:1 honours degree or equivalent in pharmacy, health sciences or related science field

Knowledge, Experience, Skills & Competence (Essential & Desirable)
Essential

- Proficiency in English language
- Excellent communication skills
- Excellent time management
- Ability to work independently and as part of a team
- Flexible with regards to research environment
- Knowledge of medicines used in patients with Intellectual Disability

Desirable

- Population health / social science/ health services research experience
- Statistical knowledge and experience in using statistical packages
- Experience with working with patients with Intellectual Disability
- Knowledge of relevant health and research legislation
- Experience of working within a multidisciplinary team
- Knowledge of GDPR and Health Regulations

Theoretically informed and data-driven innovations in medication self-management and breast-feeding

Principle Investigator: Associate Professor Tamasine Grimes, Trinity College Dublin.

Post Summary

The School of Pharmacy and Pharmaceutical Sciences at Trinity College, the University of Dublin, is seeking a candidate for a 'Panoz Pharmaceutical Innovation PhD Scholarship in Pharmaceutical Sciences' working on the project '**Theoretically informed and data-driven innovations in medication self-management and breast-feeding**'. This is a collaborative project supervised by Associate Professor Tamasine Grimes, supported by internal collaboration provided by Associate Professor Deirdre D'Arcy, Assistant Professor Juliette O'Connell and external collaboration by Associate Professor Deirdre Daly, School of Nursing and Midwifery and Principal Investigator on the Maternal health And Maternal Morbidity in Ireland (MAMMI) Study, and by Assistant Professor Sam Cromie, School of Psychology and Co-Director of the Centre for Innovative Human Systems. This is a four-year PhD programme.

Project details:

There were 57,064 births in 2020 in Ireland and up to 29% of mothers report breastfeeding at six months. Most breastfeeding mothers are likely to need some form of medication during this period. Medication use during breastfeeding is challenging because the medication may transfer to breastmilk and therefore to baby. Hence, the use or non-use of medication by breastfeeding mothers can impact significantly on maternal and child health.

Little is known about the frequency or nature of medication use during breastfeeding, the mothers' perspectives of medication self-management in this setting or the impact on breastfeeding duration or medication safety. This project aims to address these gaps across three studies.

- Study 1 will systematically review the literature to identify, from the mother's perspective, the barriers and facilitators to medication optimisation, using mixed-methods and a systems-based theoretical framework.
- Study 2 will explore the frequency and nature of medication use in first-time mothers during the first-year post-partum and how is this associated with breastfeeding. This cohort study will apply secondary data analysis to responses to the Maternal health And Maternal Morbidity in Ireland (MAMMI) study antenatally and at 3-, 6-, 9- or 12-month post-partum.
- Study 3 will apply qualitative work system exploration using focussed ethnography to describe the barriers and facilitators that breastfeeding mothers in Ireland experience in their medication use.

Women from the MAMMI Study's Public and Patient Involvement initiative will be engaged across all three studies. Findings from the three studies will be triangulated to identify research and innovation opportunities to enhance future experience and maternal and child patient safety.

Standard Duties and Responsibilities of the Post

The PhD student will carry out high quality research as part of the requirements for a PhD degree at Trinity College Dublin. They will also engage in the structured component of the degree, as required

by the university. The student will be involved in training, education and public engagement as well as occasional teaching demonstrations. In addition, the student will be required to attend regular meetings with the supervisors and the research group, attend other meetings if required, write reports, communicate and disseminate information/research findings at conferences, collaborate with other members and publish research findings in high impact international peer-reviewed journals. The student will also engage in outreach activities to share knowledge about the project with the public and is expected to be eager to learn and enthusiastic about this area of study. Training will be provided in new techniques. The student will take one of the award-winning full PG Certificate programmes offered by Tangent over the four years of the PhD: PG Cert in Creative Thinking, Innovation and Entrepreneurship or the PG Cert in Innovation and Enterprise Development.

Person Specification

This PhD studentship would be ideally suited to someone who is highly motivated, has an aptitude/strong interest in and is considering a future in academia or patient safety research and development. Excellent interpersonal skills are required to communicate efficiently with other members of the School, the research group, the MAMMI study PPI participants, and the other PhD students funded through the Panoz Pharmaceutical Innovation programme.

The below sections detail a list of qualifications, knowledge and experience, and skills and competencies of an ideal candidate for the position. Please note that it is unlikely that any one PhD candidate will have them all. Therefore, strength in one area can make up for less experience in another. However, prospective candidates must meet the essential criteria at a minimum. Carefully consider your motivation for embarking on a PhD, the skills/experience that you think make you well suited to this project. These points should form the basis of a cover letter expressing your interest in the role.

Qualifications

- The successful candidate must hold a degree (minimum 2.1) in a professional healthcare course, psychology, systems engineering, human factors or a cognate discipline [Essential].
- A Master's degree in a relevant field [Desirable].

Knowledge & Experience (Essential & Desirable)

The successful candidate will have:

- Foundation knowledge about the following: the challenges of medication use in breastfeeding, systematic reviewing and patient and public involvement in research [Essential].
- Initiative, ability to work independently and as part of a team [Essential].
- Willingness to undertake training and career development [Essential].
- Flexibility to work irregular hours on occasion [Essential].

It is desirable that the successful candidate have:

- Previous research experience [Desirable].
  Experience in presenting research results in written and oral formats [Desirable].
- Evidence of publication commensurate with career stage [Desirable].

Skills & Competencies

- Outstanding interpersonal skills (i.e., communication, decision-making, leadership, organisation).
- Have a highly motivated, persistent and result-driven attitude.
- Ability to work well both independently and in a team environment, with a sense of responsibility.
- Ability to set and meet clear research goals.
- Critical thinking and analytical skills.
- Strong writing skills.
- Strong record keeping and data handling skills.
- English language certification if English is not first language; please refer to: https://www.tcd.ie/study/apply/admission-requirements/postgraduate/index.php