



ESR Project Information Sheet

Project title	Polymeric transfection agents for drug delivery to treat retinal damage and disease
Reference number	ORBITAL_ESR_2019_Project 10
Host Institution/University	University of Birmingham
Supervisor(s)	Prof Ann Logan (PI) Cmdr Dr Richard Blanch Dr Lisa Hill Dr Zubair Ahmed
Research Group	Neuroscience and Ophthalmology
Department / School	Institute of Inflammation and Ageing, University of Birmingham
Duration	36-month employment contract provided and ESR enrolled on PhD programme. ESR will be required to self-fund after the initial 36 months
Status: Full-time / part-time	Full-time PhD Programme
Funding information	Funding agency: H2020-MSCA-ITN-2018
Early Stage Researcher Allowances:	Living allowance: €54,857.52 p/a + mobility allowance of €7,200 p/a + family allowance where applicable (all values before tax and social security payments) Fees: University PhD fees
Closing date and time	5 p.m. (CET) Friday 28 th June, 2019
Commencement date	2 nd September 2019

Post summary

Diseases of the posterior segment of the eye are increasing considerably, in part due to an ageing population. One such disease, Age-related macular degeneration (AMD), the most common cause of blindness in patients over sixty, accounts for almost 10% of blindness worldwide. Its predicted global incidence for 2020 is 196M, rising to 288M in 2040. Typical treatment involves regular injections into the eye, which is associated with significant patient discomfort and potentially serious side effects, including bleeding, infection and retinal detachment. As such, there is an unmet clinical need for the development of new and improved drug delivery techniques to treat this and similar diseases of the posterior segment of the eye. This project aims to address this challenge through the development of drug-loaded eyedrops designed for targeted and controlled release of therapeutics for AMD and other posterior segment disease treatment. Novel polymer drug delivery platforms incorporating penetration enhancing agents (PEA) will greatly improve patient comfort and outcomes by negating or reducing the need for ocular injections. Research and experimental work will involve the synthesis, characterization and evaluation of novel polymers incorporating the drug-PEA complexes, that are capable of delivering pharmacologically relevant titres of neuroprotective drugs as dictated by the clinical need. The project is transdisciplinary in nature,

incorporating chemical, biomedical, polymeric, industrial and clinical expertise, as well as being highly relevant to patients and industry.

The main phases of the research can be summarised as follows:

- Complete an advanced research training programme in nanotechnology and bioformulation methods for non-invasive drug delivery to the posterior chamber of the eye, together with receiving an enhanced understanding of the underpinning pathophysiology of retinal disease and learning techniques for drug evaluation focussed on relevant in vitro and in vivo models of retinal damage
- To synthesise a small library of penetration enhancing agents (PEA)
- To evaluate the ability of synthesised PEA to transport therapeutically useful titres of neuroprotective drugs through biological barriers to the retina.
- To assess the capability of eye drops of PEA containing neuroprotective drugs to deliver therapeutic levels of these drugs in a rat/mouse models of ocular injury/disease and to effect similar therapeutic effects to injected doses

Standard duties and responsibilities of the ESR

For the 36 months of employment contract the ESR will be required to work exclusively on the MSCA programme.

- **In all cases, all duties and responsibilities will be clearly outlined in the researchers Personal Career Development Plan, as determined in the early stages of the project between the ESR and their supervisory committee.**

Person specification

Qualifications

Essential

Applicants should hold or expect to attain, as a minimum a 2:1 Honours degree, or equivalent, in Biomedical Science, Neuroscience, Polymer Chemistry, Biochemistry, or related area.

Knowledge & Experience

Essential

- Research project carried out in one of the above disciplines
- A demonstrated knowledge of at least three of the following: cell culture/molecular biology, in vivo disease models, pharmaceutical formulation development, drug delivery, polymerisation techniques

Desirable

Work placement undertaken in an industry related to the above disciplines

Skills & Competencies

Essential

- Applicants whose first language is not English must submit evidence of competency in English, please see <https://www.birmingham.ac.uk/postgraduate/pgt/requirements-pgt/international/index.aspx> for details.
- Evidence of interest, aptitude and research experience in the above disciplines

Further information

For any informal queries, please contact Professor Ann Logan on +44 (0)121 414 8854 or by email on a.logan@bham.ac.uk

For queries relating to the application process please contact Dr Laurence Fitzhenry at orbital@wit.ie or by telephone at +353 (0)51 302624.

Website: www.orbital-itn.eu

The Institute may decide to interview only those applicants who appear from the information available, to be the most suitable, in terms of experience, qualifications and other requirements of the position.



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