ESR Project Information Sheet

Project title	Design and formulation of nanomicelles for the treatment of diabetic eye diseases
Reference number	ORBITAL_ESR_2019_Project 7
Host Institution/University	Universidade de Santiago de Compostela
Host Company	
Academic institute of registration	
Supervisor(s)	C. Alvarez-Lorenzo (Supervisor); A. Concheiro, T. Loftsson, A. Chauhan (Academic co-supervisor); A. Gonzales Paredes (Non-academic supervisor)
Research Group	R+D in Drug Dosage Forms and Drug Delivery Systems, USC
Department / School	Department of Pharmacology, Pharmacy and Pharmaceutical Technology, School of Pharmacy
Duration	36-month employment contract provided and ESR enrolled on 4-year structured PhD. ESR will be required to self-fund after the initial 36 months
Status: Full-time / part-time	Full time
Funding information	Funding agency: H2020-MSCA-ITN-2018
Early Stage Researcher Allowances:	Living allowance: €37,434 p/a + mobility allowance of €7,200 p/a + family allowance where applicable (**all values before tax and social security payments**) Fees: Enrolment in the USC PhD Program
Closing date and time	5 p.m. (CET) Tuesday 26th November, 2019
Commencement date	Immediate start

Post summary

Diabetes is a highly prevalent disease that affects nearly 10% world population and is characterized by severe acute and chronic complications. Affectation of ocular structures may lead to retinopathy, papilopathy, glaucoma, cataracts and corneal damage, with an increased risk of loss of vision. Current pharmacological strategies involve prevention of sorbitol accumulation, vascular proliferation and inflammatory conditions, and delivery of growth factors for healing. Most treatments for diabetic eye conditions rely on systemic (oral) or intravitreal administration, and there is still a demand of efficient ocular dosage forms that can be administered in a comfortable way for the patient. Recently, nanomicelles (<100 nm) have been pointed out as advantageous delivery systems for both anterior and posterior segment ocular drug delivery, being able to prolong the permanence of the formulation in the cornea and overcome a variety of barriers. The aim of this Thesis project is to develop nanomicelles that can be topically administered and can deliver active substances to the posterior eye segment, mainly for the prevention or treatment of deleterious effects due to sorbitol accumulation, vascular proliferation and inflammatory conditions.

This project aims to address this challenge through the design of nanomicelles that can be topically administered and can deliver active substances to the posterior eye segment, mainly for the prevention or treatment of deleterious effects caused by diabetes. Research and experimental work will involve the development of strategies for triggering the self-assembly of amphiphilic copolymers and drug loading that are compatible with ocular administration, the characterization of the drug-loaded nanomicelles and their capability to accumulate into the cornea and diffuse to inner eye structures, strategies for the optimization of the formulations, scale-up and in vivo assessment in animal models.

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

- Selection of copolymers and drug candidates. Development of strategies for triggering the self-assembly of amphiphilic copolymers and drug loading that are compatible with ocular administration. The formulation will be progressively optimized. Encapsulation of the drug candidate, and physical stability of the drug-loaded nanomicelles against dilution and sterilization will be tested.
- Assessment of ocular safety, capability to accumulate into the cornea and diffuse to inner eye structures. The assays will be carried out according to the EU Reference Laboratory for Alternatives to Animal Testing (EURL ECVAM) and the US Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM).
- Strategies for the optimization of the formulations, scale-up and in vivo assessment in animal models will be implemented.

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 of 7/10, or equivalent, in Chemistry subjects, Biomedical Science, Materials Science or related area.

Knowledge & Experience

Essential

- Research project carried out in one of the above disciplines
- A demonstrated knowledge of at least two of the following: pharmaceutical formulation development, drug delivery, cell culture/molecular biology, nanotechnology, polymerisation techniques
- Excellent communication and organisation skills
- Willingness and ability to work in a multi-disciplinary team and multicultural environment

Desirable

- Participation/attendance to international meetings/workshops

Skills & Competencies

Essential

- Applicants whose first language is not English must submit evidence of competency in English, preferably B2 level or equivalent.
- Evidence of interest, aptitude and research experience in the above disciplines

Further information

For any informal queries, please contact Prof. Carmen Alvarez-Lorenzo at carmen.alvarez.lorenzo@usc.es

For queries relating to the application and admission 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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