



Waterford Institute of Technology  
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

## ESR Project Information Sheet

<b>Project title</b>	Topical formulation for Posterior Eye Drug delivery
<b>Reference number</b>	ORBITAL_ESR_2019_Project 9
<b>Host Institution/University</b>	Waterford Institute of Technology, Ireland (WIT)
<b>Supervisor(s)</b>	Dr Peter McLoughlin, WIT (lead supervisor) Dr Gautam Behl, WIT Dr Niall O'Reilly, WIT Dr Laurence Fitzhenry, WIT Dr Thakur R.R. Singh, Queens University Belfast Prof. Ann Logan, University of Birmingham Dr Ana Gonzalez Paredes, Nanovector srl
<b>Research Group</b>	Ocular Therapeutics Research Group (OTRG), PMBRC
<b>Department / School</b>	Department of Science, School of Science and Computing
<b>Duration</b>	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
<b>Status: Full-time / part-time</b>	Full time
<b>Funding information</b>	Funding agency: H2020-MSCA-ITN-2018
<b>Early Stage Researcher Allowances:</b>	Living allowance: €45,361 p/a + mobility allowance of €7,200 p/a + family allowance where applicable ( <b>all values before tax and social security payments</b> ) Fees: € 4,500 - 6,500 (paid from funding for 36 months)
<b>Closing date and time</b>	5 p.m. (CET) Tuesday 26 <sup>th</sup> November, 2019
<b>Commencement date</b>	Immediate start

### 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 topical formulations using liposomes functionalised with cell-penetrating peptides (CPPs). Delivery platforms such as these could greatly improve patient comfort and outcomes by negating or reducing the need for ocular injections. Research and experimental work will involve the formulation of active ingredients (small molecules and biomolecules) into functionalised nanoparticles and the characterisation of these formulations using standard analytical and cell culture techniques. Pre-clinical studies will examine the extent of drug uptake and its impact on known disease biomarkers.

The project is transdisciplinary in nature, incorporating chemical, biomedical, 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:

- Formulation and characterisation of drug-encapsulating nanomaterials designed to act as a drug depot for posterior segment ocular drug delivery.
  - Innovative nanomaterials will be formulated to encapsulate the specific model drug compounds.
  - Functionalisation of the nanoparticles with cell penetrating peptides to enhance bioavailability.
  - The resultant formulations will be fully characterised and biological evaluation of these nanomaterials will be carried out on ocular cell lines and cytotoxicity evaluation will be fully determined.
- Pre-clinical studies will examine the extent of drug absorption and its impact on certain disease biomarkers.

## **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 Chemistry, Materials Science, Analytical Chemistry, Organic Chemistry, Biomedical Science, Polymer Chemistry 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: pharmaceutical formulation development, drug delivery, cell culture/molecular biology, nanotechnology, 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 [WIT's English Language Requirements](#) for details.
- Evidence of interest, aptitude and research experience in the above disciplines

## **Further information**

For any informal queries, please contact Dr. Peter McLoughlin at [pmcloughlin@wit.ie](mailto:pmcloughlin@wit.ie) or Dr. Gautam Behl at [gbehl@wit.ie](mailto:gbehl@wit.ie)

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

Website: [www.orbital-itn.eu](http://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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