JOB VACANCY: Novel Antibacterial Natural Polymers (HyMedPoly ESR 5)

The HyMedPoly project, “Drug-Free Antibacterial Hybrid Biopolymers for Medical Applications”, has received funding from the European Union’s Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie grant agreement No *643050* for European Industrial Doctorate.

A **3 year PhD position** is available at the **University of Westminster, London, UK**

Please submit your application as detailed below through the project website:
http://hymedpoly.eu/open-positions/

Deadline for application: 15th July 2015

Job Description:
The recruited candidate will pursue research work on the development of novel antibacterial natural polymers produced using bacterial fermentation technology, for use in a range of biomedical applications including soft and hard tissue engineering, wound healing, drug delivery and medical device development. With declining antibiotic efficiency and development of “super bugs”, combined with an ageing population, there is a huge demand for new advanced therapies including development of antibacterial materials. Most current antibacterial materials contain drugs or active factors which then induce the development of antibiotic resistant bacteria. In this project we will aim to develop natural polymers with inherent antibacterial properties, modify and functionalize these polymers in order to allow their use in a range of different applications.

This project will include the development of a family of Polyhydroxyalkanoates (PHAs) with antibacterial properties. PHAs are water-insoluble storage polymers which are polyesters of 3-, 4-, 5- and 6-hydroxyalkanoic acids, produced by a variety of bacterial species, under nutrient-limiting conditions. They are biodegradable and biocompatible, exhibit thermoplastic properties and can be produced from renewable carbon sources. Hence, there has been considerable interest in the commercial exploitation of PHAs. A relatively new class of PHAs are the polythioester derivatives of PHAs including monomers such as 3-mercaptopropionate (3MP), 3-mercaptobutyrate (3MB) or 3-mercaptovalerate (3MV), in addition to 3-hydroxybutyrate (3HB). These sulphur containing polymers are known to have intrinsic antibacterial properties.

The candidate will start with the production of the thioester derivatives of PHAs using *Cupriavidus necator* (*Ralstonia eutropha*), a wide range of sulphur containing carbon sources and optimize fermentation conditions leading to good yields of the polythioesters. In addition to the polythioesters, other PHAs will also be produced using a range of other bacteria and carbon sources. The PHAs produced will be purified using novel supercritical carbon dioxide based green technology (to be developed in Vornia Ltd.), in order to avoid large scale usage of solvents. The polymers

produced will be suitably functionalized and thoroughly characterized with respect to chemical, thermal and antibacterial properties. Processing of the polymers including 3D printing will be explored. The ESR will spend 18 months of the project in the University of Westminister, UK and the remaining 18 months in Vornia Ltd, Ireland. The project should output some novel scientific contribution along with the development of intellectual property.

During the 3 years project period, the recruited PhD candidate will be enrolled by the Faculty of Science and Technology, Department of Life Sciences, University of Westminster, UK and will work within the Biomaterials section of the Applied Biotechnology Research Group led by Dr Ipsita Roy (http://www.westminster.ac.uk/about-us/our-people/directory/roy-ipsita), an internationally leading group in bacteria derived biopolymers. Experimental work will be carried out both at the University of Westminster (London, UK, Academic host) and Vornia Limited (Galway, Ireland, Industrial Host).

Additional Information about HyMedPoly:

Infection has become one of the toughest problems in the medical world. As bacteria become more resistant to drugs, there are fewer effective antibiotics to fight against pathogens.

HyMedPoly aims to develop new therapies based on biomedical polymers and inorganic materials. 10 universities and companies from across Europe are creating a cohort of 15 European Industrial Doctorates to synthesise new biopolymers with added antibacterial functionality and develop functionalized bioactive ceramics and glasses that can act as active agents to kill bacteria and prevent their growth.

The new material systems from HyMedPoly are aimed at applications such as wound care, implants and bio film prevention.

Requirements:

We seek a person with strong motivation and the ability to define his/her own research questions. The applicant must hold a Master's degree in Biochemical Engineering, Biotechnology, Fermentation Technology, Microbial Biotechnology or a related Master of Science degree and good written and oral communication skills in English. Industrial experience in the areas of biochemical engineering and microbial biotechnology is also relevant. Applicants shall, at the time of recruitment, be in the first four years (full-time equivalent research experience) of their research careers and not yet have been awarded a doctoral degree. Full-Time Equivalent Research Experience is measured from the date when a researcher obtained the degree which would formally entitle him/her to embark on a doctorate. In addition, at the time of recruitment, applicants must not have resided or carried out their main activity (work, studies, etc.) in the UK for more than 12 months in the 3 years immediately prior to the recruitment date. Compulsory national service and/or short stays such as holidays are not taken into account.

Important characteristics of the new European Industrial Doctorate programme are:

- you will be jointly supervised by academia and industry supervisors

- you are required to spend 50% of the time in your registered university in the United Kingdom (University of Westminster- www.westminster.ac.uk) and 50% time with the industrial research organization, Vornia (www.vornia.com) in Galway, Ireland.

Personal Qualities:

- Excellent collaborative and teamwork skills
- Strong dedication and self-motivation
- Certificate of English language knowledge.

IELTS with a minimum score of 6.5 and no lower than 6.0 in any individual component is required for all candidates for whom English is not their first/native language.

The application for admission can be submitted even if the above certificate has not yet been obtained, but applicants shall obtain it before the deadline for enrolment expires. In this event, the admission to selection procedures will be subject to the obtainment of the above certificate; the failure to submit the said certificate during enrolment shall entail the loss of the right to enroll.

We offer:

- Competitive salary in a 3 year full time position (3740 €/month)
- Mobility and family allowance (600 or 1100 €/month depending on the researcher's family situation)
- High working capacity
- An excellent and intersectorial training environment at the academic host University of Westminster, London, UK and industrial host Vornia Limited (Galway, Ireland)

UNIVERSITY OF WESTMINSTER

The University of Westminster's most strategic mission is to create a high quality academic environment where researchers and students from all over the world can study, work and collaborate on innovative and challenging projects. At the University of Westminster we pride ourselves on our record of excellence in research that makes a difference – to academia, to the professions, to business, to industry. We have a rich and diverse profile of activity across a broad range of subjects and as highly as we value pure academic research, we are equally committed to ensuring that our knowledge delivers real-world benefits, through knowledge transfer and applied research. (www.westminster.ac.uk)

VORNIA BIOMATERIALS

Vornia's strategic mission is to develop high quality industrial environment delivering commercially viable products for the medical devices supply chain/market place. Vornia designs, develops and fabricates customized biomaterial solutions for medical device manufacturers and providers who need to add differentiation to their products in the marketplace. Vornia are an equal opportunities organization and as such collaborate with groups all over the world

including a number of European partners. Vornia are committed to providing a challenging environment for development of high quality commercially relevant research skills. (www.vornia.com)

Evaluation and Application:

Competences of applicants will be assessed on the basis of the evaluation of their educational and research background, according to the following requirements:

Required Research Experiences:

Main Research Field: Biochemical Engineering

Sub Research Field: Microbiology/ Biotechnology/Biopolymers/Biomaterials

Additional Requirements

- Hands-on experience in microbial fermentation and optimization of product yield

The Application must include:

- Application letter detailing the reasons for applying
- CV (summarizing education, positions and academic work - scientific publications and any other relevant experience)
- A 1-page Personal Statement outlining your research interests, research experience, academic achievements and career ambitions.
- Copies of educational certificates and transcript of records
- Details of internationally recognized language qualifications achieved
- List of publications and academic work that the applicant wishes to be considered by the evaluation committee
- Names and contact details of 2-3 references (name, relation to candidate, e-mail and telephone number). One or more letters of reference may be included