OXFORD INTERDISCIPLINARY BIOSCIENCE
Doctoral Training Partnership

Industrial CASE Studentship Advertisement – 2021-22

Supervisor(s) names:	Prof. Mark Howarth Dr. Mike Bedford
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Project Title:	Synthetic biology engineering of ultra-stable proteins to promote gastrointestinal immunity

Brief description of project:

Control of the immune system by injected recombinant proteins has led to great breakthroughs, from checkpoint inhibitors in cancer therapy to subunit vaccines for infectious disease. However, the hostile environment of the gastrointestinal (GI) tract, including extreme pH and high concentration of proteases, has prevented the general use of targeted protein therapeutics there. Using synthetic biology approaches, we have engineered ultra-stable proteins which can tolerate these challenging conditions. In this project we will develop this new platform, optimising affinity, specificity and pharmacology (including the protein's distribution through the GI tract and general circulation). We will apply these novel targeting tools to counteract pathogens which downregulate host immunity in the GI tract. Establishing such a robust targeting platform should have broad applications for disease diagnosis and maintaining GI health against infectious or autoimmune challenges.

Skills training will be provided in molecular biology, protein engineering and design, genetic selection and screens including phage display, mass spectrometry, microscopy, and bioinformatics. According to the development of the project there may also be the chance to learn structure determination by X-ray crystallography.

The major part of the studentship will be carried out in Oxford University Department of Biochemistry. For the industrial placement (of no less than 12 weeks duration), the student will be trained and supported by Dr. Mike Bedford at AB Vista at their headquarters in Marlborough, UK. At this site there are team members with a range of expertise, including on the industrial use of proteins for GI health, microbiome analysis, and business-related training. The headquarters in Marlborough is supported by field sites locally and at other sites in the UK for testing of GI health. According to the needs of the project, the student may also be given the opportunity to work at AB Enzymes in Rajamäki Finland or Darmstadt Germany, a partner company of AB Vista, and one of the world's largest recombinant protein manufacturers with both R&D and manufacturing operations.

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Attributes of suitable applicants:

Candidates should have or shortly be about to complete an honours degree in the biological or biomedical sciences (biochemistry, biology, pharmacology etc.) with a predicted or achieved grade of 2.1 or above, a Master's degree, or substantive relevant work experience.

Funding notes:

This project is funded for four years by the Biotechnology and Biological Sciences Research Council UKRI-BBSRC. UKRI-BBSRC eligibility criteria apply (https://www.ukri.org/files/funding/ukri-training-grant-terms-and-conditions-guidance-pdf/). Successful students will receive a stipend of no less than the standard UKRI stipend rate, currently set at £15,285 per year, which will be supplemented by a further £5,000 per year from AB Vista.

This project is supported through the Oxford Interdisciplinary Bioscience Doctoral Training Partnership (DTP) studentship programme. The student recruited to this project will join a cohort of students enrolled in the DTP's interdisciplinary training programme, and will participate in the training and networking opportunities available through the DTP. For further details, please visit www.biodtp.ox.ac.uk. The DTP and its associated partner organisations aim to create a community that is innovative, inclusive and collaborative, in which everyone feels valued, respected, and supported, and we encourage applications from a diverse range of qualified applicants.