Development of a platform for tracking the stability of advanced BioTherapeutics

Supervisory team:
Lead supervisors: Dr Christopher Pudney (University of Bath), Prof Steve Conlan (Swansea University)
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Collaborators: Dr John O'Hara (UCB), Dr Phillip Brown (BLOC Laboratories Ltd), Dr Heiko Haschke (Bruker Nano), Dr Randolph Coertling (Reneuron)

Host institutions: University of Bath, Swansea University

Submit applications for this project to the University of Bath

Project description:

The project involves developing a new platform for detecting the stability of biopharmaceuticals. Biopharmaceuticals are some of the most successful drugs in the world. This success has largely been built on the use of monoclonal antibodies. More recently new developments in antibody drug conjugates have led to six+ new regulatory approvals and Exosomes (Exo), and Exosome Mimetics (self-assembled filter-fractionated nano-cellular products (ExoM)) are poised to deliver the next wave of major advances.

One of the major challenges in developing biopharamceuticals is their stability. Compared to small molecule drugs, biopharmaceuticals can suffer major stability issues and these can often prevent a promising candidate from being a usable drug.

We have developed novel approaches to detecting antibody stability (Knight et al. 2020. Biochem. J. In Press, BCJ20200580) and we now wish to explore applying this approach to more advanced biopharmaceuticals including ADCs and Exo(M)s. This platform would be a step change in how stability of biopharmaceuticals are assessed with direct and immediate industrial relevance and interest.

The student will apply a range of biophysical approaches including fluorescence spectroscopy, atomic force microscopy and nanovesicle flow cytometry. This data will then allow the student to develop and apply physical models to understand the data. The student will therefore gain a detailed education in advanced biophysics and biochemistry with direct industrial biopharma relevance. The project has been designed to be flexible, to suite changes in working patterns due to coronavirus and so we anticipate part of the project would not need to be lab based if the situation requires.

The supervisory team spans a range of disciplines from biopharmaceutical development, analytical biochemistry and biophysics. The student will have the opportunity to experience the research environments in both Bath and Swansea, leveraging the unique resources of both environments.

We anticipate the student will have the opportunity to participate in national and international conference attendance as well as be involved with industrial partner interactions. Moreover, the project is very likely to generate new Intellectual Property, which we would actively seek to commercialise.