

**THE UNIVERSITY OF MANCHESTER****PARTICULARS OF APPOINTMENT****FACULTY OF LIFE SCIENCES****MOLECULAR SYSTEMS****RESEARCH ASSOCIATE IN NMR SPECTROSCOPY AND PROTEIN CHEMISTRY****Vacancy ref: LSX-08394**

**Salary:** £30,738 per annum

**Hours:** Full time

**Duration:** Fixed term, from 01/10/2016 until 30/09/2017

**Location:** Oxford Road, Manchester

**Responsible to:** Alexander Golovanov

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**Enquiries about the vacancy, shortlisting and interviews:**

Dr Alexander Golovanov

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**PROJECT DESCRIPTION**

The protein-based biopharmaceuticals (such as monoclonal antibodies, mAbs) are often hailed as “drugs of the future” and are developed to treat wide range of diseases. They also constitute the fastest growing part of the drugs market. For some biotherapeutics, such as antibodies, highly concentrated protein solutions are required to meet patient dose requirements. Our exciting new project is focused on understanding the solution behaviour of concentrated monoclonal antibodies. The study will involve use of NMR spectroscopy ( $^1\text{H}$  and  $^{19}\text{F}$ ) and protein labelling for characterizing protein solutions and mixtures thereof. The methods will be developed and tested by labelling individual protein components with tags (eg containing  $^{19}\text{F}$ ) and tracking them in solution by NMR, characterizing their relaxation rate and translational diffusion properties. The effects of formulation additives will be examined. A key outcome of the work will be multi-component formulations that can access ultra-high protein concentrations while minimizing high viscosities and particle formation. You will have a PhD in NMR spectroscopy, biochemistry and/or biophysics, or in a related discipline. Experience is required in protein NMR spectroscopy and basic protein chemistry (protein purification, concentration and labelling, e.g. with paramagnetic or fluorine labels).

## **BACKGROUND INFORMATION (Faculty / section / research group)**

The project is funded by MedImmune, the global biologics research and development arm of AstraZeneca, and is part of a collaborative initiative with the Centre of Excellence in Biopharmaceuticals (COEBP, <http://www.coebp.ls.manchester.ac.uk>) in the University of Manchester. The research project will be largely based in the Manchester Institute of Biotechnology (MIB), supervised by Dr Alexander Golovanov (Faculty of Science and Engineering, School of Chemistry) and Prof Jeremy Derrick (Faculty of Biology, Medicine and Health), with placements (up to 25% FTE) at MedImmune's R&D site in Cambridge, UK. The NMR Facility in the MIB is equipped with 800, 600 and 500 MHz Bruker spectrometers, with cryoprobes, including a QCI HFCN (QCI-F) quadruple resonance probe on 5-channel 500 MHz spectrometer. The Formulation Laboratories at MedImmune, Cambridge, house all instrumentation and facilities necessary for a modern, large biopharmaceutical company. The successful applicant will also gain from interactions with the cross-Faculty community of staff (PDRAs, technicians) and PhD students working on varied aspects of biopharmaceutical research at the University of Manchester.

## **OVERALL PURPOSE**

The principal purpose of the job will be to work with Alexander Golovanov and Jeremy Derrick to characterize concentrated solutions of protein combinations by using post-translational labelling (using protein chemistry) and NMR spectroscopy, developing and testing different protocols and NMR experiments, and assessing different formulations.

## **KEY RESPONSIBILITIES**

- Develop/use/test protocols for attaching covalent labels to mAbs and model proteins.
- Use solution NMR to record fingerprint spectra of covalently-labelled proteins.
- Use solution NMR to measure protein translational diffusion coefficients (using DOSY) and relaxation rates.
- Developing and setting up NMR –based protocols for characterising combination samples.
- Develop non-covalent labels for characterizing protein solutions by NMR.
- Testing different formulations for combination samples.
- Report the results of research in the form of reports, research papers and conference presentations, as required.

The nature of the project research means that you may need to spend significant periods of time working at MedImmune. The timing of this will be defined as research progresses but additional funding is included within the grant to support the period(s) of time based at MedImmune sites.

The Faculty of Medical and Human Sciences/Life Sciences will form part of a newly created Faculty of Biology, Medicine and Health from 1st August 2016. This post will transfer to the new structure on that date and details of the where the post sits within the new structure will be provided to successful candidates in their letter of appointment.

## **PERSON SPECIFICATION**

### **Essential**

- First degree (or equivalent) in Biochemistry, Biophysics, Chemistry, or a related subject.
- PhD (or equivalent) in NMR Spectroscopy, Biochemistry, Biophysics, or related discipline.
- Experience in protein NMR spectroscopy.
- Experience in protein biophysical characterization methods, protein purification and protein chemistry.
- Motivation and ability to work independently and provide strong input to the project.
- Good verbal and written communication skills.
- Evidence of an ability to maintain appropriate records of experimental procedures and data.
- Demonstration of an awareness of the importance of Health and Safety in the workplace.
- Able to work as part of a diverse research team.
- High degree of motivation for a research career.

### **Desirable**

- A publication record in reputable journals.
- Experience with covalent modification of proteins and labelling them, e.g. via Cys or Lys residues.
- Experience with  $^{19}\text{F}$  NMR spectroscopy.
- Experience with DOSY NMR.
- Experience with characterizing weak protein-protein interactions by biophysical techniques, eg by static and/or dynamic light scattering, analytical ultracentrifugation, etc.
- Experience carrying out biophysical characterization of antibody molecules.
- Experience with modelling/calculating protein solution properties.