Project proposal template – Faculty studentships Summer 2014

Project title	The covalent attachment of bio-compatible polymers to proteins to improve their pharmaceutical	*Director of Study*	John Fletcher
Second Supervisor	Alex Sinclair	*School*	Pharmacy and Chem
Other members of supervisory team	Gianpiero Calabrese	*Any requirements from applicant (eg degree in specific subject area)*	

Project summary

(max 1,000 characters)

Protein PEGylation, the covalent attachment of polyethylene glycol (PEG) to a protein is often used to increase the circulatory half-life by increasing the protein's hydrodynamic size whilst reducing immunogenicity and antigenicity. Protein PEGylation often results reduced toxicity and dosing frequency, and is cost effective and cost saving.

Proteins are often formulated as lyophilised powders for reconstitution rather than solutions to maximise their stability. Unfortunately PEG has a low glass transition temperature which leads to an increased amount of molecular motion in the dried state. This can result in a loss of protein activity during lyophilisation of PEGylated proteins.

The aim of this PhD project will be to develop methods to circumvent this problem by covalently attaching common pharmaceutical proteins such as G-CSF or interleukin, to a range of bio-compatible polymers through click chemistry and subsequent screening for improved drug delivery properties.