

The School of Pharmacy and Pharmaceutical Sciences

Seminar Series 2009/10

'Exploiting synthetic polymers for pharmaceutical applications'

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Professor Cameron Alexander, School of Pharmacy, University of Nottingham

Abstract

Synthetic polymers are of interest in a variety of biomedical applications, including therapeutic delivery, drug targeting, tissue engineering and cell culture/processing. New materials are needed with 'bio-like' behaviour, such as a response to a stimulus or local environment, but without the disadvantages of biological systems such as poor processability or potential for immune response. Importantly, these novel materials must possess 'smart' properties without incurring toxicological problems or environmental penalties. Successful generation of such active or 'smart' synthetic polymers will mark a 'step-change' in therapeutic delivery technologies and biomedical materials.

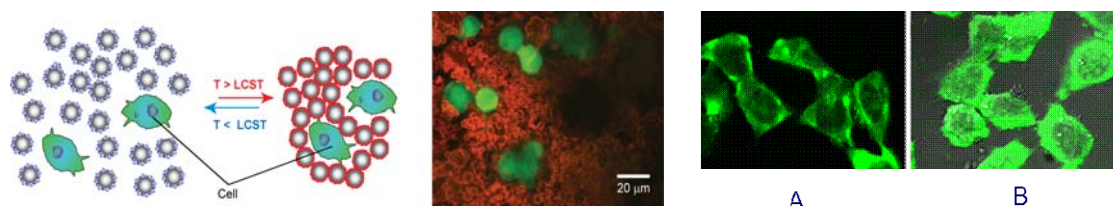


Figure 1: Left hand side – Schematics of responsive polymers in cell delivery applications. Right-hand side shows delivery of DNA (labelled green) via thermoresponsive polymers to mouse muscle C2C12 cells after 1 and 3 hrs (A-b) respectively

We are investigating the use of stimuli-responsive polymers for biomedical applications in 3 major areas:

- Drug, gene and cell delivery¹⁻⁵
- Polymer-biopolymer conjugates and control of enzyme function^{6,7}
- Mediation of cell- cell communication and cell-surface interactions^{8,9}

Currently, we are preparing stimuli-responsive materials by a range of polymerisation techniques and evaluating the behaviour of these materials in biological and pharmaceutical applications. At the seminar our latest data from these areas will be presented.

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