Stimuli Responsive Polymers for Enhanced Drug Release Applications

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***Abstract*—This talk will focus on the development of polymeric nano-structured systems for drug and gene delivery applications. Two major classes of polymer systems will be considered; namely poly(ethylene-oxide-b-propylene-oxide-b-ethylene-oxide) (Pluronics) tri-block copolymers (FDA approved) and methacrylic acid (MAA) block and random copolymers. These polymers were functionalised with biodegradable or stimuli-sensitive functional groups to produce stimuli-sensitive nano-structure for efficient delivery of drugs and DNAs.**

The atom transfer radical polymerisation (ATRP) was adopted to synthesize a range of mono-dispersed block copolymers (e.g. PEO-b-MAA, MMA-b-MAA). Ring opening polymerization method was used to functionalize Pulronics with degradable functional groups, such as lactide (LA), and caprolactone (CL). Other stimuli-sensitive functional groups such as methacrylic acid was used to impart pH sensitivity to the polymers. Various types of methacrylic acid block and random cross-linked copolymers and other novel systems, such as fullerene based block copolymers were synthesized. Detailed mechanism and physics that control the micellization, microstructure and drug/polymer interactions will be discussed.

[Full Text Not Available]