BIOENGINEERING SEMINAR

“Targeted Nanomedicines for the Resolution of Inflammation”

Tuesday – March 4, 2014 – 02:30 p.m.
EPFL – room SV1717a

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host: Prof. M. Swartz

Abstract

Inflammation is an essential biological response that is required for tissue homeostasis after injury or infection. Chronic inflammation however is destructive, can lead to tissue damage, and is a hallmark of many diseases such as arthritis, cardiovascular disease, and cancer. New potential therapeutic targets in addressing diseases associated with unresolved inflammation and their underlying mechanisms are now being investigated and understood, making therapeutics which dampen inflammation and enhance resolution of considerable interest - in particular those which can achieve this in a controlled manner with minimal host collateral damage.

Nanomedicine encompasses a multidisciplinary approach to drug delivery and has been driven in large part by discoveries in nanomaterials design and engineering, which have enabled the accomplishment of the following milestones: 1) development of biodegradable nanocarriers for the delivery of molecules of various sizes and solubilities, in sufficient loading amounts for therapeutic efficacy, 2) selective accumulation of therapeutics at disease sites and improved drug pharmacokinetic, biodistribution and degradation profiles due to careful optimization and engineering of nanoparticle biophysicochemical properties, 3) the ability to target any disease at the organ, tissue, cellular and sub-cellular levels, and 4) emerging clinical successes spanning a 40 year period.

This talk will present investigations into the development of targeted anti-inflammatory controlled-release polymeric nanomedicines for the treatment of inflammation driven diseases including atherosclerosis and colitis. The synthesis, nanoengineering, characterization and in vivo biological investigations of polymeric nanoparticles containing a payload of biologic drugs including a potent mediator biomimetic peptide and the anti-inflammatory cytokine IL-10 will be presented.

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