IBI SEMINAR

“Dynamic Nanomaterials for Drug Delivery and Diagnostics”

Wednesday – May 15, 2013 – 3:30 p.m.
EPFL – room SV 1717a

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host: Prof. M. Lutolf

Abstract

Our group develops stimuli-responsive nanomaterials that utilize dynamic structural and architectural transitions to enable new drug delivery and diagnostic functionalities. For drug delivery applications we are focused on opening the intracellular target universe to biologic drugs. Biologic drugs such as DNA, RNA and proteins have significant therapeutic potential, but effectively formulating and delivering them remains a widely recognized challenge. Barriers include drug stability, tissue penetration and transport, but cytoplasmic entry is a widespread barrier for those that function against intracellular disease targets. We have been developing synthetic polymeric carriers that mimic the highly efficient intracellular delivery systems found in pathogenic viruses and organisms. Another important aspect of these polymeric carriers is the development of controlled polymerization techniques to streamline bioconjugation of targeting agents and therapeutics, as well as to generate controlled carrier architectures. The carriers might open up new families of peptide, antibody or nucleic acid drug candidates that attack previously inaccessible intracellular targets. For diagnostic applications we are addressing the technology gap for making clinical assays faster and more sensitive, as well as the need for simple yet efficient sample handling techniques that concentrate dilute biomarkers for point-of-care (POC) tests. We have developed a new stimuli-responsive magnetic nanoparticle reagent system for achieving both of these goals. These new bioanalytical systems are being applied to clinical lab assays, lab card disposable devices and for non-instrumented lateral flow diagnostic platforms

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