COINS Seminar #21

"Polymer coatings for dynamic adjustment of specific and non-specific interactions for cell culture"

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日時：2016 年 10 月 25 日（火）15:00～16:00（受付開始　14:30）
会場：ナノ医療イノベーションセンター（iCONM）3 階　3001 号室
定員：30 名
申込：メール事前登録制「①氏名」「②ご所属機関名・部署」「③お役職」「④メールアドレス」を COINS 支援事務局宛にメールでお申込みください。
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—Abstract—

Tools providing in situ control of the formation of patterns on surfaces are highly in demand for sensors, cell biology, and tissue engineering, to orient cell migration, proliferation. These surfaces must initially be repellent to cells and proteins (stealthy), and become prone to cell adhesion, or specific binding upon non-toxic stimulation. Reaching this goal is however technically challenging, and needs usually to combine advanced microfabrication with surface chemistry. To make such patterning more versatile, we tailored copolymer chains that spontaneously bind from their water solutions onto most usual materials (e.g. petri dish, glass plates, etc…), form biocompatible dense hydrophilic brushes, and afford stimuli-triggered patterning. Conversion of the properties of patches was achieved by either exposing the surface to solutions of bioorthogonally reactive small molecules, or by temperature variation.

Poly(L-Lysine)-graft-poly(ethyleneglycol) copolymers (PLL-g-PEG) are cationic chains successfully used to coat, upon physisorption most anionic surfaces. In aqueous solutions, the resulting monolayer of PEG imparts the substrates with a high resistance to adsorption of proteins. Patterns were formed by burning this layer with deep UV, and subsequent (re)coating of the uncoated regions with another grafted PLL derivative. This approach allowed photopatterning at micrometer resolutions for advanced spatial control. Using PEG grafts that carried azido groups, we obtained reactive patterns surrounded by a non-reactive PEGylated surface. Attachment of molecules, or proteins was triggered on demand on the initially repellent azido-presenting pattern, by copper-free "click" addition with alcyne-attached fluorophores, biotin, or peptides. The reaction with RGD peptide was for instance implemented in the presence of cells floating above the surface, thereby triggering with high temporal resolution cell adhesion, or migration. To allow a dynamic on/off control of the interactions with the patterns, we used alternatively PLL carrying temperature-responsive grafts that undergo a transition from well-hydrated, protein-repellent state to hydrophobic state above 32°C. These PLL-PNIPAM copolymers allowed us to thermo modulate cell adhesion.

*主催: JST　COI プログラム
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＜会場へのアクセス＞

住所：

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交通：

電車の方は　京急川崎駅から 京急大師線 「小島新田」下車 乗車時間約 10 分　 徒歩約１５分

バスの方は

「JR 川崎駅 東口ターミナル」

■20 番のりば

・川 02「殿町」行き乗車（臨港バス）乗車時間約 30 分「殿町」下車　徒歩約３分

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■16 番のりば

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