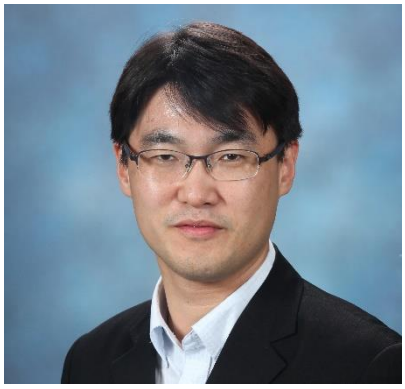
Frontier Chemistry Center
フロンティア化学教育研究センター

講演会

演 題：**Multiscale modulation of nanocrystalline cellulose hydrogel for 3D neuronal bilayer formation**



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日 時：2017 年 1 月 23 日（月）15:30~16:30

場 所：工学部材料・化学棟中会議室（MC102）

主 催：高分子化学研究室

共 催：高分子学会北海道支部

要 旨：

Bacteria-driven biopolymers have drawn much attention due to their unconventional 3-dimensional structures and interesting functions, which are closely correlated with bacterial physiology. Herein, we report the non-genetic modulation of bacterial cellulose (BC) synthesis by *Acetobacter xylinum* and its application to the layered neuronal tissue emulation. The controlled dispersion of graphene oxide (GO) nanoflakes into culture media not only intervenes the molecular interaction within a cellulose crystalline nanofibril but also modulate the collective association of bacterial bodies, leading to the cellulose nanofibrillar hydrogel with reduced Young's modulus (~50%) and flattened surface profiles. Furthermore, the real-time investigation of 3D neuronal networks constructed in this GO-incorporated BC hydrogel with broken chiral nematic orderness revealed the vertical locomotion of growth cones, the accelerated neurite outgrowth (~100 μm/day) with reduced backward travel length (~6 μm at Day 1), and the efficient formation of synaptic connectivity with distinct axonal bifurcation points. In comparison to the pristine BC, GO-BC supports the formation of well-defined neuronal bilayer networks with flattened surface profiles and vertical axonal outgrowth, which can emulate the in vivo neuronal development. We envision that our findings may contribute to various applications of non-genetically engineered BC hydrogel materials to fundamental neurobiology studies, neural engineering, etc.

本講演は、大学院総合化学院『化学研究先端講義（修士課程選択科目）／総合化学特別研究第二（博士後期課程選択科目）』の一部として認定されています。

連絡先：工学研究院応用化学部門　佐藤　敏文（内線：6602）

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