

応化分子教室セミナー 未来化学創造センターセミナー

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Marine-derived Bio-silicification Design and application of silica-forming proteins and peptides

Dr. Seung Pil Pack

Professor & Department Chair
Department of Biotechnology and Bioinformatics, Korea University
Principle Investigator, Nano and Artificial Biotechnology Laboratory (NABL),
Adjunct Professor, Korea University Medical Center & Medical School,
Director, Institute of Science and Technology, Korea University

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Silica with nontoxic and highly biocompatible characteristics can be applied for tissue scaffolds, drug-delivery system, biosensors and imaging. For silica synthesis, conventional methods typically require a combination of high temperatures and extreme pH and also it is difficult to prepare controlled structures. However, the discovery of the critical molecules involved in biosilicification found both in diatoms (silaffins and polyamines) and sponges (silicateins) brings out understandings about silica forming process in vivo and has presented a new paradigm for silica synthesis under ambient or mild conditions. Here, we reported new silica-forming peptides (SFP), named EctP1 and EctP2. They were also genetically fused to the N- or C-terminus of other protein. SFP-fused proteins showed silicification ability. In addition, silicified SFP-fused protein exhibited an organic-inorganic complex form. These results indicate that the SFP fusion system is a novel tool for immobilizing biomolecules on silica material for biological and industrial applications.

CONTACT: 神谷 典穂
九州大学 大学院工学研究院 応用化学部門 & 未来化学創造センター
Phone: 092-802-2807
E-mail: nori_kamiya@mail.cstm.kyushu-u.ac.jp