令和7年度奨励会外国人研究者講演会

学術変革Bスケール横断分析セミナー

第 85 回「工学とバイオ」セミナー/ MMCもしかする未来の化学

Molecularly Imprinted Polymers: Synthetic Antibodies for Medical Diagnostics and Therapy

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Place: IIS, An404

Abstract :

Molecularly imprinted polymers (MIPs) [1] are synthetic antibodies that specifically recognize molecular targets. They are cross-linked polymers synthesized in the presence of a molecular template, which induces three-dimensional binding sites in the polymer that are complementary to the template in size, shape and chemical functionality. MIPs against proteins are obtained through a rational approach starting with in silico epitope design. Chemically synthesized peptide epitopes can then be used as templates in a solid-phase protocol for MIP synthesis [2,3]. We demonstrate the potential of MIP nanogels (~50 nm) for medical diagnostics [3], bioimaging [4] and medical therapy [4,5], on the example of cell surface protein targets [4], as well as soluble cytokines and biomarkers [3,5]. We will also demonstrate the study of these synthetic antibody mimics using single-molecule methods.

学術変革領域研究(B)
スケール横断分析
Cross-scale Analysis

CREMeB
Center for Research on Engineering in Medicine and Biology

References :
[1] Chem. Rev. 2020
[2] Small 2023
[3] Angew.Chem.Int.Ed.2021
[4] Angew.Chem.Int.Ed.2020
[5] Angew.Chem.Int.Ed.2023

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