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Ultra-sensitive capillary electrophoresis for single cell analysis

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Recently, single-cell analysis is becoming more and more important to understand cell-to-cell heterogeneity in the complicated life system. Although large molecules within the single cell can easily be visualized via immune-histochemical staining, simultaneous analysis of numerous compounds still remains one of the most challenging issues. Among several analytical techniques, Capillary Electrophoresis (CE) coupled to Laser-Induced Fluorescence (LIF) or Mass Spectrometer (MS) is an effective method due to its high separation efficiency, low sample requirements, and high detectability. In this presentation, ultra-sensitive CE-LIF/MS system is introduced that uses online sample pre-concentration techniques like Large-Volume Sample Stacking (LVSS) for the single cell analysis. So far, pM detectability has been achieved in the analysis of biogenic compounds such as amino acids and oligosaccharides. Successful demonstration of LVSS-CE-LIF chiral analysis of a single cell will finally be introduced.

Biography

Takayuki Kawai received MSc and PhD in School of Engineering, Kyoto University, for his research on highly sensitive micro-scale electrophoresis. He then became a Postdoc in AIST and University of Illinois to study micro-fluidics and capillary electrophoresis for high-performance bio-analytical chemistry. In 2014, he was promoted to Research Scientist in RIKEN where he started the current research on integrated single-cell analysis. He also has the position of a PRESTO Researcher in Japan Science and Technology Agency, which is awarded to very few outstanding young scientists in Japan. He has published 13 qualified papers to date.

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