北海道大学
大学院総合化学院
GRADUATE SCHOOL OF CHEMICAL SCIENCES AND ENGINEERING
HOKKAIDO UNIVERSITY

北海道大学 理学部
School of Science,
Hokkaido University

化学部門特別講演会

Advancing NMR Methods for the Study of Intrinsically Disordered Proteins

Nuclear magnetic resonance (NMR) spectroscopy is a powerful tool for investigating intrinsically disordered proteins (IDPs). In this seminar, I will first describe the combination of laser excitation with NMR to probe IDP conformations. This approach is currently being extended toward high-resolution transient absorption spectroscopy to deconvolute the specific contributions of quenching agents. This integrated method will provide quantitative insights into how cosolutes, including dyes, interact with multiple residues within IDPs in solution. Second, I will present a novel NMR method for monitoring IDP aggregation at high resolution. This technique, termed "inertia NMR," offers a promising new strategy for diagnosing neurodegenerative disorders. Third, I will demonstrate how the intracellular environment of red blood cells (RBCs) can be probed by monitoring IDPs directly inside live cells. Our results reveal that person-specific conformations, dynamics, and modifications of IDPs can provide unique molecular signatures with diagnostic potential across diverse disease classes. Taken together, this work demonstrates that methodological advances in NMR can decode fundamental biophysical aspects of IDPs, effectively bridging basic IDP biophysics with personalized diagnostic applications.

日時：2026 年 7 月 14 日（火）16:30～
場所：北海道大学理学部 7 号館 7-310 講義室
講師：Prof. Jung Ho Lee（Seoul National University）

主催： 北海道大学総合化学院
共催： 日本化学会北海道支部、電気化学会北海道支部
フロンティア化学教育研究センター
物質科学フロンティアを開拓する Ambitious リーダー育成プログラム，
スマート物質科学を拓くアンビシャスプログラム

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