

Leading Scientist Seminar

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Native mass spectrometry for probing membrane protein dynamics

Abstract

Understanding protein–protein and protein–ligand interactions is essential for elucidating the biological functions of proteins. However, gathering such information is challenging and complex. Native mass spectrometry (native-MS) has emerged as a powerful analytical approach for protein characterization under non-denaturing conditions. By preserving non-covalent interactions in the gas phase, native-MS enables robust and detailed investigation of complex biomolecular assemblies.

In this talk, I will highlight the application of native-MS to address key questions in membrane biology, including the membrane interactome, protein–lipid dynamics, and glycosylation. Recent advances in methodology and instrumentation development, such as charge-detection mass spectrometry, proton-transfer-reaction mass spectrometry and native top-down mass spectrometry, will be introduced to further expand the scope of native-MS applications. Collectively, these developments underscore the role of mass spectrometry as a central technique for probing the dynamics of integral membrane proteins in their native environment, particularly in complement to the recent breakthroughs achieved with cryo-electron microscopy.

Reference

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2. Yen HY, Hoi KK, Liko I, Hedger G, Horrell MR, Song W, Wu D, Heine P, Warne T, Lee Y, Carpenter B, Pluckthun A, Tate CG, Sansome MSP, Robinson CV, *Nature* (2018)
3. Yen HY, Hopper JTS, Liko I, Allison TM, Zhu Y, Wang D, Stegmann M, Mohammed S, Wu B, Robinson CV *Science Advances* (2017)

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