Guest lecture

High resolution secondary ion mass spectrometry imaging using the 3D OrbiSIMS instrument

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6 November 2018 at 11.15 – 12.00

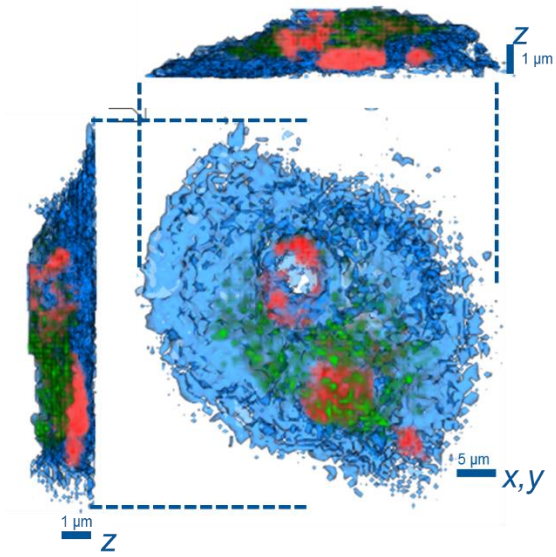
Location: Lykeion (V11-604-1)
Host: Christer Ejsing, BMB

NB! If you are interested in talking with Rasmus Havelund, you can mail Christer at cse@bmb.sdu.dk before Monday 5/11 at 12.00.

Abstract:
Secondary ion mass spectrometry (SIMS) has become a powerful tool for label-free chemical imaging with high spatial resolution. During the past three decades, the emergence of new cluster ion sources has led to new capabilities for the analysis of organic and biological samples using SIMS. Recent advances in the mass spectrometer design are also beginning to have significant impact in SIMS.

The 3D OrbiSIMS instrument combines the high spatial resolution of secondary ion mass spectrometry (SIMS; <2 μm for biomolecules) with the high mass-resolving power, high mass accuracy, and MS/MS capability of an Orbitrap mass analyser [1]. Therefore, the 3D OrbiSIMS instrument is well suited for label-free 2D and 3D imaging with sub-cellular resolution and direct identification of metabolites and small molecules (<1,000 Da) from available databases.

This talk will review some of the developments that led to the conception and development of the 3D OrbiSIMS instrument and give examples of applications of secondary ion mass spectrometry imaging with an emphasis on imaging the distribution of pharmaceutical drugs in cells and tissue.



3D ToF-SIMS image of a macrophage cell incubated in media with the drug amiodarone. Signals shown are phosphocholine marker (m/z 184), blue, nuclear marker (m/z 157), red, and amiodarone (m/z 646), green.

[1] M. K. Passarelli *et al*. The 3D OrbiSIMS—label-free metabolic imaging with subcellular lateral resolution and high mass-resolving power. *Nature methods*, 2017, vol. 14, no 12, p. 1175.