Institute colloquium

Electron cryotomography: present capabilities and future potential

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In the last ten years electron cryotomography has made it possible to visualize large macromolecular assemblies inside intact cells in a near-native, "frozen-hydrated" state in 3-D to a few nanometers resolution. Increasingly, atomic models of individual proteins and smaller complexes obtained by X-ray crystallography, NMR spectroscopy, or other methods can be fit into cryotomograms to reveal how the various pieces work together inside cells. A few good pictures is therefore sometimes all that is really needed to distinguish between competing models. To illustrate these points, I will present examples of current results from our recent work on bacterial secretion systems, including new images and mechanistic insights into type II, IV, V, and VI secretion systems. The range of cellular samples that ECT can reveal is dramatically expanding with FIB-milling, and will likely soon become dramatically more useful with correlated light and electron microscopy (CLEM) targeting. Two major developments in ECT technology further suggest that ECT will become an important new method for determining the structures of single particles and small proteins as well. First, highly eucentric stages are now allowing tilt-series to be recorded in seconds rather than minutes, opening the possibility of high resolution single particle tomography. Second, ECT of very small crystals (“nanocrystals”) offers compelling potential advantages over X-ray crystallography. I will explain these advances and their projected implications with examples from our work.

Monday, October 1, 2018 04:00pm - 05:00pm
Raiffeisen Lecture Hall, Central Building

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.
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