

Correlative Soft-Xray Tomography and Cryo-Fluorescence Microscopy for adherent cells

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Abstract

Discover the ultrastructure inside the cell is one of the major goals in cell biology research. Soft X-ray Tomography (SXT) is a synchrotron-based imaging technique to see the ultrastructure of fully hydrated intact cells [1] as cells were only frozen without staining and processing. SXT provides morphological information of subcellular organelles at nanometer scale resolution in three dimensions (3D). However, for those organelles with similar shapes or contrast, it is difficult to identify by morphology alone. The combination of complementary imaging techniques is always beneficial to biomedical researchers to answer biological questions. Fluorescence microscopy has been widely used to track the specific organelles/molecules by labeling with a fluorescent dye or expressing of the fluorescent protein. However, it is limited to visualize the structures with fluorescent labeled and unable to visualize locations relative to other unlabeled organelles. Coupling between SXT and fluorescence microscopy is able to provide complete information of organelles on both morphology and function.

In this project, we show the example [2] of employing the in-line cryo-fluorescence microscopy or conventional fluorescence microscopy with stand-alone cryo-stage to guide SXT and to navigate the targeted region of interest (ROI) in cells.

Keywords- SXT, Cryo-florescence Microscopy

References

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- [2] H.-Y. Chen, *et al.*, "Nanoimaging granule dynamics and subcellular structures in activated mast cells using soft X-ray tomography," *Sci. Rep.* **6**, 34879, 2016