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Advances in cryo-electron tomography for biology and medicine

Running title: Advances in cryo-electron tomography for biology and medicine

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Abstract

Cryo-electron tomography (CET) utilizes a combination of specimen cryo-fixation and multi-angle electron microscopy imaging to produce three-dimensional (3D) volume reconstructions of native-state macromolecular and subcellular biological structures with nanometer-scale resolution. In recent years, cryo-electron microscopy (cryoEM) has experienced a dramatic increase in the attainable resolution of 3D reconstructions, resulting from technical improvements of electron microscopes, improved detector sensitivity, the implementation of phase plates, automated data acquisition schemes, and improved image reconstruction software and hardware. These developments also greatly increased the usability and applicability of CET as a diagnostic and research tool, which is now enabling structural biologists to determine the structure of proteins in their native cellular environment to sub-nanometer resolution. These recent technical developments have stimulated us to

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