

Structure determination of molecular machines by cryo-electron microscopy



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Methodological breakthroughs in cryo-electron microscopy, particularly the development of direct electron detectors and maximum-likelihood image processing methods, have revolutionized structural biology, enabling detailed structural analysis of molecular assemblies that are beyond the reach of crystallographic experiments. Here, I will discuss how these new methods have enabled structure determination of ribosomal complexes at near-atomic resolution, revealing fascinating and unexpected principles of their molecular architectures. While the ribosome field was at the forefront of this technical revolution, these techniques have also led to breakthroughs in structure determination of smaller and more flexible protein complexes. I will present recent progress from studies of eukaryotic transcription to illustrate this trend.