

Unlock the Wonders of Biological Macromolecules with Single Particle Cryo-EM

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The field of structural biology has undergone a paradigm shift with the advent of single particle cryo-electron microscopy (cryo-EM). This revolutionary technique enables researchers to visualize the molecular architecture of biological macromolecules, such as proteins, nucleic acids, and their complexes, at unprecedented resolutions.



Single-particle Cryo-EM of Biological Macromolecules (Biophysical Society-IOP Series) by Rose Mary Sheldon

★★★★☆ 4.7 out of 5

Language : English
File size : 23028 KB
Text-to-Speech : Enabled
Screen Reader : Supported
Enhanced typesetting : Enabled
Print length : 120 pages



Single Particle Cryo-EM: A Revolutionary Technique:

Cryo-EM involves rapidly freezing biological samples in liquid ethane at temperatures below -180°C , preserving their native structures in a vitreous, ice-like state. This allows the capture of thousands to millions of individual particle images using an electron microscope.

Advanced image processing algorithms are then employed to align and average the individual particle images, reconstructing a three-dimensional (3D) structure of the molecule. The high resolution achieved through cryo-EM enables the visualization of intricate molecular details, including atomic interactions, conformational changes, and the binding of ligands.

Applications in Biological Research:

Single particle cryo-EM has opened up a vast array of applications in biological research, including:

- **Structural Characterization:** Determining the 3D structures of proteins, nucleic acids, and their complexes at high resolution.
- **Mechanism Elucidation:** Visualizing conformational changes and molecular interactions that underlie biological processes.
- **Drug Discovery:** Investigating the structures of drug targets and their interactions with potential therapeutics.
- **Disease Mechanisms:** Unraveling the molecular underpinnings of diseases by studying the abnormal structures and interactions of biomolecules.

Key Features of the Book:

The book, "Single Particle Cryo Em Of Biological Macromolecules Biophysical Society Iop," provides a comprehensive overview of this groundbreaking technique, covering:

- **Cryo-EM Methodology:** A detailed guide to the principles and practical aspects of cryo-EM, from sample preparation to data collection and image processing.
- **Advanced Techniques:** In-depth discussions on advanced cryo-EM techniques, such as subtomogram averaging, symmetry expansion, and tilt reconstruction.
- **Biophysical Applications:** Case studies showcasing how cryo-EM has revolutionized various areas of biophysics, including structural biology, membrane biology, and cell biology.
- **Future Perspectives:** Insights into the latest advancements and future directions in cryo-EM, including cryo-tomography and time-resolved cryo-EM.

Authoritative Contributors:

The book is written by leading experts in the field, ensuring the accuracy and depth of the information presented. The authors provide a unique blend of theoretical knowledge and practical experience, offering valuable guidance for both novice and experienced researchers.

Target Audience:

The book is primarily intended for researchers and students in structural biology, biophysics, biochemistry, cell biology, and related fields. It is also a valuable resource for those working in drug discovery, disease diagnosis, and other areas where advanced structural information is crucial.

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Single Particle Cryo Em Of Biological Macromolecules Biophysical Society IOP" is an indispensable resource for anyone seeking to understand the principles, applications, and future advancements in this transformative technique. With its comprehensive coverage, authoritative authorship, and clear presentation, this book empowers researchers to unlock the secrets of biological macromolecules and gain unprecedented insights into the molecular basis of life.

Free Download Your Copy Today:

Visit the official publisher's website or your preferred bookseller to Free Download your copy of "Single Particle Cryo Em Of Biological Macromolecules Biophysical Society IOP" and embark on an extraordinary journey into the world of single particle cryo-EM.



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