

# What Improvements Does Cryo-EM Technology Offer Us?

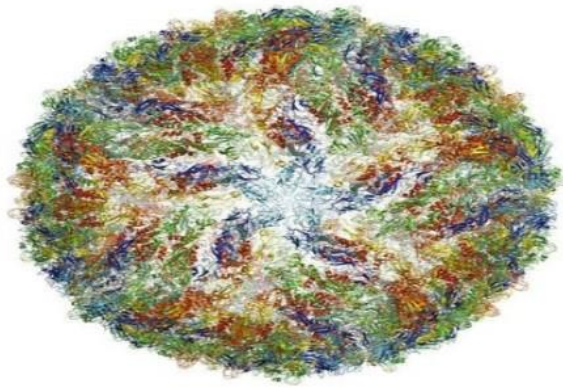
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## What is cryo-EM?

Single-particle Cryo-electron microscopy is a method used to solve atomic resolution structures. This technique complements x-ray crystallography by exposing structural features without the need for a crystalline specimen. Cryo-EM also complements structural research using nuclear magnetic resonance (NMR) in that it makes it possible to study specimens greater than 90 kDa.

## What is cryo-EM used for?

Cryo-EM is used to understand how biomolecules interact and structure of the biomolecules, thereby developing medical treatments and designing new drugs. As an example, scientists created a 3D image of the structure of the virus to develop new treatment in the Zika virus outbreak in Brazil.

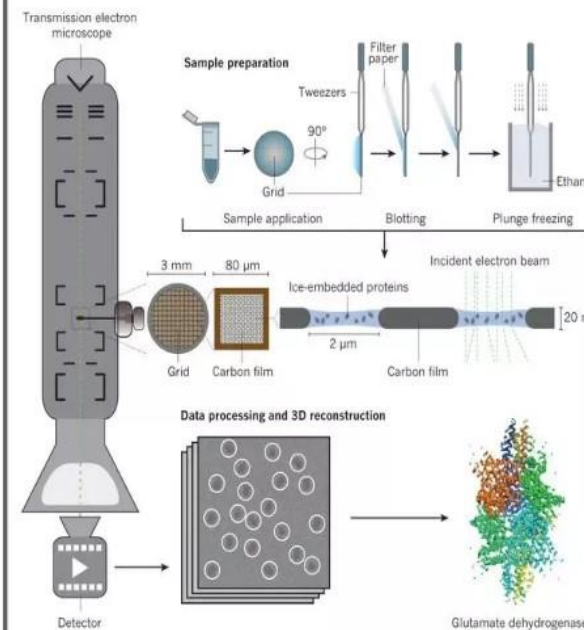


Zika Virus

## How cryo-EM works?

An electron gun shoots electrons through a thin layer of frozen protein sample. The electrons which are scattered after the impact, land on a photo sensor underneath the protein sample to create a digital image.

The image goes through several processes using 3d image composition algorithms. The end result is a 3d model of a protein.



How does cryo-electron microscopy work scheme

## Capability

Analyses structures in their natural form, hydrated state

Enables the study of larger assemblies

Enlightens atomic resolution structures

Controls the chemical environment

Substrates crystallization steps

## Advantage

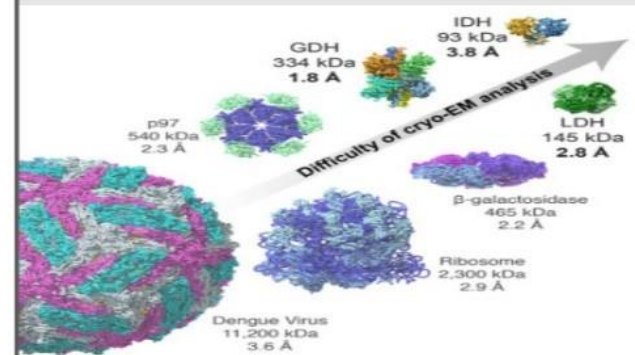
Maintains the sample in a biological environment, including sample concentration and buffer composition.

It can characterize the molecules larger than 150kDa that is metastable and hard to crystallize

It can detect the asymmetric side of chains, hydrogen bonds and water molecules in addition to alpha helices and beta sheets

Allows you to change the conditions of the experiment for different molecules of different functional states

Shortens the time and avoids unnecessary preparation steps



## References

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