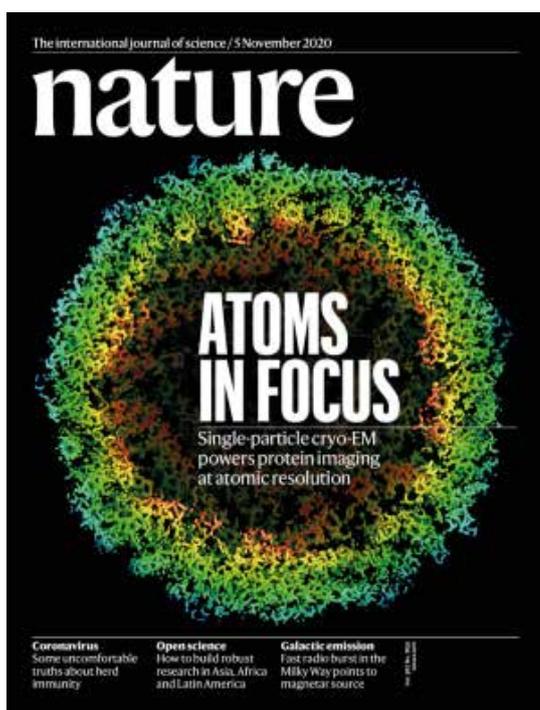


Image courtesy of P. Emsley, MRC-LMB

Cryo-EM Publications

with Selectris X Imaging Filter

Cryo-electron microscopy (cryo-EM) reached single-atom resolution in 2020, enabling the location of individual atoms in a protein to be determined for the first time (Nakane et al.). Since 2020, researchers have investigated the protein structures of SARS-CoV-2 ion channels, human membrane proteins, HIV and tau filaments. Ultimately, these developments will help researchers gain a better understanding, at unprecedented resolution, of how proteins work in health and disease, with the potential to aid the design of better therapeutics.



Nakane T, Kotecha A, Sente A, *et al.* (2020) **Single-particle cryo-EM at atomic resolution.** *Nature* 587: 152–156.

[DOI: 10.1038/s41586-020-2829-0](https://doi.org/10.1038/s41586-020-2829-0)

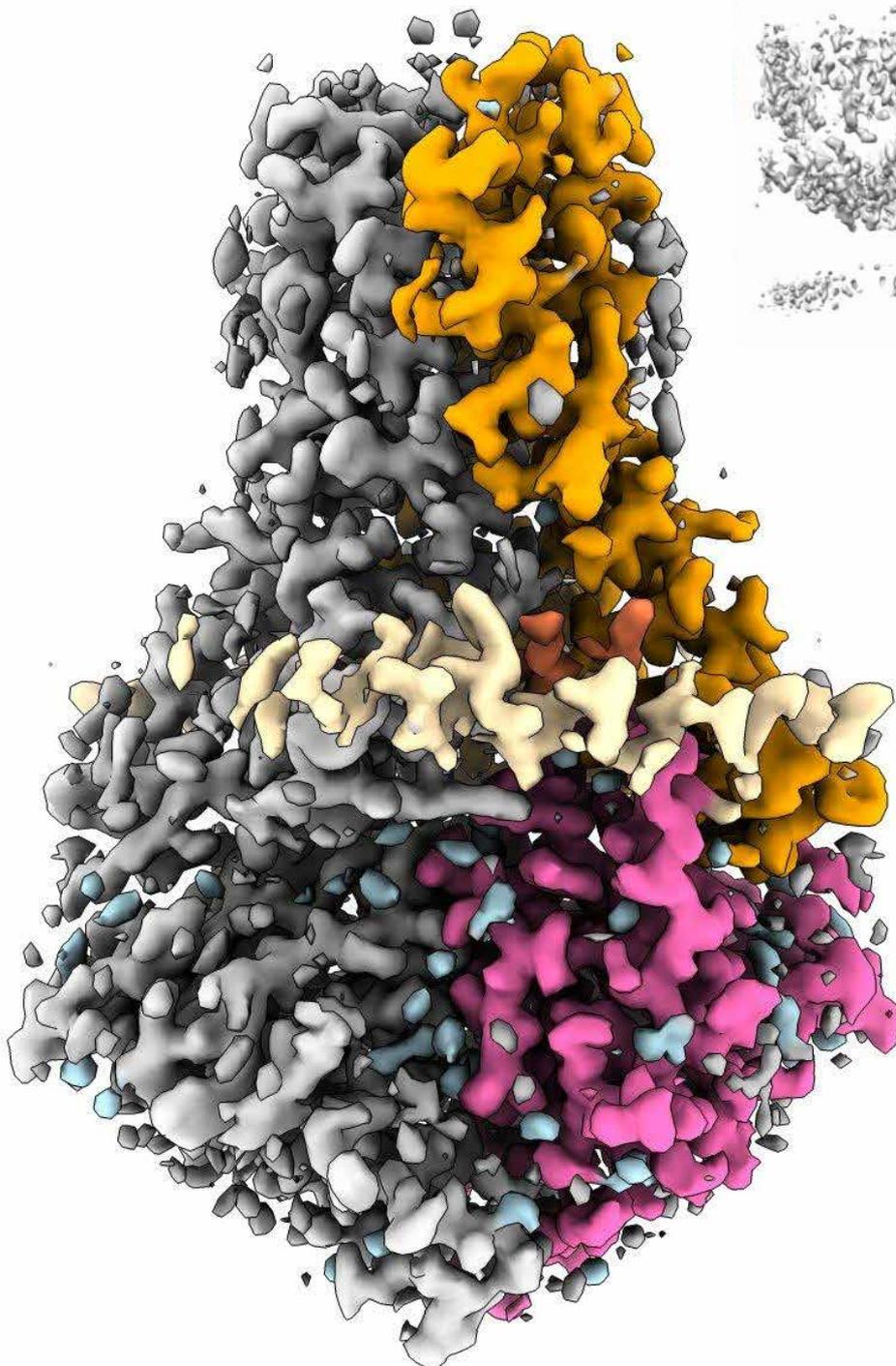
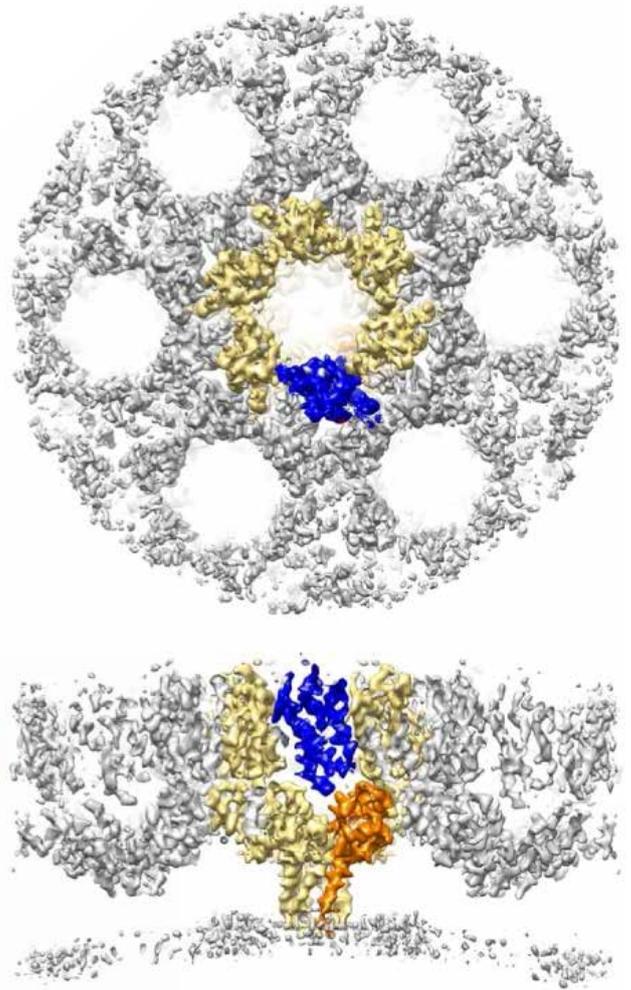
Keywords: cryo-electron microscopy, data processing, hardware and infrastructure, ion channels in the nervous system

Instruments used: Thermo Scientific™ Krios™ G4 Cryo-TEM, E-CFEG, Falcon 4 Direct Electron Detector, Selectris™ X imaging Filter

Mendonça, L, Sun D, Ning J, *et al.* (2021) CryoET structures of immature HIV Gag reveal six-helix bundle. *Commun Biol* 4: 481. DOI: [10.1038/s42003-021-01999-1](https://doi.org/10.1038/s42003-021-01999-1)

Keywords: cryo-electron tomography, retrovirus

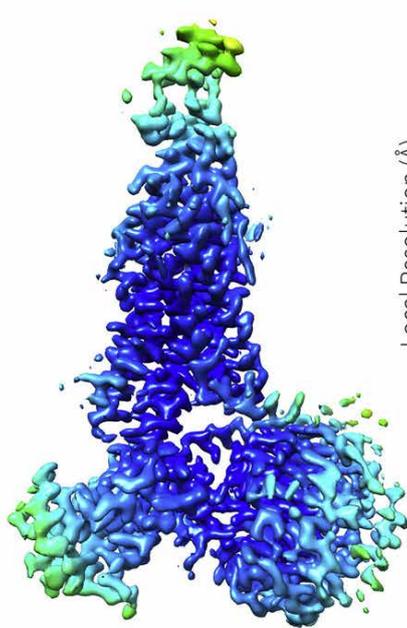
Instruments used: Thermo Scientific Krios G4 Cryo-TEM, E-CFEG, Falcon 4 Direct Electron Detector, Selectris X Imaging Filter



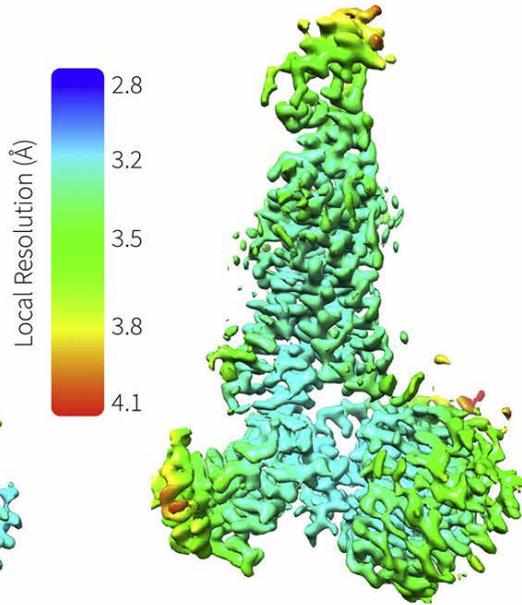
Kern DM, Sorum B, Mali SS, *et al.* (2021) Cryo-EM structure of SARS-CoV-2 ORF3a in lipid nanodiscs. *Nat Struct Mol Biol* 28: 573–582. DOI: [10.1038/s41594-021-00619-0](https://doi.org/10.1038/s41594-021-00619-0)

Keywords: cryo-electron microscopy, SARS-CoV-2

Instruments used: Thermo Scientific Krios G4 Cryo-TEM, E-CFEG, Falcon 4 Direct Electron Detector, Selectris X Imaging Filter



Titan Krios (300 kV) : Falcon4

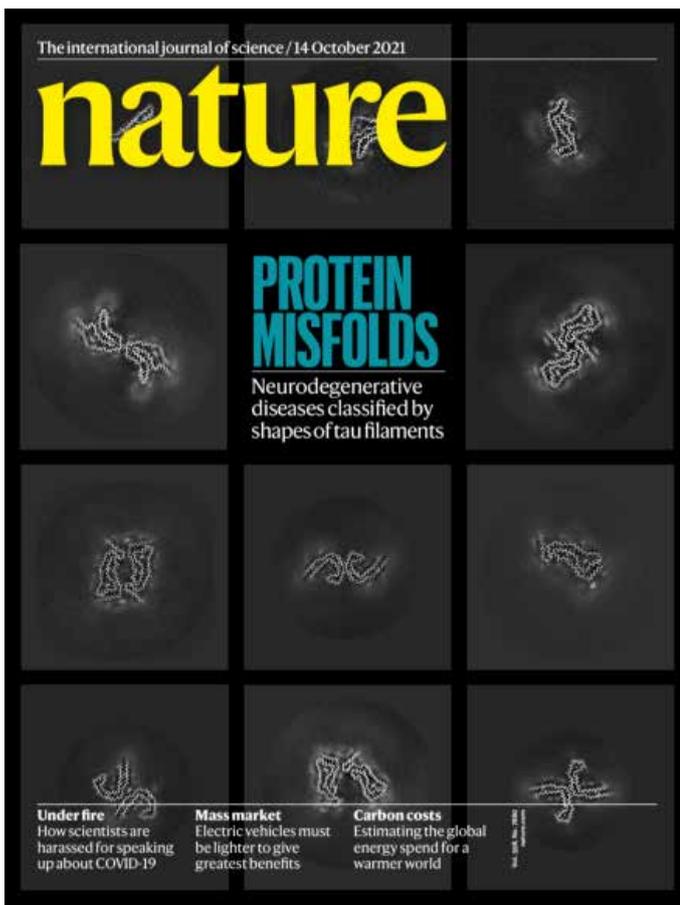


Glacios (200 kV) : Falcon 4

Zhang X, Johnson RM, Drulyte I, *et al.* (2021) **Evolving cryo-EM structural approaches for GPCR drug discovery.** *Structure* 29: 963-974.e6.
[DOI: 10.1016/j.str.2021.04.008](https://doi.org/10.1016/j.str.2021.04.008)

Keywords: cryo-electron microscopy, GPCR, drug discovery, patent free, methods development

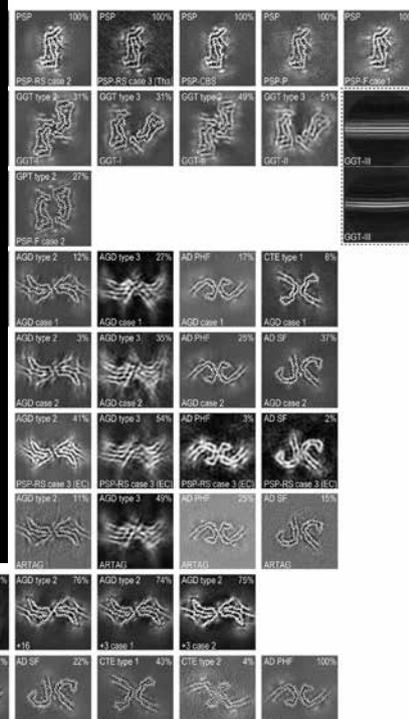
Instruments used: Thermo Scientific Glacios™ Cryo-TEM, Falcon 4 Direct Electron Detector

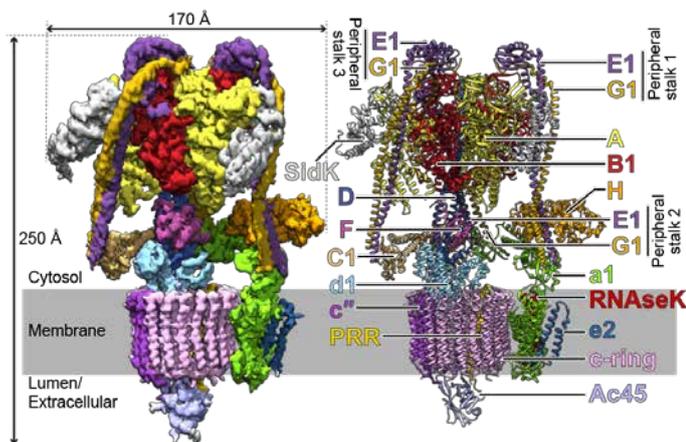


Shi Y, Zhang W, Yang Y, *et al.* (2021) **Structure-based classification of tauopathies.** *Nature* 598: 359-363.
[DOI: 10.1038/s41586-021-03911-7](https://doi.org/10.1038/s41586-021-03911-7)

Keywords: cryo-electron microscopy, neurodegeneration

Instruments Used: Thermo Scientific Krios G4 Cryo-TEM, Falcon 4 Direct Electron Detector, Selectris X Imaging Filter





Tan YZ, Abbas YM, Wu J Z, *et al.* (2021) **Structure of mammalian V-ATPase with the TLDC domain protein mEAK7 bound.** *Life Science Alliance* Jul 2022. 5 (11) e202201527. [DOI: 10.26508/lsa.202201527](https://doi.org/10.26508/lsa.202201527)

Keywords: biochemistry

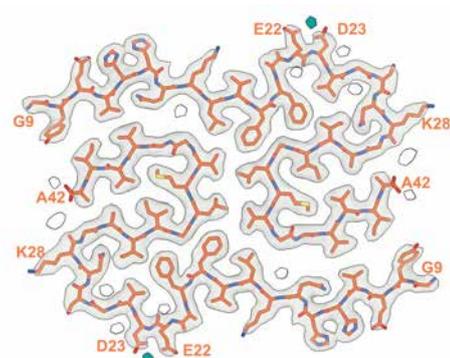
Instruments Used: Thermo Scientific Glacios Cryo-TEM, Falcon 4 Direct Electron Detector, Selectris X Imaging Filter

Schweighauser M, Arseni D, Huang M, *et al.* (2022) **Age-dependent formation of TMEM106B amyloid filaments in human brain.** *Nature* 605, 310–314. [DOI: 10.1038/s41586-022-04650-z](https://doi.org/10.1038/s41586-022-04650-z)

Keywords: neurodegeneration, molecular neuroscience

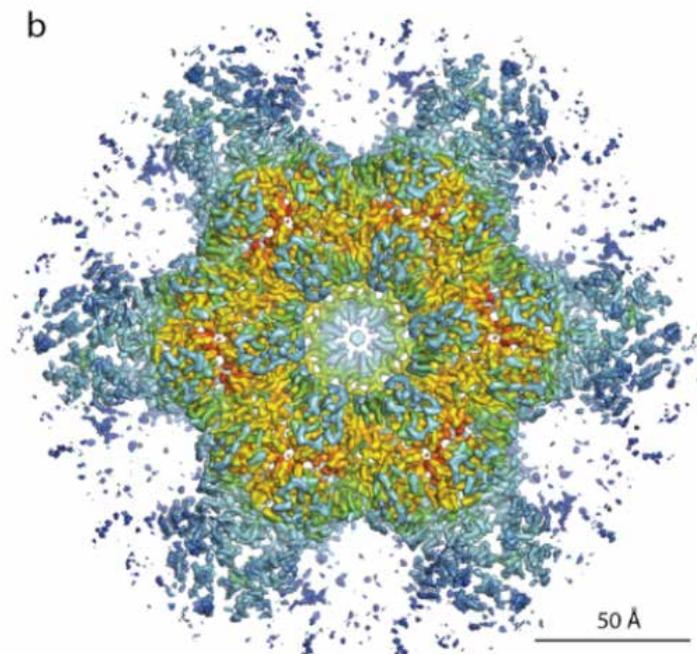
Instruments Used: Thermo Scientific Krios G4 Cryo-TEM, E-CFEG, Falcon 4i Direct Electron Detector, Selectris X Imaging Filter

Yang Y, Diana A, Wenjuan Z, *et al.* (2022) **Cryo-EM structures of amyloid- β 42 filaments from human brains.** *Science* 375: 167-172. [DOI: 10.1126/science.abm7285](https://doi.org/10.1126/science.abm7285)



Keywords: neurodegeneration

Instruments Used: Thermo Scientific Krios Cryo-TEM, E-CFEG, Falcon 4i Direct Electron Detector, Selectris X Imaging Filter



Obr M, Hagen WJH, Dick RA, *et al.* (2022) **Exploring high-resolution cryo-ET and subtomogram averaging capabilities of contemporary DEDs.** *J. Structural Biology*, 214, 2, 107852. [DOI: 10.1016/j.jsb.2022.107852](https://doi.org/10.1016/j.jsb.2022.107852)

Keywords: molecular biology, sub-tomogram averaging

Instruments used: Thermo Scientific Krios G4 Cryo-TEM, E-CFEG, Falcon 4 Direct Electron Detector, Selectris X Imaging Filter

Lövestam S, Koh, FA, van Knippenberg B, *et al.* (2021) **Assembly of recombinant tau into filaments identical to those of Alzheimer's disease and chronic traumatic encephalopathy.** *eLife* 11:e76494. [DOI: 10.7554/eLife.76494](https://doi.org/10.7554/eLife.76494)

Keywords: neurodegeneration

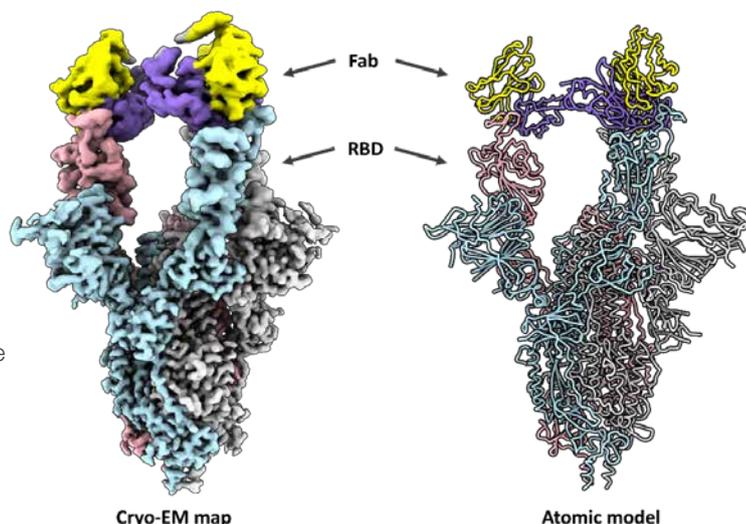
Instruments used: Thermo Scientific Krios G4 Cryo-TEM, E-CFEG, Glacios Cryo-TEM, Falcon 4 Direct Electron Detector, Selectris X Imaging Filter (on Krios and Glacios Cryo-TEMs), EPU Multigrid

Du, W, Hurdiss, DL, Drabek, D, *et al.* (2022) An ACE2-blocking antibody confers broad neutralization and protection against Omicron and other SARS-CoV-2 variants of concern. *Science Immunology*, 7, 73.

DOI: [10.1126/sciimmunol.abp9312](https://doi.org/10.1126/sciimmunol.abp9312)

Keywords: ACE2, Omicron, SARS-CoV-2

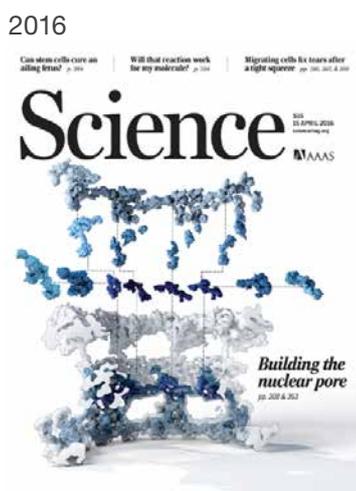
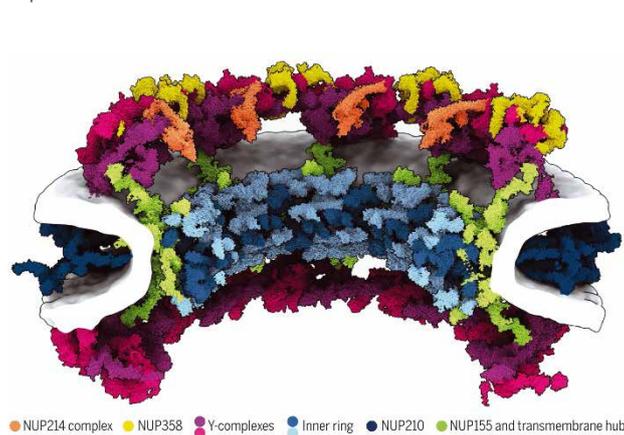
Instruments used: Thermo Scientific Krios G4 Cryo-TEM, Falcon 4 Direct Electron Detector, Selectris X Imaging Filter



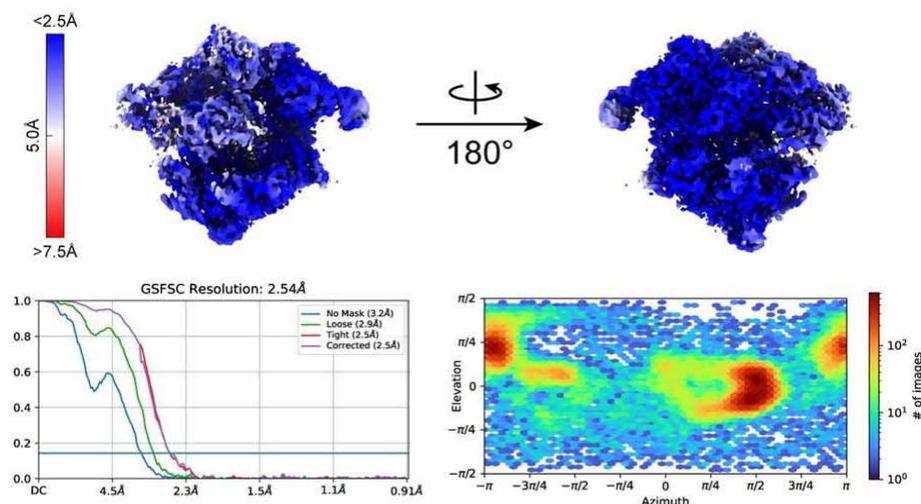
Mosalaganti, S, Obarska-Kosinska, A, Siggel, M, *et al.* (2022) AI-based structure prediction empowers integrative structural analysis of human nuclear pores. *Science*, 376, 6598. DOI: [10.1126/science.abm9506](https://doi.org/10.1126/science.abm9506)

Keywords: nuclear pore complex

Instruments used: Thermo Scientific Krios G4 Cryo-TEM, Falcon 4 Direct Electron Detector, Selectris X Imaging Filter, AlphaFold



18-nt match (checkpoint)



Pacesa, M, Loeff, L, Querques, I, *et al.* (2022) R-loop formation and conformational activation mechanisms of Cas9. *Nature*, 609, 191-196. DOI: [10.1038/s41586-022-05114-0](https://doi.org/10.1038/s41586-022-05114-0)

Keywords: DNA, genetic engineering, RNA

Instruments used: Thermo Scientific Krios G4 Cryo-TEM, Falcon 4 Direct Electron Detector, Selectris X Imaging Filter

Sheng, Y, Morris, K, Radecke, J, *et al.* (2022)

Cryo-electron Tomography Remote Data Collection and Subtomogram Averaging. *J. Vis. Exp.* (185), e63923.

[DOI:10.3791/63923](https://doi.org/10.3791/63923)

Keywords: cryo-ET data collection, subtomogram averaging

Instruments Used: Thermo Scientific Krios G2 Cryo-TEM, Selectris X Imaging Filter, Falcon 4 Direct Electron Detector; Tomography 5

Lacey, SE, Foster, HE, Pigino, G. (2022) **The molecular structure of anterograde intraflagellar transport trains.**

bioRxiv 2022.08.01.502329. [DOI: 10.1101/2022.08.01.502329](https://doi.org/10.1101/2022.08.01.502329)

Keywords: molecular biology

Instruments Used: Thermo Scientific Krios G4 Cryo-TEM, Falcon 4 Direct Electron Detector, Selectris X Imaging Filter, AlphaFold2

Drulyte, I, Gutsell, AR, Lloris-Garcerá, P, *et al.* (2022) **Direct cell extraction of membrane proteins for astructure-function analysis.** *bioRxiv* 2022.07.05.498330.

[DOI:10.1101/2022.07.05.498330](https://doi.org/10.1101/2022.07.05.498330)

Keywords: biophysics

Instruments Used: Thermo Scientific Krios G4 Cryo-TEM, Falcon 4 Direct Electron Detector, Selectris X Imaging Filter, AlphaFold

Dolan, KA, Dutta, M, Kern, DM, *et al.* (2022) **Structure of SARS-CoV-2 M protein in lipid nanodiscs.** *bioRxiv* 2022.06.12.495841.

[DOI: 10.1101/2022.06.12.495841](https://doi.org/10.1101/2022.06.12.495841)

Keywords: biophysics

Instruments Used: Thermo Scientific Krios G4 Cryo-TEM, E-CFEG, Falcon 4i Direct Electron Detector, Selectris X Imaging Filter, AlphaFold

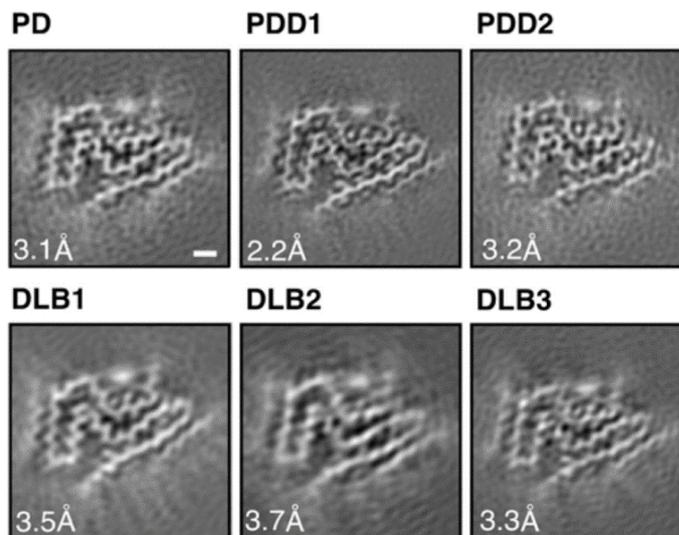
Fromm, SA, O'Connor, KM, Purdy, M, *et al.* (2022) **The translating bacterial ribosome at 1.55 Å resolution by open access cryo-EM.** *bioRxiv* 2022.08.30.505838.

[DOI: 10.1101/2022.08.30.505838](https://doi.org/10.1101/2022.08.30.505838)

Keywords: molecular biology

Instruments Used: Thermo Scientific Krios G4 Cryo-TEM, E-CFEG, Falcon 4 Direct Electron Detector, Selectris X Imaging Filter

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Yang, Y, Yang, S, Schwieghauser, M, *et al.* (2022) **Cryo-EM structures of α -synuclein filaments from Parkinson's disease and dementia with Lewy bodies.** *bioRxiv* 2022.07.12.499706. [DOI:10.1101/2022.07.12.499706](https://doi.org/10.1101/2022.07.12.499706)

Keywords: neuroscience

Instruments Used: Thermo Scientific Krios G4 Cryo-TEM, E-CFEG, Falcon 4i Direct Electron Detector, Selectris X Imaging Filter

Khavnekar, S, Wan, W, Majumder, P, *et al.* (2022) **Multishot tomography for high-resolution *in situ* subtomogram averaging.** *bioRxiv* 2022.04.10.487763.

[DOI: 10.1101/2022.04.10.487763](https://doi.org/10.1101/2022.04.10.487763)

Keywords: molecular biology

Instruments Used: Thermo Scientific Krios G3i Cryo-TEM, Falcon 4 Direct Electron Detector, Selectris X Imaging Filter

Khavnekar, S, Vrbovska, V, Zaoralova, M, *et al.* (2022) **Optimizing cryo-FIB lamellas for sub-5Å *in situ* structural biology.** *bioRxiv* 2022.06.16.496417.

[DOI: 10.1101/2022.06.16.496417](https://doi.org/10.1101/2022.06.16.496417)

Keywords: molecular biology

Instruments Used: Thermo Scientific Krios G4 Cryo-TEM, Falcon 4 Direct Electron Detector, Selectris X Imaging Filter, Tomography 5