

# PDB STRUCTURES AND THE PANDEMIC

The Protein Data Bank collects and curates three-dimensional (3D) structure data for large biological molecules (proteins, DNA, and RNA) generated and freely contributed by researchers around the world. Open-access to these 3D structures enables research and development in fundamental biology, biomedicine, biotechnology, and drug discovery as we confront the global SARS-CoV-2 pandemic.

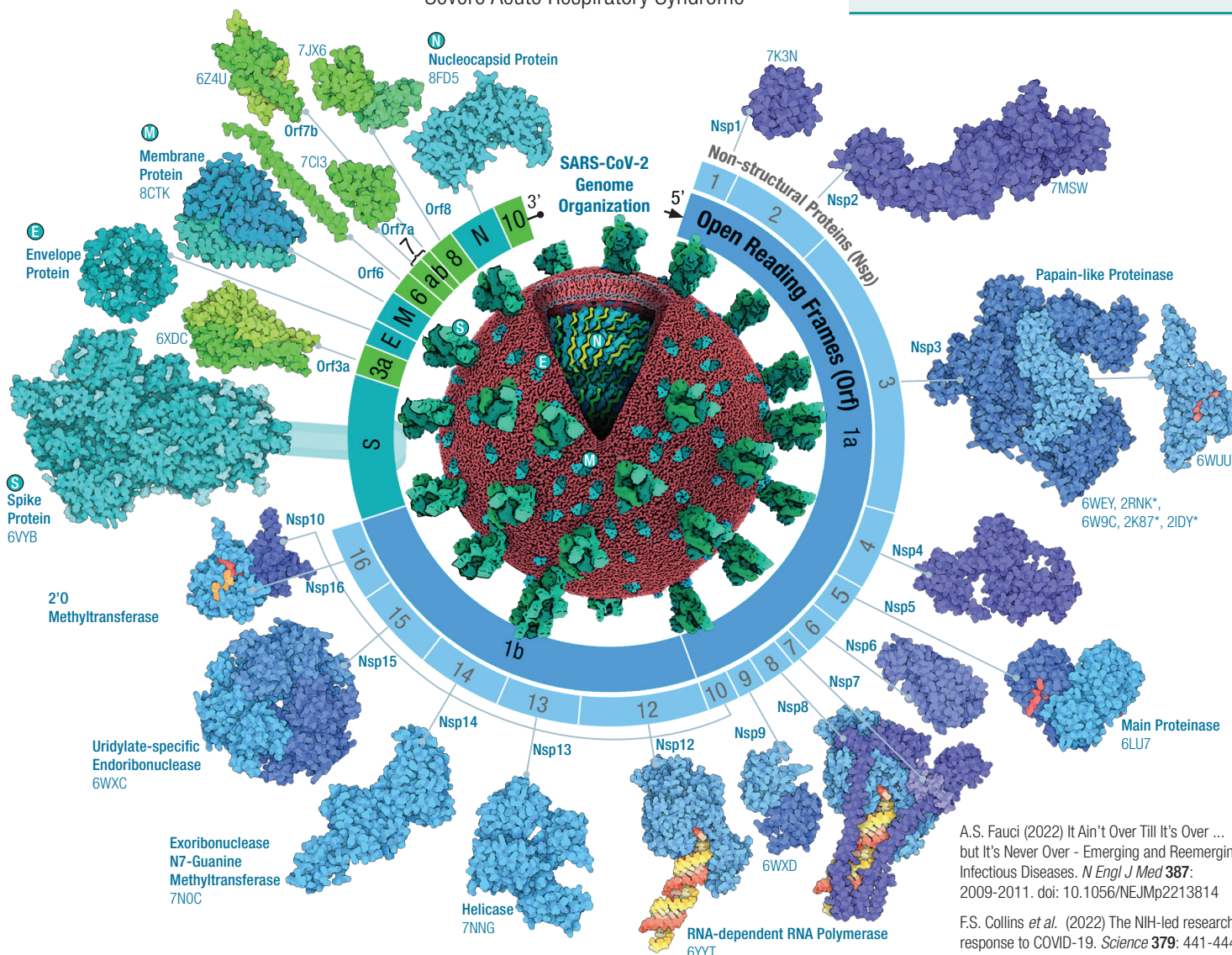
The first COVID-19 coronavirus structure was released in record time on February 5, 2020—less than one month after the virus genome sequence became public. Rapid public access to hundreds of detailed molecular portraits of the structures released since then help explain the biological and biochemical mechanisms central to the life-cycle of the virus and its impact on the infected.

As a comprehensive data archive, the PDB contains valuable clues in the structures of proteins from other coronaviruses.

The 2003 outbreak of the closely-related Severe Acute Respiratory Syndrome-

related coronavirus (SARS) stimulated a steady flow of PDB structures for SARS and other coronaviruses. This body of structural information is furthering our understanding and facilitating discovery and development of new treatments to contain the current pandemic and manage the next outbreak.

**STRUCTURAL BIOLOGISTS AND THEIR SARS-COV2 STRUCTURES MADE FREELY ACCESSIBLE FROM THE PDB WILL BE KEY IN DISCOVERING AND DEVELOPING SAFE AND EFFECTIVE NEW DRUGS AND VACCINES.**



A.S. Fauci (2022) It Ain't Over Till It's Over ... but It's Never Over - Emerging and Reemerging Infectious Diseases. *N Engl J Med* **387**: 2009-2011. doi: 10.1056/NEJMp2213814

F.S. Collins *et al.* (2022) The NIH-led research response to COVID-19. *Science* **379**: 441-444. doi: 10.1126/science.adf5167

# RCSB PDB SERVICES AND COVID-19

The PDB archive is managed by the Worldwide Protein Data Bank (wwPDB), a consortium of organizations that act as deposition, data processing, and distribution centers in America (RCSB PDB), Europe (PDBe), and Asia (PDBj).

Archiving, validating, and biocuration of PDB structure data enables far-reaching breakthroughs in research and education by millions of users around the world. Paintings, articles, and videos use PDB information to reach audiences beyond the research community.

As noted on Twitter *SARS-CoV2 is not an invisible enemy but rather one that needs special tools to see.* These features help educators and students overcome the limitations of the human eye to visualize and understand the virus.

## RCSB PDB SERVICES ENABLE ALL USERS TO EXPLORE THE STRUCTURAL FEATURES OF COVID-19

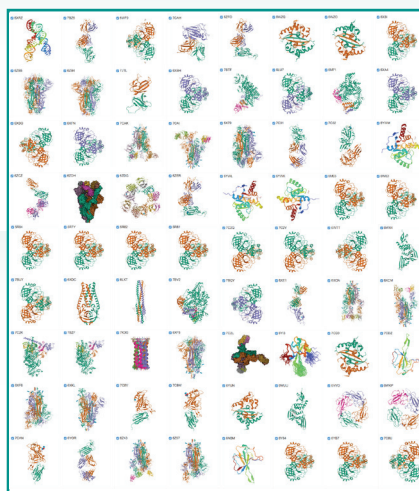
### 1 DEPOSITION AND BIOCURATION



RCSB PDB and other members of the Worldwide PDB support >60,000 depositors worldwide ensuring quality for the ever growing body of data.

### 2 ARCHIVE MANAGEMENT AND ACCESS

RCSB PDB maintains the PDB archive according to FAIR principles, provides access to the data, and integrates the structural information with other scientific resources.



Biocuration of incoming SARS-CoV-2 structures is prioritized by wwPDB annotators.

Weekly data releases provide timely access to the current research on COVID-19, usually before it appears in a scientific journal (with author permission).

### 3 DATA EXPLORATION

RCSB PDB develops tools for data searching, visualization and analysis, and makes them freely available to millions of users at [RCSB.org](http://RCSB.org)

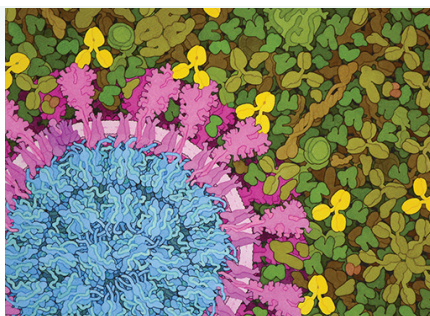
Visitors can instantly access all COVID-19 structures and resources along with exploration tools at [rcsb.org/covid19](http://rcsb.org/covid19).

**COVID-19  
CORONAVIRUS  
Resources**



### 4 TRAINING, OUTREACH AND EDUCATION

RCSB PDB develops educational resources about structural biology and makes them freely available on [pdb101.rcsb.org](http://pdb101.rcsb.org). It also provides user support and related training materials.



Educational resources on COVID-19 facilitate our understanding of the coronavirus structure.

Molecular Landscapes by David S. Goodsell  
*SARS-CoV-2 and Neutralizing Antibodies*, 2020  
doi: 10.2210/rcsb\_pdb/goodsell-gallery-025