

# Supporting the NIH *Turn Discovery into Health*<sup>1</sup>

PDB data and RCSB PDB Services expand fundamental scientific knowledge and improve health

## Tackling Our Biggest Health Challenges



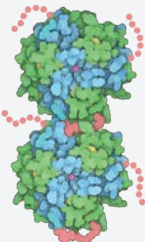
### COVID-19

Free access to ~3000 related PDB structures facilitated the discovery and development of safe and effective new drugs and vaccines<sup>2</sup>



### Cancer

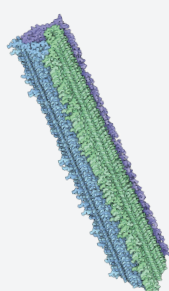
Mutation of the growth-controlling ras protein leads to many human cancers



### Diabetes

Engineered insulins have been developed to improve treatment of diabetes

## Understanding the Healthy Mind



### Alzheimer's Disease

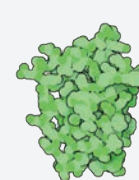
Alzheimer's disease and prion diseases both involve unnatural aggregation of proteins into amyloid fibrils



### Mental Health

Serotonin receptors control mood, emotion, and other behaviors, and are targets for important neuropsychiatric drugs

## Research for Healthy Living



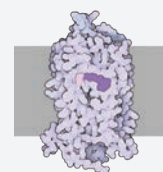
### Obesity/ Nutrition

Problems with the appetite-controlling hormone leptin can lead to obesity



### Oral Health

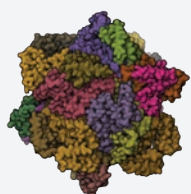
Bacteria use the enzyme glucanucrase to build sticky sugar chains that help them adhere to our teeth



### Vision

All animals use the eye protein rhodopsin to detect light and see the outside world

## Access to Transformative Technologies

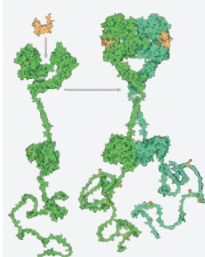


### Electron Microscopy

Groundbreaking structures are being captured at extremely high resolution at NIH centers and around the world

[cryoem.slac.stanford.edu](https://cryoem.slac.stanford.edu)

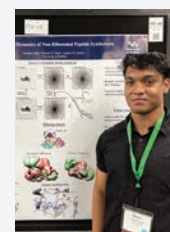
## The Promise of Precision Medicine



### Precision Oncology

Our evolving understanding of cancer has led to the discovery of new approaches to cancer therapy that directly target mutant proteins in cancer cells

## Securing the Future of Biomedicine



### Tomorrow's Scientists

RCSB PDB capacity building and training resources support the next generation of NIH researchers

## Value for NIH

- PDB safeguards 3D biostructure data generated using NIH research funding, NIH-funded synchrotron beamlines, and Cryo-EM facilities supported by the NIH Common Fund >\$5.4 Billion worth of NIH data over the lifetime of the PDB
- PDB structures have contributed data to >1 million published research papers
- 2<sup>nd</sup> most heavily used online data resource after ClinicalTrials.gov for the NIH-funded researchers<sup>3</sup>
- Connects NIH-funded research and scientists with worldwide structural biology data from public and private sector research
- Links all relevant PDB structures to NIH Common Fund Resources
- Enables structure-guided discovery of new drugs and vaccines
- Ensures rigor and reproducibility across biomedical research

## References

1. [www.nih.gov/about-nih/what-we-do/nih-turning-discovery-into-health](https://www.nih.gov/about-nih/what-we-do/nih-turning-discovery-into-health)
2. 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
3. K.B. Read *et al.* (2015) Sizing the Problem of Improving Discovery and Access to NIH-Funded Data: A Preliminary Study. *PLoS One* **10**: e0132735 doi: 10.1371/journal.pone.0132735