Supporting the Research Goals of DOE

RCSB PDB PROTEIN DATA BANK

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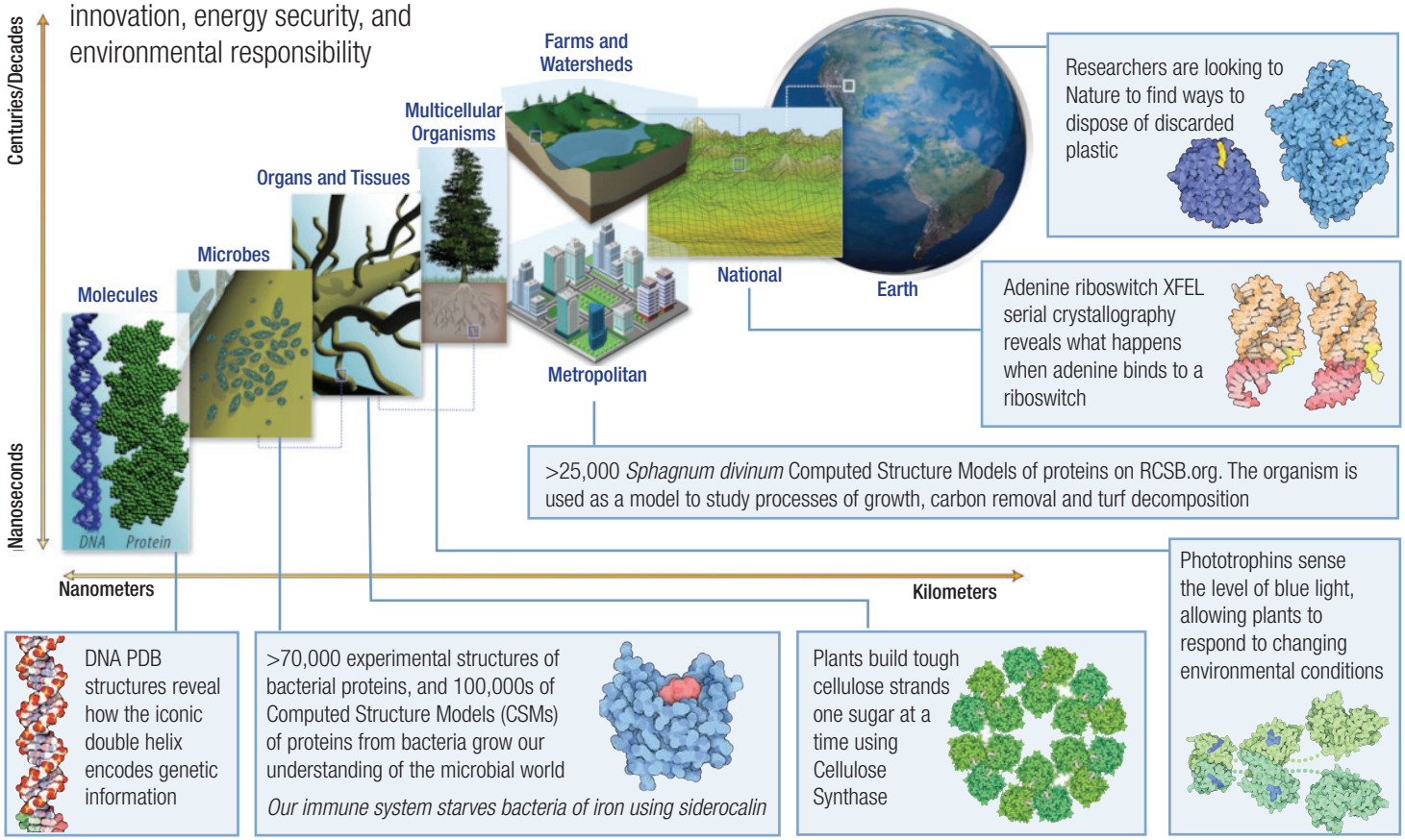
Data served by RCSB.org support the U.S. Department of Energy (DOE) missions in scientific discovery and innovation, energy security, and environmental responsibility



Researchers are looking to Nature to find ways to dispose of discarded plastic

Adenine riboswitch XFEL serial crystallography reveals what happens when adenine binds to a riboswitch

>25,000 *Sphagnum divinum* Computed Structure Models of proteins on RCSB.org. The organism is used as a model to study processes of growth, carbon removal and turf decomposition

Phototrophins sense the level of blue light, allowing plants to respond to changing environmental conditions

DNA PDB structures reveal how the iconic double helix encodes genetic information

>70,000 experimental structures of bacterial proteins, and 100,000s of Computed Structure Models (CSMs) of proteins from bacteria grow our understanding of the microbial world

Our immune system starves bacteria of iron using siderocalin

Plants build tough cellulose strands one sugar at a time using Cellulose Synthase

Last update: Spring 2024

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- RCSB PDB safeguards structural breakthroughs (Synchrotron, Neutron, and Cryo-EM) generated with DOE funding:

  >$5.7 Billion worth of DOE data over the lifetime of the PDB

- PDB structures have contributed data to more than 1 million published research papers
- PDB structures reveal how photosynthesis works in plants, bioenergy production, and opportunities for CO_2 sequestration
- RCSB PDB provides facile access to >200,000 experimental structures and >1 million Computed Structure Models of proteins
- Integration of RCSB PDB and KBase Resources supports basic and applied research in plant molecular biology and microbial physiology

Supporting DOE Facilities for Synchrotron and Neutron Crystallography, and Cryo-EM

RCSB PDB supports the fundamental research and cryo-EM facilities funded by the DOE Biological and Environmental Research program. RCSB PDB also supports scientific user facilities funded by DOE Basic Energy Sciences, including Advanced Photon Source, Advanced Light Source, and National Synchrotron Light Source II; Linac Coherent Light Source-II; and neutron diffraction instruments at Oak Ridge National Laboratory

- DOE Synchrotrons have produced >56,000 PDB structures over their lifetime
- RCSB PDB hosts BioSync (biosync.rcsb.org), an online Guide to High Energy Data Collection Facilities
  - Provides up-to-date information on over 130 X-ray beamlines at facilities worldwide
- Supporting XFEL/SX and SLAC LCLS
  - Over 850 XFEL structures deposited to PDB (41% from LCLS)
  - Data dictionary extensions in PDB will enable faithful representation of XFEL and serial crystallography (SX) experiments
  - Deposition improvements will facilitate complete ensembles of data submission, rigorous validation, and expert biocuration for XFEL structures

Image: Biological and environmental interactions across vast spatial and temporal scales.
Source: berstructuralbioportal.org/about-the-doe-biological-and-environmental-research-program/