

**Top Bar Search** by **molecule name**; **entry ID** (e.g., PDB, UniProt, AlphaFold ID); **author name**; protein or DNA/RNA **sequence**

**Include CSMs**  
- switch On

Top Bar or Basic Search

RCSB PDB Deposit Search Visualize Analyze Download Learn About Careers COVID-19

226,414 Structures from the PDB  
1,068,577 Computed Structure Models (CSM)

Enter search term(s), Entry ID(s), or sequence

Advanced Search Browse Annotations

Include CSM On  
Default Off

Search

Access Computed Structure Models (CSMs) of available model organisms

Welcome

Deposit Search Visualize Analyze Download Learn

RCSB Protein Data Bank (RCSB PDB) enables breakthroughs in science and education by providing access and tools for exploration, visualization, and analysis of:

- Experimentally-determined 3D structures from the **Protein Data Bank (PDB)** archive
- Computed Structure Models (CSM)** from AlphaFold DB and ModelArchive

These data can be explored in context of external annotations providing a structural view of biology.

Explore NEW Features

PDB-101 Training Resources

October Molecule of the Month

Angiotensin and Blood Pressure

Advanced Search

Use the **Advanced Search Query Builder** tool to create composite boolean queries. See the [Help](#) page for more detailed information.

Advanced Search Query Builder

- Full Text
- Structure Attributes
- Chemical Attributes
- Sequence Similarity
- Sequence Motif
- Structure Similarity
- Structure Motif
- Chemical Similarity

Return Structures grouped by No Grouping

Include Computed Structure Models (CSM) On

Advanced Search by protein, author, ligand name, ID, structure and chemical properties, sequences, structures, motifs, chemical formula

Search

Browse

ATC Biological Process CATH Cellular Component ECOD Enzyme Classification Genome Location MeSH Molecular Function mpstruc OPM Protein Symmetry SCOP-e SCOP2

Source Organism

ATC Browser

The Anatomical Therapeutic Chemical (ATC) Classification System is used for the classification of drugs. It is controlled by the WHO Collaborating Centre for Drug Statistics Methodology. Here you can **browse** or search for an ATC name or ATC code of small molecule drugs and view the number of associated Molecular Definitions present in the Chemical component or BIRD dictionaries.

Enter a word or phrase to search the tree.

- ALIMENTARY TRACT AND METABOLISM DRUGS (A) - [ 109 Molecular Definitions ]
- BLOOD AND BLOOD FORMING ORGAN DRUGS (B) - [ 33 Molecular Definitions ]
- CARDIOVASCULAR SYSTEM DRUGS (C) - [ 77 Molecular Definitions ]
- DERMATOLOGICALS (D) - [ 84 Molecular Definitions ]
- GENITO URINARY SYSTEM AND SEX HORMONES (G) - [ 72 Molecular Definitions ]
- SYSTEMIC HORMONAL PREPARATIONS, EXCL. SEX HORMONES AND INSULINS (H) - [ 16 Molecular Definitions ]
- ANTIINFECTIVES FOR SYSTEMIC USE (J) - [ 139 Molecular Definitions ]
- ANTI NEOPLASTIC AND IMMUNOMODULATING AGENTS (L) - [ 61 Molecular Definitions ]
- MUSCULO-SKELETAL SYSTEM DRUGS (M) - [ 48 Molecular Definitions ]
- NERVOUS SYSTEM DRUGS (N) - [ 109 Molecular Definitions ]
- ANTIPARASITIC PRODUCTS, INSECTICIDES AND REPELLENTS (P) - [ 28 Molecular Definitions ]
- RESPIRATORY SYSTEM DRUGS (R) - [ 46 Molecular Definitions ]
- SENSORY ORGAN DRUGS (S) - [ 69 Molecular Definitions ]
- VARIOUS DRUG CLASSES IN ATC (V) - [ 30 Molecular Definitions ]

Data from external resource.

Browse by drug class, enzyme classification (E.C.), source organism, molecular function, structure classification (e.g., SCOP, CATH) and more

## Top Bar Search options

Turn On to include CSMs

On  Include CSM ?

Search

A

**Query:** Type word, phrase, ID → press enter OR click on Search icon

**Result:** All structures with any of the words or ID returned. This is a very broad search option. Use the Refinements menu to select relevant structures from the results.

Insulin receptor Default Off  Include CSM ? Search

[Advanced Search](#) | [Browse Annotations](#) [Help](#)

B

**Query:** Type word, phrase, ID → select from options provided in auto suggest box → press enter OR click on Search icon

**Result:** Auto suggestion box presents options where query text appears in specific structure properties - e.g., protein name, keywords, structure title. This yields a more refined set of structures.

insulin receptor Include CSM ?  Search

[Advanced Search](#) | [Browse Annotations](#) [Help](#)

*in UniProt Molecule Name*

- Insulin receptor**
- Insulin receptor substrate 1
- Insulin receptor substrate 2
- Insulin receptor-related protein

*in Additional Structure Keywords*

- Insulin receptor, insulin, SIGNALING PROTEIN
- insulin receptor, insulin-mimic peptide, insulin receptor agonist, SIGNALING PROTEIN-AGONIST complex
- insulin, long-acting analog, insulin receptor, insulin dynamics, HORMONE
- Insulin receptor, Insulin micro-receptor, Hormone-Hormone receptor complex
- insulin receptor, insulin-mimic peptide, insulin receptor agonist, HORMONE-SIGNALING PROTEIN-AGONIST complex
- HORMONE RECEPTOR, INSULIN RECEPTOR FAMILY
- insulin receptor, insulin, SIGNALING PROTEIN-HORMONE complex

C

**Query:** Type word, phrase, ID with Boolean operation symbols → press enter OR click on Search icon

**Result:** Structures matching the text combined with the Boolean operators used (e.g., + is AND, | is OR, - is NOT) is returned. Search results are more specific compared to option A. Use Refinements menu options to select relevant structures from results.

Insulin + receptor Include CSM ?  Search

[Advanced Search](#) | [Browse Annotations](#) [Help](#)

Action	Operator	Description	Example
OR	Multiple keywords,	Will find entries containing either Word1 or Word2	<i>Citrate Synthase Citrate   Synthase</i>
AND	+ or plus sign	Will find entries containing both Word1 and Word2 anywhere in the entry.	<i>Citrate + Synthase</i>
NOT	- or minus sign	Will find entries where Word1 is not found anywhere in the entry.	<i>-Citrate</i> (Note searching for "-Citrate" with quotes will return entries containing the phrase -Citrate)
Indicate order of search terms	() or parenthesis	Placing parentheses around search terms will indicate the order of the search.	<i>-(Citrate+Synthase) -(Citrate   Synthase)</i>
Search for a phrase	" " or quotations	Using quotes around a search term will find entries containing that exact phrase.	<i>"Citrate Synthase"</i>

D

**Query:** Paste protein, DNA, or RNA sequence → press enter OR click on Search icon

**Result:** Exact polymer sequence matches and similar polymer sequences are returned along with measures showing the match extent.

FVNQHLCGSHLVEALYLVCGERGFFYTPKT Include CSM ?  Search

[Advanced Search](#) | [Browse Annotations](#) [Help](#)

# Advanced Search Query Builder options

Query options

### Full text

Enter one or more search terms.

Add Term Add Subquery

Count Remove Subquery

### Structure Attributes

AND -- Type to filter and/or select an attribute --

Add Attribute Add Subquery

Count Remove Subquery

### Chemical Attributes

AND -- Type to filter and/or select an attribute --

Add Attribute Add Subquery

Count Remove Subquery

### Sequence Similarity

AND MTTQAPTFTQPLQSVVLEG. Enter a sequence containing a minimum of 25 residues, OR enter an Entry ID in sequences that are similar to a sequence from a given structure and chain.

Entry ID 1MBN SequenceType Protein E-Value Cutoff 0.1

Count Clear

### Sequence Motif

AND MQTIF

Sequence Type Protein Mode Simple

Count Clear

### Structure Similarity

AND Entry ID 1MBN

Count Clear

### Structure Motif

AND Entry ID 4CHA

Chain ID Operator 1 Residue Number Exchanges HIS,LYS (optional)

RMSD Cutoff 2 Atom Pairing All Atoms

Count Clear

### Chemical Similarity

AND C12 H28 N4 O. Note that a Chemical Formula Search is case-sensitive. For example:

Query Type Formula Match Subset Open Chemical Sketch Tool

Count Clear

Result options

Return Structures grouped by No Grouping Default Off Include Computed Structure Models (CSM) Count Clear Search

- Structures
- Polymer Entities
- Assemblies
- Non-polymer Entities
- Molecular Definitions

- No Grouping
- PDB Deposit Group ID
- No Grouping
- Sequence Identity 100%
- Sequence Identity 95%
- Sequence Identity 90%
- Sequence Identity 70%
- Sequence Identity 50%
- Sequence Identity 30%
- UniProt Accession

How are results presented?  
list or groups

Include CSMs?  
Turn On

Search

What is returned?  
structure, polymer,  
assembly, or ligand

# Browse options

[ATC](#) [Biological Process](#) [CARD](#) [CATH](#) [Cellular Component](#) [ECOD](#) [Enzyme Classification](#) [Genome Location](#) [MeSH](#) [Molecular Function](#) [mpstruc](#) [OPM](#) [Protein Symmetry](#) [SCOP-e](#) [SCOP2](#)

Source Organism

## Enzyme Classification Browser

[Help](#)

The EC (Enzyme Commission) browser presents proteins in the PDB based on the type of enzyme function it performs. Enzymes are classified based on the recommendations of the Nomenclature Committee of the International Union of Biochemistry and Molecular Biology (IUBMB). For each enzyme in the archive an EC number has been provided (see EC). These assignments are based on UniProtKB/GenBank/KEGG/author specified mapping of the enzyme to EC numbers.

Here you can **browse** the EC tree by an enzyme or enzyme class name, **view** the number of associated PDB proteins, and **search** for the specific associated structures either by enzyme name or by partial/full EC number.

- ▶ Oxidoreductases (1) - [ 21,868 Polymer Entities ]
- ▶ Transferases (2) - [ 46,378 Polymer Entities ]
- ▶ Hydrolases (3) - [ 58,008 Polymer Entities ]
- ▶ Lyases (4) - [ 12,065 Polymer Entities ]
- ▶ Isomerases (5) - [ 4,739 Polymer Entities ]
- ▼ Ligases (6) - [ 4,019 Polymer Entities ]
  - ▶ Forming carbon-oxygen bonds (6.1) - [ 1,168 Polymer Entities ]
  - ▶ Forming carbon-sulfur bonds (6.2) - [ 347 Polymer Entities ]
  - ▶ Forming carbon-nitrogen bonds (6.3) - [ 2,185 Polymer Entities ]
  - ▶ Forming carbon-carbon bonds (6.4) - [ 189 Polymer Entities ]
  - ▶ Forming phosphoric-ester bonds (6.5) - [ 194 Polymer Entities ]
  - ▼ Forming nitrogen-metal bonds (6.6) - [ 15 Polymer Entities ]
    - ▼ Forming coordination complexes (6.6.1) - [ 15 Polymer Entities ]
      - magnesium chelatase (6.6.1.1) - [ 14 Polymer Entities ]
      - cobaltochelatase (6.6.1.2) - [ 1 Polymer Entity ]
- ▶ Translocases (7) - [ 5,134 Polymer Entities ]

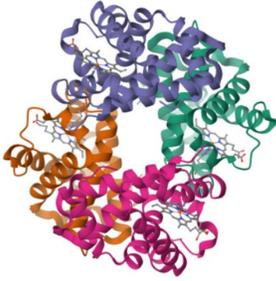
■ Data from external resource.

Browse through the categories and expand relevant sub-classes. Click on the numbers adjacent to the class of interest to find matches to that classification, OR type the name/property of the structure(s) of interest in the search box (\*) provided. Scroll down to find all relevant matches.

Browse contents of archive by	Browse level
<b>ATC</b> (Anatomical Therapeutic Chemical)	Small molecular drug definitions
<b>Biological process</b> (by Gene Ontology Consortium (GO))	Protein function
<b>CARD</b> (Comprehensive Antibiotic Resistance Database)	Protein function
<b>CATH</b> (Structure Classification)	Structure
<b>Cellular Component</b> (Cellular location, by Gene Ontology Consortium (GO))	Protein
<b>ECOD</b> (Evolutionary Classification)	Structure
<b>Enzyme Classification</b> (E.C.)	Protein function
<b>Genome Location</b>	Protein/polymer location in genome
<b>MeSH</b> (Medical Subject Headings)	Structure
<b>Molecular Function</b> (by Gene Ontology Consortium (GO))	Protein function
<b>mpstruc</b> (membrane proteins of known 3D structure)	Membrane association of protein
<b>OPM</b> ( Orientations of Proteins in Membranes)	Membrane association of protein
<b>Protein Symmetry</b>	Assembly
<b>SCOP-e</b> (Structure Classification)	Structure
<b>SCOP2</b> (Structure Classification)	Structure
<b>Source Organism</b>	Protein/polymer source

# Query by Example options

Biological Assembly 1 ?



Explore in 3D: [Structure](#) | [Sequence Annotations](#) | [Electron Density](#) | [Validation Report](#) | [Ligand Interaction \(HEM\)](#)

Global Symmetry: Cyclic - C2 (Explore in 3D)  
Global Stoichiometry: Hetero 4-mer - A2B2

Pseudo Symmetry: Dihedral - D2 (Explore in 3D)  
Pseudo Stoichiometry: Homo 4-mer - A4

[Find Similar Assemblies](#)

Biological assembly 1 assigned by authors and generated by PISA (software)

Display Files
Download Files
Data API

## 2DN2

1.25Å resolution crystal structure of human hemoglobin in the deoxy form

PDB DOI: <https://doi.org/10.2210/pdb2DN2/pdb> Entry: 2DN2 supersedes: 2DFQ

Classification: **OXYGEN STORAGE/TRANSPORT**

Organism(s): **Homo sapiens**

Mutation(s): No

Deposited: 2006-04-25 Released: 2006-05-09

Deposition Author(s): **Park, S.-Y., Yokoyama, T., Shibayama, N., Shiro, Y., Tame, J.R.**

Experimental Data Snapshot      wwPDB Validation

Method: X-RAY DIFFRACTION  
Resolution: 1.25 Å  
R-Value Observed: 0.179

Metric	Percentile Ranks	Value
Rfree		0.157
Clashscore		5
Ramachandran outliers		0
Sidechain outliers		2.8%
RSRZ outliers		10.3%

Ligand Structure Quality Assessment

Worse 0 1 Better  
Ligand structure goodness of fit to experimental data

This is version 1.4 of the entry. See complete [history](#).

↑ Click on hyperlink to launch a query

Literature Download Primary Citation

1.25 Å resolution crystal structures of human haemoglobin in the oxy, deoxy and carbonmonoxy forms

[Park, S.-Y., Yokoyama, T., Shibayama, N., Shiro, Y., Tame, J.R.](#)

(2006) J Mol Biol 360: 690-701

PubMed: [16765986](#)

DOI: <https://doi.org/10.1016/j.jmb.2006.05.036>

Primary Citation of Related Structures:  
2DN1, 2DN2, 2DN3

**PubMed Abstract:**  
The most recent refinement of the crystallographic structure of oxyhaemoglobin (oxyHb) was completed in 1983, and differences between this real-space refined model and later R state models have been interpreted as evidence of crystallisation artefacts, or numerous sub-states. We have refined models of deoxy, oxy and carbonmonoxy H...

[View More](#)

Macromolecules

Find similar proteins by: Sequence | 3D Structure

Entity ID: 1

Molecule	Chains	Sequence Length	Organism	Details	Image
Hemoglobin alpha subunit	A, C	141	Homo sapiens	Mutation(s): 0 Gene Names: <b>HBA1, HBA2</b>	

UniProt & NIH Common Fund Data Resources

Find proteins for [P69905](#) (*Homo sapiens*)      Explore [P69905](#)      Go to UniProtKB: [P69905](#)

Entity Groups

Sequence Clusters: 30% Identity 50% Identity 70% Identity 90% Identity 95% Identity 100% Identity

UniProt Group: [P69905](#)

Small Molecules

Ligands 1 Unique

ID	Chains	Name / Formula / InChI Key	2D Diagram	3D Interactions
HEM	E [auth A], F [auth B], G [auth C], H [auth D]	PROTOPORPHYRIN IX CONTAINING FE C <sub>34</sub> H <sub>32</sub> Fe N <sub>4</sub> O <sub>4</sub> KABFMIBPWCXCRK-RGGAHWMASA-L		Interactions Interactions & Density

[Query on HEM](#)

Download Ideal Coordinates: [CCD File](#)

Download Instance Coordinates

# Query by Example options

Assembly ?

Display Files Download Files Data API

## AF\_AFA0A009IHW8F1

COMPUTED STRUCTURE MODEL OF NAD(+) HYDROLASE ABTIR

AlphaFold DB: [AF-A0A009IHW8-F1](#)

Released in AlphaFold DB: 2021-12-09  
Last Modified in AlphaFold DB: 2022-09-30

Organism(s): [Amblyomma cajennense](#)

UniProtKB: [A0A009IHW8](#)

Model Confidence

pLDDT (global): 85.13  
pLDDT (local):

Model Confidence ?

- Very high (pLDDT > 90)
- Confident (90 > pLDDT > 70)
- Low (70 > pLDDT > 50)
- Very low (pLDDT < 50)

Computed Structure Models provide per-residue confidence score (pLDDT) between 0 and 100. Some regions below 50 pLDDT may be unstructured in isolation.

Explore in 3D: [Structure](#) | [Sequence Annotations](#)

Global Symmetry: Asymmetric - C1 ?  
Global Stoichiometry: Monomer - A1 ?

[Find Similar Assemblies](#)

Macromolecule Content

- Total Structure Weight: 30.97 kDa ?
- Atom Count: 2,176 ?
- Modelled Residue Count: 269 ?
- Deposited Residue Count: 269 ?
- Unique protein chains: 1

Macromolecules

Find similar proteins by: [Sequence](#) (by identity cutoff) | [3D Structure](#)

Entity ID: 1

Molecule	Chains ?	Sequence Length	Organism	Details	Image
Evasin P1126	A	90	<a href="#">Amblyomma cajennense</a>	Mutation(s): 0 ?	

UniProt

Find proteins for [A0A023FFB1](#) (*Amblyomma cajennense*)

Explore [A0A023FFB1](#) ?

Go to UniProtKB: [A0A023FFB1](#)

Entity Groups ?

Sequence Clusters: [30% Identity](#) [50% Identity](#) [70% Identity](#) [90% Identity](#) [95% Identity](#) [100% Identity](#)

UniProt Group: [A0A023FFB1](#)

↑ Click on hyperlink to launch a query