

ENTREZ can search across
all NCBI databases at the
same time

Entrez cross-database search


NCBI

Entrez, The Life Sciences Search Engine


ARCH SITE MAP PubMed All Databases Human Genome GenBank Map View


Search across databases [Help](#)


Welcome to the Entrez cross-database search page

 **PubMed:** biomedical literature citations and abstracts


 **PubMed Central:** free, full text journal articles


 **Site Search:** NCBI web and FTP sites


 **Books:** online books


 **OMIM:** online Mendelian Inheritance in Man


 **OMIA:** online Mendelian Inheritance in Animals


 **Nucleotide:** Core subset of nucleotide sequence records


 **EST:** Expressed Sequence Tag records


 **GSS:** Genome Survey Sequence records


 **Protein:** sequence database


 **Genome:** whole genome sequences


 **Structure:** three-dimensional macromolecular structures


 **Taxonomy:** organisms in GenBank


 **SNP:** single nucleotide polymorphism


 **dbVar:** Genomic structural variation


 **Gene:** gene-centered information


 **SRA:** Sequence Read Archive


 **BioSystems:** Pathways and systems of interacting molecules


 **dbGaP:** genotype and phenotype


 **UniGene:** gene-oriented clusters of transcript sequences


 **CDD:** conserved protein domain database


 **3D Domains:** domains from Entrez Structure


 **UniSTS:** markers and mapping data


 **PopSet:** population study data sets


 **GEO Profiles:** expression and molecular abundance profiles

 **GEO DataSets:** experimental sets of GEO data

 **Cancer Chromosomes:** cytogenetic databases

 **PubChem BioAssay:** bioactivity screens of chemical substances

 **PubChem Compound:** unique small molecule chemical structures

 **PubChem Substance:** deposited chemical substance records



Search across databases GO CLEAR Help

Welcome to the Entrez cross-database search page

- PubMed: biomedical literature citations and abstracts
- Books: online books
- PubMed Central: free, full text journal articles
- OMIM: online Mendelian Inheritance in Man
- Site Search: NCBI web and FTP sites
- OMIA: online Mendelian Inheritance in Animals
- Nucleotide: sequence database (GenBank)
- Protein: sequence database
- CDD: conserved protein domain database
- Genome: whole genome sequences
- 3D Domains: domains from Entrez Structure
- Structure: three-dimensional macromolecular structures
- UniSTS: markers and mapping data
- Taxonomy: organisms in GenBank
- PopSet: population study data sets
- SNP: single nucleotide polymorphism
- GEO Profiles: expression and molecular abundance profiles
- Gene: gene-centered information
- GEO DataSets: experimental sets of GEO data
- HomoloGene: eukaryotic homology groups
- Cancer Chromosomes: cytogenetic databases
- PubChem Compound: unique small molecule chemical
- PubChem BioAssay: bioactivity screens of chemical

Put your search term in here (eg. Embryonic stem cells)

Search across databases

GO





















































Clear

Help

Lots of results!

- Result counts displayed in gray indicate one or more terms not found

6929		PubMed: biomedical literature citations and abstracts	
3950		PubMed Central: free, full text journal articles	
6		Site Search: NCBI web and FTP sites	
163		Books: online books	
496		OMIM: online Mendelian Inheritance in Man	
7		OMIA: online Mendelian Inheritance in Animals	

Wait		CoreNucleotide: Core subset of nucleotide sequence records	
157717		EST: Expressed Sequence Tag records	
278890		GSS: Genome Survey Sequence records	
44		Protein: sequence database	
none		Genome: whole genome sequences	
none		Structure: three-dimensional macromolecular structures	
none		Taxonomy: organisms in GenBank	
Wait		SNP: single nucleotide polymorphism	
258		Gene: gene-centered information	
none		HomoloGene: eukaryotic homology groups	
none		GENSAT: gene expression atlas of mouse central nervous system	
248		Probe: sequence-specific reagents	
1		Genome Project: genome project information	
4		dbGaP: genotype and phenotype	
1		UniGene: gene-oriented clusters of transcript sequences	
1		CDD: conserved protein domain database	
none		3D Domains: domains from Entrez Structure	
none		UniSTS: markers and mapping data	
none		PopSet: population study data sets	
Wait		GEO Profiles: expression and molecular abundance profiles	
153		GEO DataSets: experimental sets of GEO data	
Wait		Cancer Chromosomes: cytogenetic databases	
none		PubChem BioAssay: bioactivity screens of chemical substances	
none		PubChem Compound: unique small molecule chemical structures	
none		PubChem Substance: deposited chemical substance records	
none		Protein Clusters: a collection of related protein sequences	

Journals: detailed information about the journals

MeSH: detailed information about NLM's controlled



National Center for
Biotechnology Information

Search All Databases

Search

Clear

Resources

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[All Resources \(A-Z\)](#)

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Welcome to NCBI

The National Center for Biotechnology Information advances science and health by providing access to biomedical and genomic information.

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Genome Reference Consortium

Formed to improve human and mouse reference assemblies, GRC will fix loci misrepresented in reference assembly, fill remaining gaps, and make alternate representations of complex loci.

|| 1 2 3 4

How To...

- [Obtain the full text of an article](#)
- [Retrieve all sequences for an organism or taxon](#)
- [Find a homolog for a gene in another organism](#)
- [Find genes associated with a phenotype or disease](#)
- [Design PCR primers and check them for specificity](#)
- [Find the function of a gene or gene product](#)
- [Determine conserved synteny between the genomes of two organisms](#)

[See all ...](#)

Popular Resources

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- [Gene](#)
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- [Protein](#)
- [GEO](#)
- [Conserved Domains](#)
- [Structure](#)
- [PubChem](#)

NCBI News

[NIH Roadmap](#) 22 Apr 2010

[Epigenomics Project data in GEO database](#)
GEO's Roadmap Epigenomics Project Data Listings page allows ...

[March News issue](#) 09 Apr 2010

available
Includes My NCBI, E-Utility, and BLAST news.

[NIH announces Genetic](#) 23 Mar 2010

[Testing Registry](#)
NCBI will be responsible for developing the regist

You can search for
biomedical Books

★ Favorites Books Home



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The **Bookshelf** is a growing collection of biomedical books that can be searched directly by typing a concept into the textbox above and selecting "Go". Try one of these searches:

▶ [cell cycle control](#) ▶ [immunodeficiency](#) ▶ [protein evolution](#)

▶ **New on the Bookshelf:**



[Comparative Oncology](#)

Baba, Alecsandru Ioan; Cătoi, Cornel
Bucharest: [The Publishing House of the Romanian Academy](#); 2007



[Familial Cancer Syndromes \[Internet\]](#)

Riegert-Johnson, Douglas L.; Boardman, Lisa A.; Hefferon, Timothy; Spurck, Lauren, editors
Bethesda (MD): [National Library of Medicine \(US\), NCBI](#); 2009



[Health, United States, 2008](#)

Atlanta (GA): [Centers for Disease Control and Prevention](#); 2008



[The National Academies Collection: Reports funded by National Institutes of Health](#)

Washington (DC): [The National Academies Press](#); c2006-2009

Search: Purine and pyrimidine

Result: You get a number of books containing the words purine and pyrimidine.

The screenshot shows the NCBI Bookshelf search interface. At the top, the NCBI logo is on the left, and the 'Bookshelf' logo is in the center. Below the logos is a navigation bar with tabs for 'All Databases', 'PubMed', 'Nucleotide', 'Protein', 'Genome', 'Structure', and 'PMC'. The search bar contains the text 'Books' in a dropdown menu, followed by 'for Purine and pyrimidine'. To the right of the search bar are buttons for 'Go', 'Clear', and a link for 'Save Search'. Below the search bar are buttons for 'Limits', 'Preview/Index', 'History', 'Clipboard', and 'Details'. Further down, there are controls for 'Display' (set to 'Books'), 'Show' (set to '20'), and 'Send to'. A summary bar shows 'All: 194' and 'Figures: 23' with a small icon. The search results are listed below, each with a small icon, a title, and a description. The first result is '31 items in Madame Curie Bioscience Database', the second is '27 items in Biochemistry' (circled in red with an arrow pointing to it), the third is '17 items in Cancer Medicine', and the fourth is '15 items in Introduction to Genetic Analysis'. The text 'Done' is visible at the bottom left of the page.

NCBI

Bookshelf

All Databases PubMed Nucleotide Protein Genome Structure PMC

Search Books for Purine and pyrimidine Go Clear Save Search

Limits Preview/Index History Clipboard Details

Display Books Show 20 Send to

All: 194 Figures: 23

31 items in Madame Curie Bioscience Database
Chapters taken from the Madame Curie Bioscience Database (formerly, Eureka Bioscience Database)
Eureka.com and Landes Bioscience and Springer Science+Business Media; c2009

27 items in Biochemistry
Berg, Jeremy M.; Tymoczko, John L.; and Stryer, Lubert.
New York: W. H. Freeman and Co.; c2002

17 items in Cancer Medicine
Kufe, Donald W.; Pollock, Raphael E.; Weichselbaum, Ralph R.; Bast, Robert C., Jr.; Gansler, Ted S.; Holland, James F.; Frei III, Emil, editors.
Hamilton (Canada): BC Decker Inc.; c2003

15 items in Introduction to Genetic Analysis
Griffiths, Anthony J.F.; Miller, Jeffrey H.; Suzuki, David T.; Lewontin, Richard C.; Gelbart

Done

Select **entries** that are of interest to you and click on link.

By selecting option 2, the search has been limited to a book called "Biochemistry" by Stryer et al



Bookshelf

All Databases

PubMed

Nucleotide

Protein

Genome

Structure

PMC

Search Books for Purine and pyrimidine AND stryer[book] Go Clear Save Search

Limits Preview/Index History Clipboard Details

Display Summary Show 20 Send to

All: 27 Figures: 2


Items 1 - 20 of 27

Page 1 of 2 Next

- 1: [The Purine Ring System Is Assembled on Ribose Phosphate](#)
Biochemistry -> 25.2 Purine Bases Can Be Synthesized de Novo or Recycled by Salvage Pathways
- 2: [25.4 Key Steps in Nucleotide Biosynthesis Are Regulated by Feedback Inhibition](#)
Biochemistry -> Nucleotide Biosynthesis
- 3: [Purines Bases Can Be Synthesized de Novo or Recycled by Salvage Pathways](#)
Biochemistry -> Summary
- 4: [Chapter Integration Problems](#)
Biochemistry -> Problems
- 5: [27.6 Mutations Involve Changes in the Base Sequence of DNA](#)
Biochemistry -> DNA Replication, Recombination, and Repair
- 6: [Problems](#)
Biochemistry -> Nucleotide Biosynthesis

Looking at 6 -
Problems

You can test yourself and check your answers online




W. H. FREEMAN AND COMPANY
BIOCHEMISTRY
FIFTH EDITION
Jeremy M. Berg John L. Tymoczko Lubert Stryer

Search for

Within This book All books PubMed

NCBI » Bookshelf » Biochemistry » Synthesizing the Molecules of Life » Nucleotide Biosynthesis » Problems

 By agreement with the publisher, this book is accessible by the search feature, but cannot be browsed.

Problems

1 *Activated ribose phosphate.* Write a balanced equation for the synthesis of PRPP from glucose through the oxidative branch of the pentose phosphate pathway.

[See answer](#)

2 *Making a pyrimidine.* Write a balanced equation for the synthesis of orotate from glutamine, CO₂, and aspartate.

[See answer](#)

3 *Identifying the donor.* What is the activated reactant in the biosynthesis of each of these compounds?

(a) Phosphoribosylamine

Details, Limits, Preview ...

1. Limits: ways to restrict a search to a defined subset of the database.
2. Preview/Index: list last searches; combine with new search terms
3. History: review, delete, recall and combine past searches (max 100)
4. Clipboard: temporarily store results
5. Details: review interpretation of the query term

LIMITS



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Genome

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for Purine and pyrimidine

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Details

Restrict your search to:

- different types of book content; checking multiple boxes is equivalent to a Boolean "OR"
- one or more books; use control+click to select more than one book
- topics by a particular person; use: smith jc

Or use in combination to build a complex query.

Limit search to:

- Titles
- Figures
- Tables
- Boxes

In:

All Books
Aging in Sub-Saharan Africa
Asbestos
Ethical Considerations for Research Involving Prisoners
A Stereotaxic Atlas Of The ... Finch, Taeniopygia Guttata
A Strategy for Assessing Science
AHCPR Supported Guide and Guidelines
AHFS Consumer Medication Information
AHRQ Comparative Effectiveness Reviews
AHRQ Evidence Report Summaries

Author

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PREVIEW INDEX

NCBI **Bookshelf** [My NCBI](#) [\[Sign In\]](#) [\[Register\]](#)

All Databases PubMed Nucleotide Protein Genome Structure PMC Taxonomy OMM Books

Books for

- Enter terms and click Preview to see only the number of search results.
- To save search indefinitely, click query # and select Save in My NCBI.
- To combine searches use #search, e.g., #2 AND #3 or click query # for more options.

Search	Most Recent Queries	Time	Result
#1	Search Purine and pyrimidine	02:52:41	194

Add Term(s) to Query or View Index:

- Enter a term in the text box; use the pull-down menu to specify a search field.
- Click Preview to add terms to the query box and see the number of search results, or click Index to view terms within a field.

All Fields

Click to add a term to the query box

HISTORY

for Purine and pyrimidine [Preview] [Go] [Clear]

[Limits] [Preview/Index] **[History]** [Clipboard] [Details]

- Search History will be lost after eight hours of inactivity.
- Search numbers may not be continuous; all searches are represented.
- To save search indefinitely, click query # and select Save in My NCBI.
- To combine searches use #search, e.g., #2 AND #3 or click query # for more options.

Search	Most Recent Queries	Time	Result
#1	Search Purine and pyrimidine	02:52:41	194

Options

- ▶ AND
- ▶ OR
- ▶ NOT
- ▶ Delete
- ▶ Go
- ▶ Details
- ▶ Save in My NCBI

[Clear]

CLIPBOARD



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for Purine and pyrimidine

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Clipboard

Details

Clipboard contains no items - see [Help](#)

- The Clipboard will hold a maximum of 500 items.
- Clipboard items will be lost after eight hours of inactivity.
- To save items indefinitely, use Send to My NCBI Collections.


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Query Translation:

Click to see how your search was enhanced

```
(Purine[All Fields] AND pyrimidine[All Fields]) AND Stem  
cells[All Fields]
```

Search

URL

Result:

1

Stopword(s) Ignored:

and

Database:

Books

Catalog of human genes and genetic disorders

OMIM Home - Windows Internet Explorer
http://www.ncbi.nlm.nih.gov/sites/entrez

NCBI OMIM Online Mendelian Inheritance in Man Johns Hopkins University

All Databases PubMed Nucleotide Protein Genome Structure PMC OMIM

Search OMIM for

Entrez

- OMIM
- Search OMIM
- Search Gene Map
- Search Morbid Map

Help

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- How to Link

FAQ

- Numbering System
- Symbols
- How to Print
- Citing OMIM
- Download

OMIM Facts

- Statistics
- Update Log
- Restrictions on Use

Allied Resources

- Genetic Alliance

Limits Preview/Index History Clipboard Details

- Enter one or more search terms.
- Use **Limits** to restrict your search by search field, chromosome, and other criteria.
- Use **Index** to browse terms found in OMIM records.
- Use **History** to retrieve records from previous searches, or to combine searches.

OMIM® - Online Mendelian Inheritance in Man®

Welcome to OMIM®, Online Mendelian Inheritance in Man®. OMIM is a comprehensive, authoritative, and timely compendium of human genes and genetic phenotypes. The full-text, referenced overviews in OMIM contain information on all known mendelian disorders and over 12,000 genes. OMIM focuses on the relationship between phenotype and genotype. It is updated daily, and the entries contain copious links to other genetics resources.

This database was initiated in the early 1960s by Dr. Victor A. McKusick as a catalog of mendelian traits and disorders, entitled Mendelian Inheritance in Man (MIM). Twelve book editions of MIM were published between 1966 and 1998. The online version, OMIM, was created in 1985 by a collaboration between the National Library of Medicine and the William H. Welch Medical Library at Johns Hopkins. It was made generally available on the internet starting in 1987. In 1995, OMIM was developed for the World Wide Web by NCBI, the National Center for Biotechnology Information.

OMIM is authored and edited at the McKusick-Nathans Institute of Genetic Medicine, Johns Hopkins University School of Medicine, under the direction of Dr. Ada Hamosh.

NLM's Profiles in Science -- The McKusick Papers [More...](#)

NOTE: OMIM is intended for use primarily by physicians and other professionals concerned with genetic disorders, by genetics researchers, and by

OMIM database searching (human genes and genetic disorders)

- OMIM: “online Mendelian inheritance in man”.
- Search term: “adenosine deaminase”.
 - Found: 47 entries
 - Chose: #102700 (severe combined immunodeficiency)
- NOTE: the # symbol is used to show mutants



All Databases

PubMed

Nucleotide

Protein

Genome

Structure

PMC

OMIM

Search OMIM for adenosine deaminase

Go

Clear

[Save Search](#)

Limits

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Details

Display Titles

Show

20

Send to

All: 47

OMIM UniSTS: 10

OMIM dbSNP: 9



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- 1:** [*146920. ADENOSINE DEAMINASE, RNA-SPECIFIC; ADAR](#) MGI, [Links](#)
 Gene map locus [1q21.3](#)
- 2:** [#102700. SEVERE COMBINED IMMUNODEFICIENCY, AUTOSOMAL RECESSIVE, T CELL -NEGATIVE, B CELL-NEGATIVE, NK CELL-NEGATIVE, DUE TO ADENOSINE DEAMINASE DEFICIENCY](#) GeneTests, [Links](#)
 SCID DUE TO ADA DEFICIENCY, DELAYED ONSET, INCLUDED
 Gene map locus [20q13.11](#)
- 3:** [*608958. ADENOSINE DEAMINASE; ADA](#) MGI, GeneTests, [Links](#)
 Gene map locus [20q13.11](#)
- 4:** [+102770. ADENOSINE MONOPHOSPHATE DEAMINASE 1; AMPD1](#) MGI, GeneTests, [Links](#)
 MYOADENYLATE DEAMINASE DEFICIENCY, MYOPATHY DUE TO, INCLUDED
 Gene map locus [1p21-p13](#)
- 5:** [*601218. ADENOSINE DEAMINASE, RNA-SPECIFIC, B1; ADARB1](#) MGI, [Links](#)

The result gives you all the information about the disease in man and includes:

Clinical features; Pathogenesis, Diagnosis; Animal models, Clinical management and references for all the above.

NCBI **OMIM** *Online Mendelian Inheritance in Man*  **Johns Hopkins University** [My NCBI](#) [Sign In](#)

All Databases PubMed Nucleotide Protein Genome Structure PMC OMIM

Search OMIM for

[Limits](#) [Preview/Index](#) [History](#) [Clipboard](#) [Details](#)

Display Detailed Show 20 Send to

All: 1 OMIM UniSTS: 0 OMIM dbSNP: 1

MIM #102700
SEVERE COMBINED IMMUNODEFICIENCY, AUTOSOMAL RECESSIVE, T CELL-NEGATIVE, B CELL-NEGATIVE, NK CELL-NEGATIVE, DUE TO ADENOSINE DEAMINASE DEFICIENCY

Alternative titles; symbols

- SCID DUE TO ADA DEFICIENCY
- ADA-SCID
- SCID DUE TO ADA DEFICIENCY, EARLY-ONSET
- SCID DUE TO ADA DEFICIENCY, DELAYED ONSET, INCLUDED
- SCID DUE TO ADA DEFICIENCY, LATE-ONSET, INCLUDED
- ADENOSINE DEAMINASE DEFICIENCY, PARTIAL, INCLUDED
- PARTIAL ADA DEFICIENCY, INCLUDED


Gene map locus: [20q13.11](#)

[Clinical Synopsis](#)

Table of Contents

- MIM #102700
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- Other Features
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- Animal Model
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- Edit History


Clinical management


homozygous ADA-deficient fetus, respectively. The diagnoses were confirmed after birth and in abortus tissue. 


Clinical Management

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Enzyme Replacement Therapy

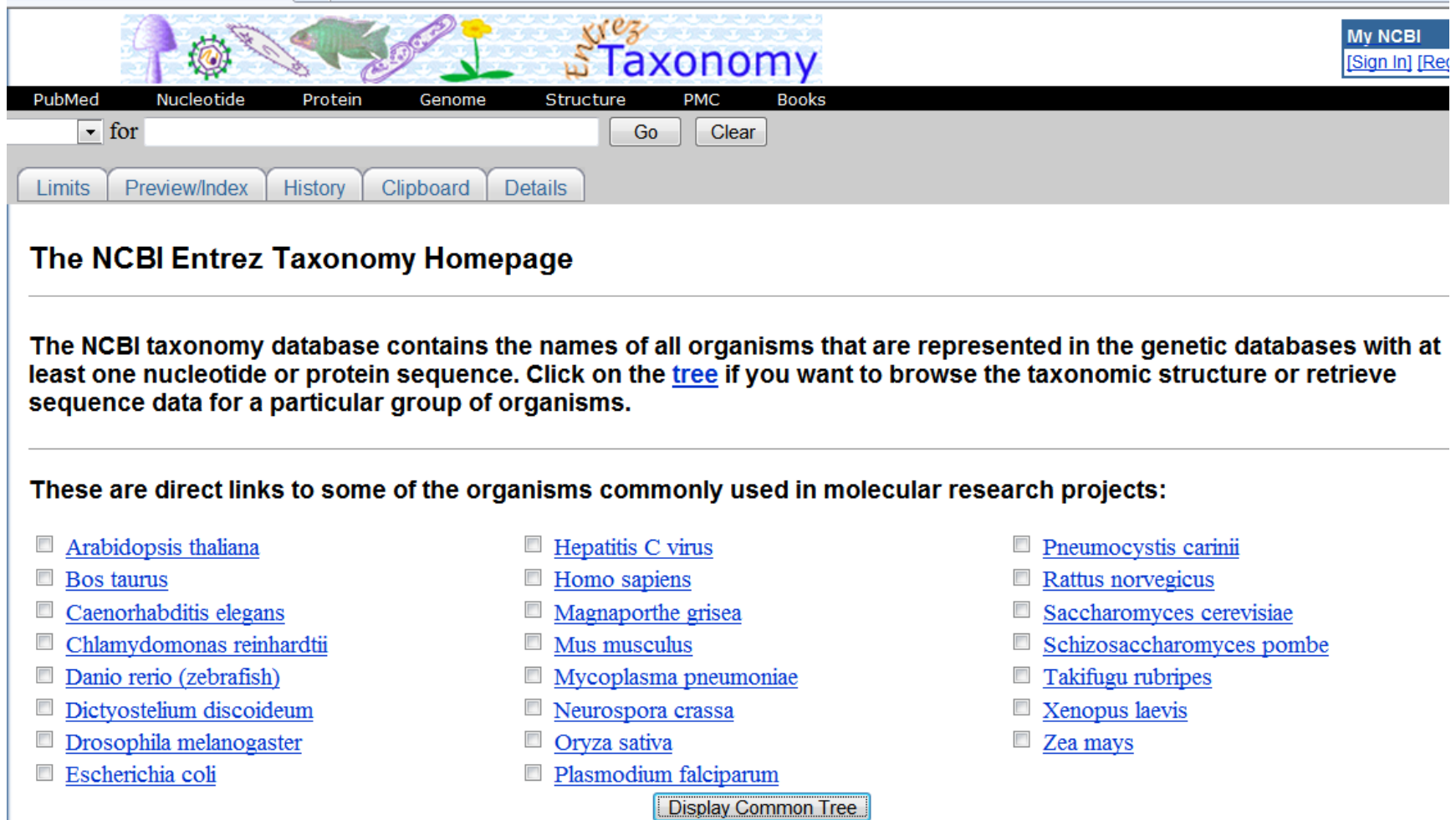
Polmar et al. (1976) reported successful treatment of a child with SCID due to ADA deficiency by 'enzyme replacement therapy' using frozen irradiated red blood cells with normal ADA activity. After treatment, a thymic shadow appeared radiographically, lymphocytic responses were demonstrated in vitro, and there was immunoglobulin synthesis. With infusions at 4-week intervals, the child remained free of infection for 17 months. 

Ziegler et al. (1980) reported a patient with SCID due to ADA deficiency who was treated with ADA-positive red cell infusions. Although there was some resolution of interstitial pneumonitis and skeletal abnormalities, there was no evidence of immunologic reconstitution, and the patient died at age 17 months. The authors noted that severe cases of SCID due to ADA deficiency may not respond to exogenous enzyme therapy. Markert et al. (1987) reported 5 ADA-deficient patients who showed no lasting benefit from red blood cell transfusions. 

Hershfield et al. (1987) reported successful treatment of 2 SCID ADA-deficient patients with polyethylene glycol-modified bovine intestinal ADA (PEG-ADA). The modified enzyme was rapidly absorbed after intramuscular injection and had a half-life in plasma of 48 to 72 hours. Weekly doses maintained plasma ADA activity at 2 to 3 times the level of red cell ADA in normal subjects, resulting in a decrease in toxic deoxyadenosine nucleotides to less than 0.5% of total adenine nucleotides. The activity of S-adenosylhomocysteine hydrolase, which is inactivated by deoxyadenosine, increased to normal in red cells and nucleated marrow cells. Neither toxic effects nor hypersensitivity reactions were observed. In vitro tests of cellular immune function of each patient showed marked improvement, together with an increase in T lymphocytes. Covalent attachment of polyethylene glycol to ADA blocked access to vulnerable sites on the surface of the protein, inhibiting clearance from the circulation, attack by degrading enzymes, binding of antibodies, and processing by antigen-presenting cells. 

Levy et al. (1988) reported a child who developed symptoms of SCID due to ADA deficiency at age 2 years. She had

Organisms represented in the genetic database with at least one nucleotide or protein sequence



The image shows a screenshot of the NCBI Entrez Taxonomy homepage. At the top, there is a navigation bar with icons for various biological entities and the text 'Entrez Taxonomy'. Below this is a search bar with a dropdown menu, a search input field containing the word 'for', and 'Go' and 'Clear' buttons. A row of buttons for 'Limits', 'Preview/Index', 'History', 'Clipboard', and 'Details' is located below the search bar. The main heading is 'The NCBI Entrez Taxonomy Homepage'. A paragraph explains that the database contains names of all organisms with at least one nucleotide or protein sequence, and provides a link to the 'tree'. A section titled 'These are direct links to some of the organisms commonly used in molecular research projects:' lists 15 organisms in three columns, each with a checkbox and a link. A 'Display Common Tree' button is at the bottom.

My NCBI
[Sign In] [Re]

PubMed Nucleotide Protein Genome Structure PMC Books

for Go Clear

Limits Preview/Index History Clipboard Details

The NCBI Entrez Taxonomy Homepage

The NCBI taxonomy database contains the names of all organisms that are represented in the genetic databases with at least one nucleotide or protein sequence. Click on the [tree](#) if you want to browse the taxonomic structure or retrieve sequence data for a particular group of organisms.

These are direct links to some of the organisms commonly used in molecular research projects:

- [Arabidopsis thaliana](#)
- [Bos taurus](#)
- [Caenorhabditis elegans](#)
- [Chlamydomonas reinhardtii](#)
- [Danio rerio \(zebrafish\)](#)
- [Dictyostelium discoideum](#)
- [Drosophila melanogaster](#)
- [Escherichia coli](#)
- [Hepatitis C virus](#)
- [Homo sapiens](#)
- [Magnaporthe grisea](#)
- [Mus musculus](#)
- [Mycoplasma pneumoniae](#)
- [Neurospora crassa](#)
- [Oryza sativa](#)
- [Plasmodium falciparum](#)
- [Pneumocystis carinii](#)
- [Rattus norvegicus](#)
- [Saccharomyces cerevisiae](#)
- [Schizosaccharomyces pombe](#)
- [Takifugu rubripes](#)
- [Xenopus laevis](#)
- [Zea mays](#)

Display Common Tree

3D structure database
as well as tools for
visualization

NCBI Structure

My NCBI [Sign In] [Reg]

All Databases PubMed Nucleotide Protein Genome Structure OMIM PMC Journals Books

Search Structure for [Go] [Clear]

Limits Preview/Index History Clipboard Details

Molecular Modeling Database (MMDB) RESOURCES SEARCH METHODS HOW TO HELP NEWS FTP PUBLICATIONS DISCOV

Hints on Finding 3D Macromolecular Structures

- This page is used for searching by text term (other [search methods](#) allow queries by protein sequence)
- Enter one or more [search terms](#) (e.g., chloride channel)
- Use [search fields](#) and other [Advanced Search](#) options ([Limits](#), [Preview/Index](#), and [History](#)) to refine a search
- [Boolean operators](#) AND, OR, NOT must be in upper case
- Use [quotes](#) to force a phrase search (e.g., "voltage gated")
- Use a [wildcard](#) (e.g., glycol*[title]) to search for a word stem
- [Search results](#) and [structure record displays](#) are described in the help document.

About the Database

[Three dimensional structures](#) provide a wealth of information on the biological function, on mechanisms linked to the function, and on the evolutionary history of and relationships between macromolecules. Most 3D-structure data are obtained from X-ray crystallography and NMR-spectroscopy.

The Molecular Modeling DataBase (MMDB), also known as "Entrez Structure," is a database of experimentally determined structures obtained from the [RCSB Protein Data Bank \(PDB\)](#). MMDB is developed by the [Structure Group](#) of the NCBI

SEQUENCE-STRUCTURE-FUNCTION RELATIONSHIPS
Example: structural basis of aspirin activity (1PTH)

1PTH - Cn3D 4.2

You can search for RNA/DNA sequences on nucleotide

NCBI Nucleotide

Search Nucleotide for falciparum lactate dehydrogenase

Found 46 nucleotide sequences. Nucleotide [46]

Display Summary Show 20 Sort By Send to

All: 46 Bacteria: 23 INSDC (GenBank): 29 RefSeq: 17 mRNA: 1

This search in Gene shows 3 results, including:

- [PF13_0144](#) (*Plasmodium falciparum* 3D7): oxidoreductase
- [PF13_0141](#) (*Plasmodium falciparum* 3D7): L-lactate dehydrogenase
- [PFF0895w](#) (*Plasmodium falciparum* 3D7): malate dehydrogenase

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- [Arabidopsis thaliana chromosome 5, complete sequence](#)
26,975,502 bp linear genomic
NC_003076.8 GI:240256493
- [Arabidopsis thaliana chromosome 3, complete sequence](#)
23,459,830 bp linear genomic
NC_003074.8 GI:240255695

Top Organisms [Tree]

- Plasmodium falciparum* (8)
- Toxoplasma gondii* (5)
- Arabidopsis thaliana* (4)
- Toxoplasma gondii* ME49 (4)
- Mycobacterium bovis* AF2122/97 (3)
- All other taxa (26)

Recent activity

- falciparum lactate dehydr... (46) Nucleotide
- A general method applicable to the search for similarities in the amino acid sequence of t...

Find entry number 43
and click on the link

★ Favorites

Limits Preview/Index History Clipboard Details

Display Summary Show 20 Sort By Send to

All: 46 Bacteria: 23 INSDC (GenBank): 29 RefSeq: 17 mRNA: 1

This search in Gene shows [3 results](#), including:

- [PF13_0144](#) (*Plasmodium falciparum* 3D7): oxidoreductase
- [PF13_0141](#) (*Plasmodium falciparum* 3D7): L-lactate dehydrogenase
- [PFF0895w](#) (*Plasmodium falciparum* 3D7): malate dehydrogenase

Items 41 - 46 of 46 Previous Page 3 of 3

- [A kit for diagnosing malaria comprising monoclonal antibodyesto malarial lactate dehydrogenase and aldolase](#)
41. 1,084 bp linear genomic
DI122512.1 GI:168421398
- [Plasmodium falciparum isolate FCC1/HN lactate dehydrogenase \(LDH\) gene, complete cds](#)
42. 951 bp linear genomic
DQ825436.1 GI:111034850
- [Plasmodium falciparum isolate FCBR L-lactate dehydrogenase \(LDH\) gene, complete cds](#)
43. 951 bp linear genomic
DQ198262.1 GI:76563842
- [Plasmodium falciparum isolate K1 L-lactate dehydrogenase \(LDH\) gene, complete cds](#)

▼ Top Organisms [\[Tree\]](#)

- [Plasmodium falciparum](#) (8)
- [Toxoplasma gondii](#) (5)
- [Arabidopsis thaliana](#) (4)
- [Toxoplasma gondii ME49](#) (4)
- [Mycobacterium bovis AF2122/97](#) (3)
- [All other taxa](#) (26)

[More...](#)

Recent activity [Turn Off](#) [Clear](#)

- [Plasmodium falciparum L-lactate dehydrogenase \(LDH-P\) mRNA, complete cds](#)
- [falciparum lactate dehydr...](#) (46) Nucleotide
- A general method applicable to the search for similarities in the amino acid sequence of t...

» See more..


```

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/ product="L-lactate dehydrogenase"
complement(1..951)
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NKIMIEIGGHIKKNCPNAFIIIVVTNPVDVMVQLLHQHSGVPPKNIIGLGGVLDTSRLK
YYISQKLVNCPRDVNAHIVGAHGNKMLLKYITVGGIPLQEFINNKLISDAELEAIF
DRTVNTALEIVNLHASPYPVAPAAAIEMAESYLKDLKKVVICSTLLEGQYGHSDIFGG
TPVVLGANGVEQVIELQLNSEEKAKFDEAIAETKRMKALA"

```

Can type protein ID into "protein" database on NCBI (see next slide)

```

ORIGIN
1 ttaagctaatt gccttcattc tcttagtttc agctatggct tcatcaaat tagctttttc
61 ctccactattt aattgtaatt cgataacttg ttcaacacca ttagcaccta aaacaacagg
121 tgtaccaccg aatatacgg agtgtccata ttgtccttct aacaagggtg agcaaattaa
181 tacttttttc aaatctttta agtaggattc agccatttcg ataatagcag cagctgggtgc
241 aacatatggt gatgcatgta agtttacaat ttctaagca gtaataacag ttctatcaaa
301 tatagcttct aattcagcat cagaaattaa cttgttatta ataaattctt gtaaagggat
361 accacctaca gtaatgtatc tttttaaaag aaccatttta ttccatgag cacctacaat
421 gtgtgcattt acatctcttg ggcatacatt taatttctga gatatgtaat acttcaatct
481 tgatgtatct aatacaccac ctaaaccaat aatcttgttt ttaggaacac ctgaatggtg
541 atgtaataat tgtaccataa catctactgg gtttggtaca acaataataa aagcatttgg
601 acaattcttc ttaatatgac caccaatttc aatcataatc ttggtgttta atggtaataa
661 atcatctcta ttccattctt tgctactctt tcctggggcc ttggtaaate cagctgttac
721 tattactaca tctgctccag ccaaatcgtc ataagtgttt gaaccacta ctttgcaatt
781 tgaatagcc ataacattag tatgagatgt atctaaagct ttccatgtg gcatgttctt
841 tacaatatcg aacaaaacta catctcctaa atttttctga acaattaagg tagccattac
901 tectccaate atacctgagc caactaaaac gatttttget tttggtgcca t

```

DNA and protein sequence given

Info on the protein

GenBank: ABA46355.1

L-lactate dehydrogenase [Plasmodium falciparum]

Features Sequence

LOCUS ABA46355 316 aa linear INV 04-OCT-2005
DEFINITION L-lactate dehydrogenase [Plasmodium falciparum].
ACCESSION ABA46355
VERSION ABA46355.1 GI:76563843
DBSOURCE accession [DQ198262.1](#)
KEYWORDS .
SOURCE Plasmodium falciparum (malaria parasite P. falciparum)
ORGANISM [Plasmodium falciparum](#)
Eukaryota; Alveolata; Apicomplexa; Aconoidasida; Haemosporida;
Plasmodium; Plasmodium (Laverania).
REFERENCE 1 (residues 1 to 316)
AUTHORS Turgut-Balik,D. and Holbrook,J.J.
TITLE Determination of the DNA and aminoacid sequences of lactate
dehydrogenase gene from Plasmodium falciparum strains K1 and PF
FCBR: A route to the design of new antimalarials
JOURNAL Turk. J. Biol. 25, 241-250 (2001)
REFERENCE 2 (residues 1 to 316)

Change Region Shown

Customize View

Analyze This Sequence

- ▶ Run BLAST
- ▶ Identify Conserved Domains

Recent activity

- [L-lactate dehydrogenase \[Plasmodium falciparum\]](#)
- [Plasmodium falciparum isolate FCBR L-lactate dehydrogenase \(LDH\) gene,](#)
- [Plasmodium falciparum L-lactate](#)

Elazig 23169, Turkey

```
FEATURES             Location/Qualifiers
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                       /isolate="FCBR"
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    mRNA                <1..>951
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ALDTSHTNVMAYSNCKVSGSNTYDDLADVIVTAGFTKAPGKSDKEWNRDDLLPLN
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YYISQKLNVCPRDVNAHIVGAHGKMKVLLKRYITVGGIPLQEFINNKLISDAELEAIF
DRTVNTALEIVNLHASPYVAPAAAIEMAESYLKDLKKVLIICSTLLEGQYGHSDIFGG
TPVVLGANGVEQVIELQLNSEEKAKFDEAIAETKRMKALA"
```

Tells you about the different regions of the protein (see next lecture for more detail)

```
ORIGIN
1 atggcaccaa aagcaaaaat cgtttttagtt ggctcaggta tgattggagg agtaatggct
61 accttaattg ttcagaaaaa tttaggagat gtagttttgt tcgatattgt aaagaacatg
121 ccacatggaa aagctttaga tacatctcat actaatgta tggcatattc aaattgcaaa
181 gtaagtgggt caaacactta tgacgatttg gctggagcag atgtagtaat agtaacagct
241 ggatttacca aggccccagg aaagagtgc aaagaatgga atagagatga tttattacca
301 ttaaacaaca agattatgat tgaaattggg ggtcatatta agaagaattg tccaaatgct
361 tttattattg ttgtaacaaa cccagtagat gttatggtac aattattaca tcaacattca
421 ggtgttccta aaaacaagat tattggttta ggtggtgtat tagatacatc aagattgaag
481 tattacatat ctcagaaatt aatgtatgc ccaagagatg taaatgcaca cattgtaggt
541 gctcatggaa ataaaatggt tcttttaaaa agatacatta ctgtaggtgg tatcccttta
601 caagaattta ttaataacaa gttaatttct gatgctgaat tagaagctat atttgataga
```