

Contribute to BRENDA! Your enzyme data is important for BRENDA. Send us your paper, and we will do all the work to include your data into our database. [More...](#)

Please enter a search term

Enzyme, Ligand
contains

add search field
delete search field
start search

Text-based queries

- Full-text Search
- Advanced Search
- Enzyme & Disease

Structure-based queries

- Ligand Structure Search
- Metabolic Pathways
- Enzyme Structures

Explorer

- Enzyme Classification
- TaxTree
- Protein folding: CATH / SCOPe
- Ontologies

Visualization

- Word Maps
- Genomes
- Functional Parameter Statistics
- Metabolic Pathways

Prediction


- Membrane Helices
- Localization Prediction
- EnzymeDetector

Supporting & External

- BRENDA Tissue Ontology
- Biochemical Reactions
- MetaboMAPS

News

NEW Release online! - February 1, 2021  
Release 2021.1 online including 76 new and 623 updated enzyme classes.


for Release 2021.1

evaluate BRENDA!

Information

# BRENDA Tutorial

## EC Explorer

Member of  
NBI  
National Bioinformatics Infrastructure

elixir  
Core Data Resource

UPDATE!  
Release 2021.1 (January 2021)  
BRENDA professional

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### News

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The EC Explorer provides an easy access to the data of the IUBMB Enzyme Nomenclature list ([www.enzyme-database.org/ExplorEnz](http://www.enzyme-database.org/ExplorEnz)) directly connected to BRENDA.



**UPDATE!**  
Release 2021.1 (January 2021)  
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BRENDA is the most comprehensive information system on:

- 8149 EC Numbers (Feb. 2021)
- more than 2 Mill. different enzymes
- more than 3 Mill. enzyme data, manually annotated from more than 150,000 literature references

**Enzyme Commission numbers (EC Numbers)** are defined according to the catalyzed **reaction** by the IUBMB (International Union of Biochemistry and Molecular Biology)

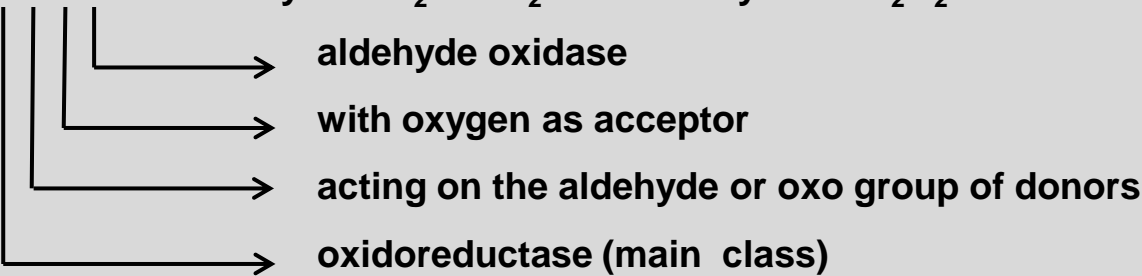
Format: **Four** numbers separated by periods, e.g. 1.2.3.1

Numbers represent from left to right a progressively finer classification scheme

Main Enzyme Classes:

- 1 Oxidoreductases
- 2 Transferases
- 3 Hydrolases
- 4 Lyases
- 5 Isomerases
- 6 Ligases
- 7 Translocases

**EC 1.2.3.1**    **an aldehyde + H<sub>2</sub>O + O<sub>2</sub> = a carboxylate + H<sub>2</sub>O<sub>2</sub>**
























# EC Explorer

[browse EC tree] - [search]

⬆ back to top

## EC Browser

- 1 Oxidoreductases (9631 organisms)   
- 2 Transferases (7171 organisms)   
- 3 Hydrolases (11482 organisms)   
- 4 Lyases (5139 organisms)   
- 5 Isomerases (2099 organisms)   
- 6 Ligases (1565 organisms)   
- 7 Translocases (1096 organisms)   

You can either  
browse or search  
the EC Explorer.

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German Network for Bioinformatics Infrastructure

**elixir**  
Core Data  
Resource

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## EC Explorer

[browse EC tree] - [search]

Please use **AND** or **OR** in combination with **NOT** to refine you query

You can run a search by entering a complete EC number, or just the main class, the subclass etc....

EC number ☒ begins with

Common name ☒ contains

Reaction ☒ contains

Systematic name ☐ contains

Comment ☐ contains

CAS registry number ☐ contains

Synonyms ☐ contains

History ☐ contains

include ☐ class (x.) ☐ subclass (x.x.) ☐ sub-subclass (x.x.x.) ☒ serial number (x.x.x.x)

10  results

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## EC Explorer

[browse EC tree] - [search]

Please use **AND** or **OR** in combination with **NOT** to refine you query

EC number ☒ begins with

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History ☐ contains

include ☐ class (x.) ☐ subclass (x.x.) ☐ sub-subclass (x.x.x.) ☒ serial number (x.x.x.x)

search  10 results

10

50

100

...and include further search options, i.e. the history and EC subclasses...

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+ information

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# EC Explorer

[browse EC tree](#) - [\[search\]](#)

Please use **AND** or **OR** in combination with **NOT** to refine you query

EC number

☒

begins with

2.5.

Common name

☒

contains

Reaction

☒

contains

Systematic name

☐

contains

Comment

☐

contains

CAS registry number

☐

contains

Synonyms

☐

contains

History

☒





























contains

include ☐ class (x.) ☐ subclass (x.x.) ☐ sub-subclass (x.x.x.) ☒ serial number (x.x.x.x)

10 results

On the result page  
you find a list of the  
EC numbers...

Results 1 - 10 of 152

EC	Common name	Reaction	History
    2.5.1.1	dimethylallyltransferase	dimethylallyl diphosphate + isopentenyl diphosphate = diphosphate + geranyl diphosphate	created 1961
    2.5.1.2	thiamine pyridinylase	thiamine + pyridine = 1-[(4-amino-2-methylpyrimidin-5-yl)methyl]pyridinium + 4-methyl-5-(2-hydroxyethyl)thiazole	created 1961, modified 1976, modified 2001
    2.5.1.3	thiamine phosphate synthase	(1) 4-amino-2-methyl-5-(diphosphooxymethyl)pyrimidine + 2-[(2 <i>R</i> ,5 <i>Z</i> )-2-carboxy-4-methylthiazol-5-(2 <i>H</i> )-ylidene]ethyl phosphate = diphosphate + thiamine phosphate + CO <sub>2</sub> ; (2) 4-amino-2-methyl-5-(diphosphooxymethyl)pyrimidine + 2-(2-carboxy-4-methylthiazol-5-yl)ethyl phosphate = diphosphate + thiamine phosphate + CO <sub>2</sub> ; (3) 4-amino-2-methyl-5-(diphosphooxymethyl)pyrimidine + 4-methyl-5-(2-phosphooxymethyl)thiazole = diphosphate + thiamine phosphate	created 1965, modified 2015
    2.5.1.4	adenosylmethionine cyclotransferase	S-adenosyl-L-methionine = S-methyl-5'-thioadenosine + 2-aminobutan-4-olide	created 1965
    2.5.1.5	galactose-6-sulfurylase	Eliminates sulfate from the D-galactose 6-sulfate residues of porphyran, producing 3,6-anhydrogalactose residues	created 1965
    2.5.1.6	methionine adenosyltransferase	ATP + L-methionine + H <sub>2</sub> O = phosphate + diphosphate + S-adenosyl-L-methionine	created 1961 as EC 2.4.2.13, transferred 1965 to EC 2.5.1.6
    2.5.1.7	UDP-N-acetylglucosamine 1-carboxyvinyltransferase	phosphoenolpyruvate + UDP-N-acetyl-α-D-glucosamine = phosphate + UDP-N-acetyl-3-O-(1-carboxyvinyl)-α-D-glucosamine	created 1972, modified 1983, modified 2002

EC Explorer

[browse EC tree] - [search]

Please use **AND** or **OR** in combination with **NOT** to refine you query

EC number
☒
begins with
2.5.

Common name
☒
contains

Reaction
☒
contains

Systematic name
☐
contains

Comment
☐
contains

CAS registry number
☐
contains

Synonyms
☐
contains

...according to the information of the IUBMB Enzyme list, including...

...the Common Name

...the Reaction

...the History

10 results

10 of 152

EC	Common name	Reaction	His
2.5.1.1	dimethylallyltransferase	dimethylallyl diphosphate + isopentenyl diphosphate = diphosphate + geranyl diphosphate	created 1965
2.5.1.2	thiamine pyridinylase	thiamine + pyridine = 1-[(4-amino-2-methylpyrimidin-5-yl)methyl]pyridinium + 4-methyl-5-(2-hydroxyethyl)thiazole	created 1965, modified 1978, modified 2001
2.5.1.3	thiamine phosphate synthase	(1) 4-amino-2-methyl-5-(diphosphooxymethyl)pyrimidine + 2-[(2R,5Z)-2-carboxy-4-methylthiazol-5(2H)-ylidene]ethyl phosphate = diphosphate + thiamine phosphate + CO <sub>2</sub> ; (2) 4-amino-2-methyl-5-(diphosphooxymethyl)pyrimidine + 2-(2-carboxy-4-methylthiazol-5-yl)ethyl phosphate = diphosphate + thiamine phosphate + CO <sub>2</sub> ; (3) 4-amino-2-methyl-5-(diphosphooxymethyl)pyrimidine + 4-methyl-5-(2-phosphooxymethyl)thiazole = diphosphate + thiamine phosphate	created 1965, modified 2015
2.5.1.4	adenosylmethionine cyclotransferase	S-adenosyl-L-methionine = S-methyl-5'-thioadenosine + 2-aminobutan-4-olide	created 1965
2.5.1.5	galactose-6-sulfurylase	Eliminates sulfate from the D-galactose 6-sulfate residues of porphyrin, producing 3,6-anhydrogalactose residues	created 1965
2.5.1.6	methionine adenosyltransferase	ATP + L-methionine + H <sub>2</sub> O = phosphate + diphosphate + S-adenosyl-L-methionine	created 1961 as EC 2.4.2.13, transferred 1965 to EC 2.5.1.6
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Synonyms ☐ contains History ☒contains include ☐ class (x.) ☐ subclass (x.x.) ☐ sub-subclass (x.x.x.) ☒ serial number (x.x.x.x)











search

10 

results

« Results 1 - 10 of 152 »

**The History column provides information on the creation, the modification, the transfer or the deletion of an enzyme.**

EC ▲ ▼	Common name ▲ ▼	Reaction ▲ ▼	
 2.5.1.1	dimethylallyltransferase	dimethylallyl diphosphate + isopentenyl diphosphate = diphosphate + geranyl diphosphate	created 1961
 2.5.1.2	thiamine pyridinylase	thiamine + pyridine = 1-[(4-amino-2-methylpyrimidin-5-yl)methyl]pyridinium + 4-methyl-5-(2-hydroxyethyl)thiazole	created 1961, modified 1976, modified 2001
 2.5.1.3	thiamine phosphate synthase	(1) 4-amino-2-methyl-5-(diphosphooxymethyl)pyrimidine + 2-[(2 <i>R</i> ,5 <i>Z</i> )-2-carboxy-4-methylthiazol-5(2 <i>H</i> )-ylidene]ethyl phosphate = diphosphate + thiamine phosphate + CO <sub>2</sub> ; (2) 4-amino-2-methyl-5-(diphosphooxymethyl)pyrimidine + 2-(2-carboxy-4-methylthiazol-5-yl)ethyl phosphate = diphosphate + thiamine phosphate + CO <sub>2</sub> ; (3) 4-amino-2-methyl-5-(diphosphooxymethyl)pyrimidine + 4-methyl-5-(2-phosphooxyethyl)thiazole = diphosphate + thiamine phosphate	created 1965, modified 2015
 2.5.1.4	adenosylmethionine cyclotransferase	S-adenosyl-L-methionine = S-methyl-5'-thioadenosine + 2-aminobutan-4-olide	created 1965
 2.5.1.5	galactose-6-sulfurylase	Eliminates sulfate from the D-galactose 6-sulfate residues of porphyran, producing 3,6-anhydrogalactose residues	created 1961 as EC 2.4.2.13, transferred 1965 to EC 2.5.1.6
 2.5.1.6	methionine adenosyltransferase	ATP + L-methionine + H <sub>2</sub> O = phosphate + diphosphate + S-adenosyl-L-methionine	created 1972, modified 1983, modified 2002
 2.5.1.7	UDP- <i>N</i> -acetylglucosamine 1-carboxyvinyltransferase	phosphoenolpyruvate + UDP- <i>N</i> -acetyl-α-D-glucosamine = phosphate + UDP- <i>N</i> -acetyl-3-O-(1-carboxyvinyl)-α-D-glucosamine	created 1972, deleted 2009
 2.5.1.8	tRNA isopentenyltransferase	isopentenyl diphosphate + tRNA = diphosphate + tRNA containing 6-isopentenyladenosine	
 2.5.1.9	riboflavin synthase	2,6,7-dimethyl-8-(1-D-ribityl)lumazine = riboflavin + 4-(1-D-ribitylamino)-5-amino-2,6-dihydroxypyrimidine	
 2.5.1.10	(2 <i>E</i> ,6 <i>E</i> )-farnesyl diphosphate synthase	geranyl diphosphate + isopentenyl diphosphate = diphosphate + (2 <i>E</i> ,6 <i>E</i> )-farnesyl diphosphate	

« Results 1 - 10 of 152 »





















Synonyms ☐ contains History ☒contains include ☐ class (x.) ☐ subclass (x.x.) ☐ sub-subclass (x.x.x.) ☒ serial number (x.x.x.x)

search

10 

results

« Results 1 - 10 of 152 »

EC ▲ ▼	Common name ▲ ▼	Reaction ▲ ▼	History ▲ ▼
  2.5.1.1	dimethylallyltransferase	dimethylallyl diphosphate + isopentenyl diphosphate = diphosphate + geranyl diphosphate	created 1981
  2.5.1.2	thiamine pyridinylase	thiamine + pyridine = 1-[(4-amino-2-methylpyrimidin-5-yl)methyl]pyridinium + 4-methyl-5-(2-hydroxyethyl)thiazole	created 1981, modified 1978, modified 2001
  2.5.1.3	thiamine pyrophosphate synthase	(1) 4-amino-2-methyl-5-(diphosphoxymethyl)pyrimidine + 2-[(2 <i>R</i> ,5 <i>Z</i> )-2-carboxy-4-methylthiazol-5-(2 <i>H</i> )-yl]ethyl phosphate + CO <sub>2</sub> ; (2) 4-amino-2-methyl-5-(diphosphoxymethyl)pyrimidine + 4-methyl-5-(2-hydroxyethyl)thiazole = diphosphate + 4-methyl-5-(2-hydroxyethyl)thiazole	created 1985, modified 2015
  2.5.1.4	adenosylmethionine cyclotransferase	adenosylmethionine = 5-methylthioadenosine + 4-aminobutan-4-olide	created 1985
  2.5.1.5	galactose-6-sulfurylase	galactose-6-phosphate + H <sub>2</sub> O = phosphate + galactose-6-sulfate residues of porphyran, producing 3,6-anhydrogalactose	created 1985
  2.5.1.6	methionine adenosyltransferase	ATP + L-methionine + H <sub>2</sub> O = phosphate + diphosphate + S-adenosyl-L-methionine	created 1981 as EC 2.4.2.13, transferred 1985 to EC 2.5.1.6
  2.5.1.7	UDP- <i>N</i> -acetylglucosamine 1-carboxyvinyltransferase	phosphoenolpyruvate + UDP- <i>N</i> -acetyl-α-D-glucosamine = phosphate + UDP- <i>N</i> -acetyl-3-O-(1-carboxyvinyl)-α-D-glucosamine	created 1972, modified 1983, modified 2002
  2.5.1.8	tRNA isopentenyltransferase	isopentenyl diphosphate + tRNA = diphosphate + tRNA containing 6-isopentenyladenosine	created 1972, deleted 2009
  2.5.1.9	riboflavin synthase	2,6,7-dimethyl-8-(1-D-ribityl)lumazine = riboflavin + 4-(1-D-ribitylamino)-5-amino-2,6-dihydroxypyrimidine	created 1972
  2.5.1.10	(2 <i>E</i> ,6 <i>E</i> )-farnesyl diphosphate synthase	geranyl diphosphate + isopentenyl diphosphate = diphosphate + (2 <i>E</i> ,6 <i>E</i> )-farnesyl diphosphate	created 1972, modified 2010

« Results 1 - 10 of 152 »

To see more details of a specific enzyme click on the EC number to go to the...

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## Information on EC 2.5.1.2 - thiamine pyridinylase

for references in articles please use BRENDA:EC2.5.1.2

### EC Tree

- 2 Transferases
  - 2.5 Transferring alkyl or aryl groups, other than methyl groups
    - 2.5.1 Transferring alkyl or aryl groups, other than methyl groups (only sub-classes referred to here)
      - 2.5.1.2 thiamine pyridinylase

...Enzyme Summary Page  
(cf. BRENDA tutorial - Enzyme Search)

### IUBMB Comments

Various bases and thiol compounds can act instead of pyridine.

### Specify your search results

Mark a special word or phrase in this record:  **Mark!**

Search Reference ID:  **Search**

Search UniProt Accession:  **Search**

Select one or more organisms in this record: ☒

- All organisms
- Acanthogobius flavimanus
- Anadara inflata
- Aneurinibacillus aneurinilyticus
- Aneurinibacillus aneurinilyticus BKA

**Submit**

### Show additional data

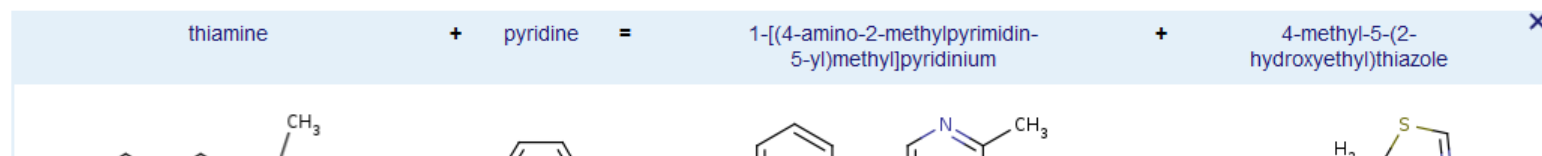
- ☒ Do not include text mining results
- ☐ Include **AMENDA** (text mining) results
- ☐ Include **BRENDA** results (AMENDA + additional results, but less precise)

### Word Map **hide**

alosa  
**thiaminolyticus**  
viscera **2.5.1.2** nutrition analysis  
thiazole pseudoharengus  
aniline **medicine**

The expected taxonomic range for this enzyme is: Eukaryota, Bacteria

### Reaction Schemes **hide**



EC Explorer

[browse EC tree] - [search]

Please use **AND** or **OR** in combination with **NOT** to refine you query

EC number

☒ begins with

2.5.

Common name

☒ contains

Reaction

☒ contains

Systematic name

☐ contains

Comment

☐ contains

CAS registry number

☐ contains

Synonyms

☐ contains

History

☒ contains

include

☐ class (x.)

☐ subclass (x.x.)

☐ sub-subclass (x.x.x.)






















☒ serial number (x.x.x.x)

search

10

results

You can switch to the EC Tree view by clicking on the icon „Show in EC Tree“.

EC	Common name	Reaction	History
   2.5.1.1	dimethylallyltransferase	dimethylallyl diphosphate + isopentenyl diphosphate = diphosphate + geranyl diphosphate	created 1981
   2.5.1.2	thiamine pyridinylase	thiamine + pyridine = 1-[(4-amino-2-methylpyrimidin-5-yl)methyl]pyridinium + 4-methyl-5-(2-hydroxyethyl)thiazole	created 1981, modified 1978, modified 2001
   2.5.1.3	thiamine phosphate synthase	(1) 4-amino-2-methyl-5-(diphosphooxymethyl)pyrimidine + 2-[(2R,5Z)-2-carboxy-4-methylthiazol-5(2H)-ylidene]ethyl phosphate = diphosphate + thiamine phosphate + CO <sub>2</sub> ; (2) 4-amino-2-methyl-5-(diphosphooxymethyl)pyrimidine + 2-(2-carboxy-4-methylthiazol-5-yl)ethyl phosphate = diphosphate + thiamine phosphate + CO <sub>2</sub> ; (3) 4-amino-2-methyl-5-(diphosphooxymethyl)pyrimidine + 4-methyl-5-(2-phosphooxyethyl)thiazole = diphosphate + thiamine phosphate	created 1985, modified 2015
   2.5.1.4	adenosylmethionine cyclotransferase	S-adenosyl-L-methionine = S-methyl-5'-thioadenosine + 2-aminobutan-4-olide	created 1985
   2.5.1.5	galactose-6-sulfurylase	Eliminates sulfate from the D-galactose 6-sulfate residues of porphyran, producing 3,6-anhydrogalactose residues	created 1985
   2.5.1.6	methionine adenosyltransferase	ATP + L-methionine + H <sub>2</sub> O = phosphate + diphosphate + S-adenosyl-L-methionine	created 1981 as EC 2.4.2.13, transferred 1985 to EC 2.5.1.6
   2.5.1.7	UDP-N-acetylglucosamine 1-carboxyvinyltransferase	phosphoenolpyruvate + UDP-N-acetyl-α-D-glucosamine = phosphate + UDP-N-acetyl-3-O-(1-carboxyvinyl)-α-D-glucosamine	created 1972, modified 1983, modified 2002

## EC Explorer







































































































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### EC 2.5.1.2 Details

<a href="#">show Brenda entry</a>
EC number
2.5.1.2
Accepted name
thiamine pyridinylase
Reaction
thiamine + pyridine = 1-[(4-amino-2-methylpyrimidin-5-yl)methyl]pyridinium + 4-methyl-5-(2-hydroxyethyl)thiazole
Other name(s)
pyrimidine transferase, thiaminase I, thiamin hydrolase, thiamin pyridinolase, thiaminase (ambiguous), thiamine pyridinolase, thiamin pyridinylase, thiamin:base 2-methyl-4-aminopyrimidine-5-methenyltransferase
Systematic name
thiamine:base 2-methyl-4-aminopyrimidine-5-methenyltransferase
CAS registry number
9030-35-7
Comment
Various bases and thiol compounds can act instead of pyridine.
History
created 1961, modified 1976, modified 2001

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### EC Browser

- 1 Oxidoreductases (9631 organisms)   
- 2 Transferases (7171 organisms)   
  - 2.1 Transferring one-carbon groups (1506 organisms)   
  - 2.2 Transferring aldehyde or ketonic groups (217 organisms)   
  - 2.3 Acyltransferases (1999 organisms)   
  - 2.4 Glycosyltransferases (2070 organisms)   
  - 2.5 Transferring alkyl or aryl groups, other than methyl groups (1084 organisms)   
    - 2.5.1 Transferring alkyl or aryl groups, other than methyl groups (only sub-subclass identified to date) (1084 organisms)   
      - 2.5.1.1 dimethylallyltransferase (19 organisms)   
      - 2.5.1.2 thiamine pyridinylase (84 organisms)**   
      - 2.5.1.3 thiamine phosphate synthase (20 organisms)   
      - 2.5.1.4 adenosylmethionine cyclotransferase (5 organisms)  
      - 2.5.1.5 galactose-6-sulfurylase (4 organisms)  
      - 2.5.1.6 methionine adenosyltransferase (64 organisms)   
      - 2.5.1.7 UDP-N-acetylglucosamine 1-carboxyvinyltransferase (32 organisms)   
      - 2.5.1.8 tRNA isopentenyltransferase 
      - 2.5.1.9 riboflavin synthase (35 organisms)   
      - 2.5.1.10 (2E,6E)-farnesyl diphosphate synthase (41 organisms)   
      - 2.5.1.11 trans-octaprenyltransferase   
      - 2.5.1.12 created 1972, deleted 1976 
      - 2.5.1.13 created 1972, deleted 1976 
      - 2.5.1.14 created 1972, deleted 1976 
      - 2.5.1.15 dihydropteroate synthase (28 organisms)   
      - 2.5.1.16 spermidine synthase (42 organisms)   
      - 2.5.1.17 corrinoid adenosyltransferase (21 organisms)   
      - 2.5.1.18 glutathione transferase (151 organisms)   
      - 2.5.1.19 3-phosphoshikimate 1-carboxyvinyltransferase (124 organisms)   
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      - 2.5.1.21 squalene synthase (44 organisms)   
      - 2.5.1.22 spermine synthase (19 organisms)   
      - 2.5.1.23 sym-norspermidine synthase (5 organisms)  
      - 2.5.1.24 discadenine synthase (6 organisms) 
      - 2.5.1.25 tRNA-uridine aminocarboxypropyltransferase (2 organisms)   
      - 2.5.1.26 alkylglycerone-phosphate synthase (13 organisms)   
      - 2.5.1.27 adenylate dimethylallyltransferase (16 organisms)   
      - 2.5.1.28 dimethylallylcyclotransferase (5 organisms)  
      - 2.5.1.29 geranylgeranyl diphosphate synthase (79 organisms)   
      - 2.5.1.30 heptaprenyl diphosphate synthase (3 organisms)   
      - 2.5.1.31 ditrans,polycis-undecaprenyl-diphosphate synthase [(2E,6E)-farnesyl-diphosphate specific] (24 organisms)   

On this page you see the classification of the enzyme within the EC Tree...

## EC Explorer

[\[browse EC tree\]](#) - [\[search\]](#)

### EC 2.5.1.2 Details

<a href="#">show Brenda entry</a>
EC number
2.5.1.2
Accepted name
thiamine pyridinylase
Reaction
thiamine + pyridine = 1-[(4-amino-2-methylpyrimidin-5-yl)methyl]pyridinium + 4-methyl-5-(2-hydroxyethyl)thiazole
Other name(s)
pyrimidine transferase, thiaminase I, thiamin hydrolase, thiamin pyridinolase, thiaminase (ambiguous), thiamine pyridinolase, thiamin pyridinylase, thiamin:base 2-methyl-4-aminopyrimidine-5-methenyltransferase
Systematic name
thiamine:base 2-methyl-4-aminopyrimidine-5-methenyltransferase
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      - 2.5.1.31 ditrans,polycis-undecaprenyl-diphosphate synthase [(2E,6E)-farnesyl-diphosphate specific] (24 organisms)

...including further information of the number of organisms, the reaction diagram, and the possibility to download known protein sequences in FASTA format or as csv-file, and published PDB-IDs

## EC Explorer

[browse EC tree] - [search]

### EC 2.5.1.2 Details

[show Brenda entry](#)

EC number

2.5.1.2

Accepted name

thiamine pyridinylase

Reaction

thiamine + pyridine = 1-[(4-amino-2-methylpyrimidin-5-yl)methyl]pyridinium + 4-methyl-5-(2-hydroxyethyl)thiazole

Other name(s)

pyrimidine transferase, thiaminase I, thiamin hydrolase, thiamin pyridinolase, thiaminase (ambiguous), thiamine pyridinolase, thiamin pyridinylase, thiamin:base 2-methyl-4-aminopyrimidine-5-methenyltransferase

Systematic name

thiamine:base 2-methyl-4-aminopyrimidine-5-methenyltransferase

CAS registry number

9030-35-7

Comment

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History

created 1961, modified 1976, modified 2001

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In the left box you find the complete IUBMB entry of the marked EC Number






















Click on the link to go directly to the BRENDA enzyme summary page

## EC Explorer

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### EC Browser

- 1 Oxidoreductases (9631 organisms)   
- 2 Transferases (7171 organisms)   
- 3 Hydrolases (11482 organisms)   
- 4 Lyases (5139 organisms)   
- 5 Isomerases (2099 organisms)   
- 6 Ligases (1565 organisms)   
- 7 Translocases (1096 organisms)   

You can use the  
„browse“ function  
to look for enzymes

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Starting with the 7 main classes you can navigate along the EC tree through the subclasses, sub-subclasses, and the serial numbers.

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### EC Browser

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- 4 Lyases (139 organisms)   
- 5 Isomerases
- 6 Ligases
- 7 Translocases

### EC class 1

All enzymes that catalyse oxido-reductions belong in this class. The substrate oxidized is regarded as a hydrogen or electron donor. The classification is based on donor:acceptor oxidoreductase. The common name is dehydrogenase, wherever this is possible; as an alternative, acceptor reductase can be used. Oxidase is used only where O<sub>2</sub> is an acceptor. Classification is difficult in some cases, because of the lack of specificity towards the acceptor.

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






































The EC browser  
with information on  
the main classes.

## EC Explorer

[browse EC tree] [search]

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### EC Browser

- 1 Oxidoreductases (9631 organisms)   
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- 2.5.1 Transferring alkyl or aryl groups, other than methyl groups (only sub-subclass identified to date) (1084 organisms)   
- 2.6 Transferring nitrogenous groups (640 organisms)   
- 2.7 Transferring phosphorus-containing groups (2690 organisms)   
- 2.8 Transferring sulfur-containing groups (410 organisms)   
- 2.9 Transferring selenium-containing groups (27 organisms)   
- 2.10 Transferring molybdenum- or tungsten-containing groups (2 organisms)   
- 3 Hydrolases (11482 organisms)   
- 4 Lyases (5139 organisms)   
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Click on the (+)-icon to expand a section or on the (-)-icon to collapse a section.

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## EC 2.5.1.45 Details

[show Brenda entry](#)

EC number

2.5.1.45

Accepted name

homospermidine synthase (spermidine-specific)

Reaction

spermidine + putrescine = sym-homospermidine + propane-1,3-diamine

Systematic name

spermidine:putrescine 4-aminobutyltransferase (propane-1,3-diamine-forming)










































































































Comment

The reaction of this enzyme occurs in three steps, with some of the intermediates presumably remaining enzyme-bound: (a) NAD<sup>+</sup>-dependent dehydrogenation of spermidine, (b) transfer of the 4-aminobutylidene group from dehydrospermidine to putrescine and (c) reduction of the imine intermediate to form homospermidine. This enzyme is more specific than EC 2.5.1.44, homospermidine synthase, which is found in bacteria, as it cannot use putrescine as donor of the 4-aminobutyl group. Forms part of the biosynthetic pathway of the poisonous pyrrolizidine alkaloids of the ragworts (*Senecio*).

History

created 2001

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- 2.5.1.33 trans-pentaprenyltransferase (1 organism)    
- 2.5.1.34 4-dimethylallyltryptophan synthase (5 organisms)    
- 2.5.1.35 aspulvinone dimethylallyltransferase (2 organisms) 
- 2.5.1.36 trihydroxyterocarpan dimethylallyltransferase (1 organism)   
- 2.5.1.37 created 1989, deleted 2004 
- 2.5.1.38 isonocardicin synthase (1 organism) 
- 2.5.1.39 4-hydroxybenzoate polyprenyltransferase (15 organisms)   
- 2.5.1.40 created 1992, deleted 1999 
- 2.5.1.41 phosphoglycerol geranylgeranyltransferase (5 organisms)    
- 2.5.1.42 geranylgeranylglycerol-phosphate geranylgeranyltransferase (3 organisms)   
- 2.5.1.43 nicotianamine synthase (20 organisms)   
- 2.5.1.44 homospermidine synthase (13 organisms)    
- 2.5.1.45 homospermidine synthase (spermidine-specific) (17 organisms)**   
- 2.5.1.46 deoxyhypusine synthase (44 organisms)    
- 2.5.1.47 cysteine synthase (89 organisms)    
- 2.5.1.48 cystathionine γ-synthase (36 organisms)    
- 2.5.1.49 O-acetylhomoserine aminocarboxypropanoyltransferase (24 organisms)    
- 2.5.1.50 zeatin 9-aminocarboxyethyltransferase (1 organism) 
- 2.5.1.51 β-pyrazolylalanine synthase (1 organism)   
- 2.5.1.52 L-mimosine synthase (1 organism)  
- 2.5.1.53 uracilylalanine synthase (8 organisms) 
- 2.5.1.54 3-deoxy-7-phosphoheptulonate synthase (64 organisms)    
- 2.5.1.55 3-deoxy-8-phosphooctulonate synthase (49 organisms) 
- 2.5.1.56 N-acetylneuraminate synthase (15 organisms)  
- 2.5.1.57 N-acylneuraminate-9-phosphate synthase (8 organisms) 
- 2.5.1.58 protein farnesyltransferase (26 organisms)  
- 2.5.1.59 protein geranylgeranyltransferase type I (16 organisms) 
- 2.5.1.60 protein geranylgeranyltransferase type II (11 organisms) 
- 2.5.1.61 hydroxymethylbilane synthase (28 organisms)   
- 2.5.1.62 chlorophyll synthase (13 organisms)   
- 2.5.1.63 adenosyl-fluoride synthase (12 organisms)    
- 2.5.1.64 2-succinyl-6-hydroxy-2,4-cyclohexadiene-1-carboxylate synthase   
- 2.5.1.65 O-phosphoserine sulfhydrylase (4 organisms)   
- 2.5.1.66 N<sup>2</sup>-(2-carboxyethyl)arginine synthase (1 organism)    
- 2.5.1.67 chrysanthemyl diphosphate synthase (2 organisms)   
- 2.5.1.68 (2Z,6E)-farnesyl diphosphate synthase (10 organisms)    
- 2.5.1.69 lavandulyl diphosphate synthase (3 organisms)   
- 2.5.1.70 naringenin 8-dimethylallyltransferase (1 organism)   
- 2.5.1.71 leachianone-G 2"-dimethylallyltransferase (1 organism) 
- 2.5.1.72 ... (10 organisms) 


If you find an appropriate EC number click on the entry to open the left box containing the detailed IUBMB information...

## EC 2.5.1.45 Details

<a href="#">show Brenda entry</a>
EC number
2.5.1.45
Accepted name
homospermidine synthase (spermidine-specific)
Reaction
spermidine + putrescine = sym-homospermidine + propane-1,3-diamine
Systematic name
spermidine:putrescine 4-aminobutyltransferase (propane-1,3-diamine-forming)
Comment
The reaction of this enzyme occurs in three steps, with some of the intermediates presumably remaining enzyme-bound: (a) NAD <sup>+</sup> -dependent dehydrogenation of spermidine, (b) transfer of the 4-aminobutylidene group from dehydrospermidine to putrescine and (c) reduction of the imine intermediate to form homospermidine. This enzyme is more specific than EC 2.5.1.44, homospermidine synthase, which is found in bacteria, as it cannot use putrescine as donor of the 4-aminobutyl group. Forms part of the biosynthetic pathway of the poisonous pyrrolizidine alkaloids of the ragworts ( <i>Senecio</i> ).
History
created 2001

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...and again the direct link will lead you to the BRENDA enzyme summary page.

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- 2.5.1.34 4-dimethylallyltryptophan synthase (5 organisms)  
- 2.5.1.35 aspuvinone dimethylallyltransferase (2 organisms) 
- 2.5.1.36 trihydroxyterocarpan dimethylallyltransferase (1 organism)  
- 2.5.1.37 1000-deleted 2004  
- 2.5.1.38 1000-deleted 2004  
- 2.5.1.39 1000-deleted 2004  
- 2.5.1.40 1000-deleted 2004  
- 2.5.1.41 1000-deleted 2004  
- 2.5.1.42 1000-deleted 2004  
- 2.5.1.43 nicotianamine synthase (20 organisms)  
- 2.5.1.44 homospermidine synthase (13 organisms)  
- 2.5.1.45 homospermidine synthase (spermidine-specific) (17 organisms)  
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- 2.5.1.72 1000-deleted 2004 