

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

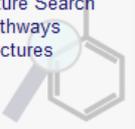
**Text-based queries**

- 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



# BRENDA Tutorial

## EC Explorer

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!

Use of this online version of BRENDA is free under the CC BY 4.0 license. See terms of use for full details.

**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.**

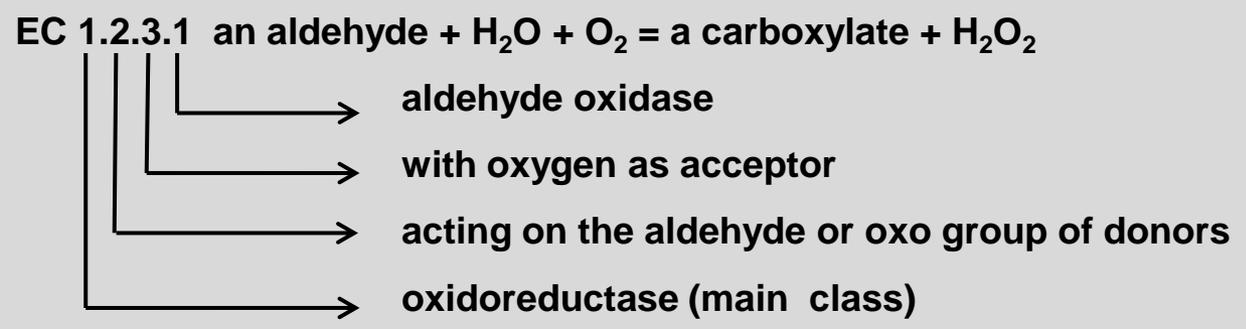
BRENDA is the most comprehensive information system on:

- 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 Explorer

[browse EC tree] - [search]  
back to top

You can either browse or search the EC Explorer.

## 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)  

Use of this online version of BRENDA is free under the CC BY 4.0 license. See terms of use for full details.

evaluate BRENDA!

Information

Getting started

Contribute

Download

member of **de NBI**  
DEUTSCHE NATIONALBANK FÜR BIOINFORMATIK UND INFORMATIONSTECHNIK

**elixir**  
Core Data Resource

**UPDATE!**  
Release 2021.1 (January 2021)  
[BRENDA professional](#)

# EC Explorer

[browse EC tree] - [search]

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

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)

search 10 results

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

Use of this online version of BRENDA is free under the CC BY 4.0 license. See terms of use for full details.

evaluate BRENDA!

Information

Getting started

Contribute

Download

member of 

  
Core Data Resource

UPDATE!  
Release 2021.1 (January 2021)  
BRENDA\_professional

# EC Explorer

[browse EC tree] - [search]

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

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)

search  10 results

- 10
- 50
- 100

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

evaluate BRENDA!

information

Use of this online version of BRENDA is free under the CC BY 4.0 license. See terms of use for full details.

Getting started

Contribute

Download

member of **de NBI**

**elixir**  
Core Data Resource

**UPDATE!**  
Release 2021.1 (January 2021)  
BRENDA professional

# EC Explorer

[browse EC tree] - [search]

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

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)

search 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-(diphosphoxymethyl)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-(diphosphoxymethyl)pyrimidine + 2-(2-carboxy-4-methylthiazol-5-yl)ethyl phosphate = diphosphate + thiamine phosphate + CO <sub>2</sub> ; (3) 4-amino-2-methyl-5-(diphosphoxymethyl)pyrimidine + 4-methyl-5-(2-phosphoxyethyl)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

Common name  contains

Reaction  contains

Systematic name  contains

Comment  contains

CAS registry number  contains

Synonyms  contains

in (x.x.)  serial number (x)

search 10 results

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

...the Common Name

...the Reaction

...the History

« « 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 1976, modified 2001
    2.5.1.3	thiamine phosphate 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> )-ylidene]ethyl phosphate = diphosphate + thiamine phosphate + CO <sub>2</sub> ; (2) 4-amino-2-methyl-5-(diphosphoxymethyl)pyrimidine + 2-(2-carboxy-4-methylthiazol-5-yl)ethyl phosphate = diphosphate + thiamine phosphate + CO <sub>2</sub> ; (3) 4-amino-2-methyl-5-(diphosphoxymethyl)pyrimidine + 4-methyl-5-(2-phosphoxyethyl)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

Synonyms  contains

History

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

search  results

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

« Results 1 - 10 of 152 »»

EC ▲▼	Common name ▲▼	Reaction ▲▼	
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 1961, modified 1976, 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-phosphooxoethyl)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-N-acetylglucosamine 1-carboxyvinyltransferase	phosphoenolpyruvate + UDP-N-acetyl-α-D-glucosamine = phosphate + UDP-N-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	(2E,6E)-farnesyl diphosphate synthase	geranyl diphosphate + isopentenyl diphosphate = diphosphate + (2E,6E)-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  results

« « Results 1 - 10 of 152 » »

EC ▲ ▼	Common name ▲ ▼	Reaction ▲ ▼	History ▲ ▼
<a href="#">2.5.1.1</a>	dimethylallyltransferase	dimethylallyl diphosphate + isopentenyl diphosphate = diphosphate + geranyl diphosphate	created 1981
<a href="#">2.5.1.2</a>	thiamine pyridinylase	thiamine + pyridine = 1-[(4-amino-2-methylpyrimidin-5-yl)methyl]pyridinium + 4-methyl-5-(2-hydroxyethyl)thiazole	created 1981, modified 1976, modified 2001
<a href="#">2.5.1.3</a>	thiamine pyrophosphate synthase	(1) 4-amino-2-methyl-5-(diphosphooxymethyl)pyrimidine + 2-[(2R,5Z)-2-carboxy-4-methylthiazol-5(2H)-yl]ethyl phosphate + CO <sub>2</sub> ; (2) 4-amino-2-methyl-5-(diphosphooxymethyl)pyrimidine + 4-methyl-5-(2-hydroxyethyl)thiazole = diphosphate + 4-methyl-5-(2-hydroxyethyl)thiazole	created 1985, modified 2015
<a href="#">2.5.1.4</a>	adenosylmethionine cyclotransferase	adenosylmethionine + L-lysine = L-lysine + 5-methylthioadenosine	created 1985
<a href="#">2.5.1.5</a>	galactose-6-sulfurylase	galactose-6-phosphate + H <sub>2</sub> O = phosphate + galactose-6-sulfate	created 1985
<a href="#">2.5.1.6</a>	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
<a href="#">2.5.1.7</a>	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
<a href="#">2.5.1.8</a>	tRNA isopentenyltransferase	isopentenyl diphosphate + tRNA = diphosphate + tRNA containing 6-isopentenyladenosine	created 1972, deleted 2009
<a href="#">2.5.1.9</a>	riboflavin synthase	2,6,7-dimethyl-8-(1-D-ribityl)lumazine = riboflavin + 4-(1-D-ribitylamino)-5-amino-2,6-dihydroxypyrimidine	created 1972
<a href="#">2.5.1.10</a>	(2E,6E)-farnesyl diphosphate synthase	geranyl diphosphate + isopentenyl diphosphate = diphosphate + (2E,6E)-farnesyl diphosphate	created 1972, modified 2010

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

« « Results 1 - 10 of 152 » »

- Enzyme Nomenclature 19
- Enzyme-Ligand Interactions 225
- Diseases 0
- Functional Parameters 135
- Organism related Information 229
- General Information 4
- Enzyme Structure 154
- Molecular Properties 20
- Applications 13
- References 28
- External Links

# Information on EC 2.5.1.2 - thiamine pyridinylase

for references in articles please use BRENDA:EC2.5.1.2

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

## 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 permitted to date)
      - └ 2.5.1.2 thiamine pyridinylase

## 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:

Search Reference ID:

Search UniProt Accession:

Select one or more organisms in this record:

All organisms ^

Acanthogobius flavimanus

Anadara inflata

Aneurinibacillus aneurinilyticus

Aneurinibacillus aneurinilyticus BKA v

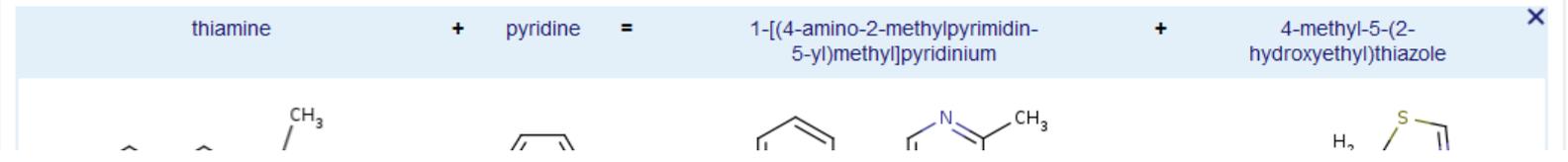
## Show additional data

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



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

## Reaction Schemes



# EC Explorer

[browse EC tree] - [search]

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

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)

results

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

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-(diphosphoxymethyl)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-(diphosphoxymethyl)pyrimidine + 2-(2-carboxy-4-methylthiazol-5-yl)ethyl phosphate = diphosphate + thiamine phosphate + CO <sub>2</sub> ; (3) 4-amino-2-methyl-5-(diphosphoxymethyl)pyrimidine + 4-methyl-5-(2-phosphoxyethyl)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]

## 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

[back to top](#)

## 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)   
- 2.5.1.20 rubber cis-polyisoprenyltransferase (18 organisms)  
- 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 dimethylallylcistransferase (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

[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  
Various bases and thiol compounds can act instead of pyridine.

History  
created 1961, modified 1976, modified 2001

[back to top](#)

## 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   
- 2.5.1.2 thiamine pyridinylase (84 organisms)   **
- 2.5.1.3 thiamine phosphate synthase   
- 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)   
- 2.5.1.20 rubber cis-polyprenylcistransferase (18 organisms)   
- 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 dimethylallylcistransferase (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)   

...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  
Various bases and thiol compounds can act instead of pyridine.

History  
created 1961, modified 1976, modified 2001

back to top

## 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 trans-2-oxo-4-oxopentanoate:amino acid transaminase (1084 organisms)
              - 2.5.1.2 thiamine pyridinylase
              - 2.5.1.3 trans-2-oxo-4-oxopentanoate:amino acid transaminase (1084 organisms)
              - 2.5.1.4 trans-2-oxo-4-oxopentanoate:amino acid transaminase (1084 organisms)
              - 2.5.1.5 trans-2-oxo-4-oxopentanoate:amino acid transaminase (1084 organisms)
              - 2.5.1.6 trans-2-oxo-4-oxopentanoate:amino acid transaminase (1084 organisms)
              - 2.5.1.7 trans-2-oxo-4-oxopentanoate:amino acid transaminase (1084 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)
              - 2.5.1.20 rubber cis-polyisoprenyltransferase (18 organisms)
              - 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 dimethylallyltransferase (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)

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

[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 use the „browse“ function to look for enzymes

evaluate BRENDA!

Information

Getting started

Contribute

Download

member of **de NBI**

**elixir**  
Core Data Resource

Release 2021.1 (January 2021)  
BRENDA professional **UPDATE!**

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

# 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 (189 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.

evaluate BRENDA!

The EC browser with information on the main classes.

UPDATE!  
Release 2021.1 (January 2021)  
BRENDA professional



# EC Explorer

[browse EC tree] [search]  
△ back to top

Click on the (+)-icon to expand a section or on the (-)-icon to collapse a section.

## 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)
  - 2.6 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)
- 5 Isomerases (2099 organisms)
- 6 Ligases (1565 organisms)
- 7 Translocases (1096 organisms)

Use of this online version of BRENDA is free under the CC BY 4.0 license. See terms of use for full details.

- Information
- Getting started
- Contribute
- Download



**UPDATE!**  
Release 2021.1 (January 2021)  
BRENDA\_professional

## 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

[back to top](#)

- 2.5.1.35 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  $\gamma$ -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  $\beta$ -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-acetylneuraminatase synthase (15 organisms)   
- 2.5.1.57 N-acylneuraminatase-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

[back to top](#)

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

- 2.5.1.35 trans-pentaprenyltransferase (10 organisms)   
- 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 deleted 2004  
- 2.5.1.38 deleted 2004  
- 2.5.1.39 deleted 2004  
- 2.5.1.40 deleted 2004  
- 2.5.1.41 deleted 2004  
- 2.5.1.42 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)  
- 2.5.1.46 deoxyhypusine synthase (44 organisms)   
- 2.5.1.47 cysteine synthase (89 organisms)   
- 2.5.1.48 cystathionine  $\gamma$ -synthase (36 organisms)   
- 2.5.1.49 O-acetylhomoserine aminocarboxypropyltransferase (24 organisms)   
- 2.5.1.50 zeatin 9-aminocarboxyethyltransferase (1 organism) 
- 2.5.1.51  $\beta$ -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-acetylneuraminatase synthase (15 organisms)   
- 2.5.1.57 N-acylneuraminatase-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 deleted 2004 