RGD Pathway Curation

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Rat Genome Database

Gene Ontology Consortium Meeting
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Rat Genome Database
http://rgd.mcw.edu

physiology

MEDICAL COLLEGE OF WISCONSIN

RGD Pathway Ontology

Ontology Browser

Term:

classic metabolic pathway (PW:0000002)

Annotations: Rat: (1852) Mouse: (1857) Human: (1802) Chinchilla: (966) Bonobo: (1015) Dog: (1009) Squirrel: (973) Pig: (1012) Naked Mole-rat: (957) Green Monkey: (1015) **Pathway Diagram Browser**

Parent Terms	Term With Siblings	Child Terms
pathway +	classic metabolic pathway + The various, enzyme-controlled, series of reactions allowing for the conversion of materials, energy availability and biodegradation of xenobiotics. disease pathway + drug pathway + regulatory pathway + signaling pathway +	amino acid metabolic pathway + biogenic amines and polyamines metabolic pathway + carbohydrate metabolic pathway + energy metabolic pathway + lipid metabolic pathway + metabolic pathway of cofactors, vitamins, nutrients + metabolic pathway of other amino acids + metabolic pathway of secondary metabolites + metabolic pathway pertinent to the brain + nucleotide metabolic pathway + peptide and protein metabolic pathway +

Annotations: RGD manual & imported

	All	minus ISO
Total	211756	51250

Annotation counts by source

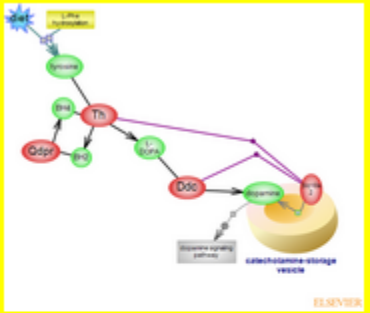
Souce	# annotations
RGD	6675
PID	2521
KEGG (legacy)	30982
SMPDB	11126

Annotations by category

PW ID	PW Category Term	# annotations
PW:0000002	classic metabolic pathway	9961
PW:0000003	signaling pathway	13197
PW:0000004	regulatory pathway	14835
PW:0000013	disease pathway	13947
PW:0000754	drug pathway	6644

dopamine biosynthetic pathway

Those metabolic reactions involved in the synthesis of dopamine.



View Interactive Diagram

dopamine degradation pathway

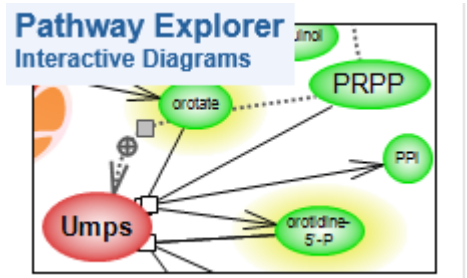
dopamine oxidation pathway

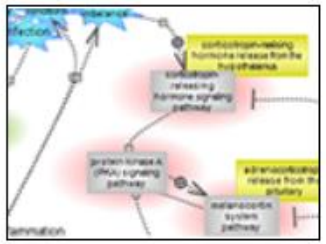
epinephrine biosynthetic pathway

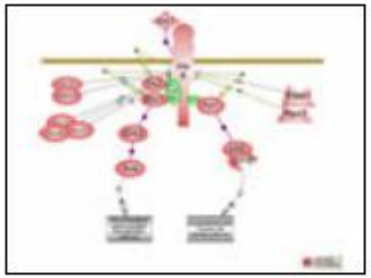
norepinephrine biosynthetic pathway

Diagrams by Category

Category	# diagrams
classic metabolic pathway	42
signaling pathway	67
regulatory pathway	47
disease pathway	10
drug pathway	34
Total # individual diagrams	200







Individual Diagram Pages

Jump to:

classic metabolic pathways
signaling pathways
regulatory pathways
disease pathways
drug pathways

Molecular Pathway Suites and Suite Networks

- Balancing Blood Pressure Regulatory Mechanisms Pathway Suite Network
  - Mechanisms Mediating and Pertinent to Increased Blood Pressure Pathway Suite
  - Mechanisms Mediating and Pertinent to Decreased Blood Pressure Pathway Suite
  - Mechanisms Mediating and Pertinent to Both Increased and Decreased Blood Pressure Pathway Suite
- Balancing Inflammatory Responses Pathway Suite Network
  - Anti-inflammatory HPA Axis, Interleukin-10 and Related Pathways Suite
  - Pro-inflammatory Nuclear Factor Kappa B, Toll-like Receptor, Interleukins and Related Signaling Pathways Suite
- Beta Adrenergic Receptor Pathway Suite
- Calcium Homeostasis Pathway Suite
- Developmental Pathway Suite
- DNA Damage Response Pathway Suite
- Doxorubicin Pathway Suite
- Energy Homeostasis Pathway Suite
- Estrogen Pathway Suite
- Gene Expression and Regulation Pathway Suite Network
  - Epigenetic Regulation/Control – Chromatin Modification/Remodeling Pathway Suite
  - Transcription and Transcription-Coupled Events Pathway Suite
  - RNA maturation, Transport and Surveillance (QC) and Protein Translation Pathway Suite
- Glucose Homeostasis Pathway Suite Network
  - Pathway Suite for the Glucose Homeostasis-related Regulatory and Signaling Pathways
  - Pathway Suite for the Metabolism of Glucose and Related Molecules Pathways
- Methionine, Homocysteine, Folate and Related Metabolites Pathway Suite
- Mitochondria Homeostasis Pathway Suite
- Parkinson Disease Pathway Suite
- Prostate Cancer Pathway Suite
- S-adenosylmethionine Homeostasis Pathway Suite Network
  - SAM-homeostasis-related Metabolic Pathway Suite
  - SAM-homeostasis-related Regulatory Pathway Suite
- Steroid Hormone Biosynthesis Pathway Suite
- Type 2 Diabetes Pathway Suite
- Vitamin A and Metabolites Pathway Suite

Description

The synthesis and release of catecholamines dopamine, norepinephrine and epinephrine are triggered by various but distinct conditions and stresses. Norepinephrine and epinephrine, also known as noradrenaline and adrenaline, act as neurotransmitters and hormones. They signal via various adrenergic receptors, G protein-coupled receptors (GPCR) which couple to distinct G alpha subunits of heterotrimeric G proteins. Stresses such as cold and pain prompt the synthesis of norepinpehrine in sympathetic...(more)

Entities

- Protein
- Small Molecule
- Treatment
- Cell Process
- Disease
- Cell Object
- Pathway
- Complex
- Functional Class

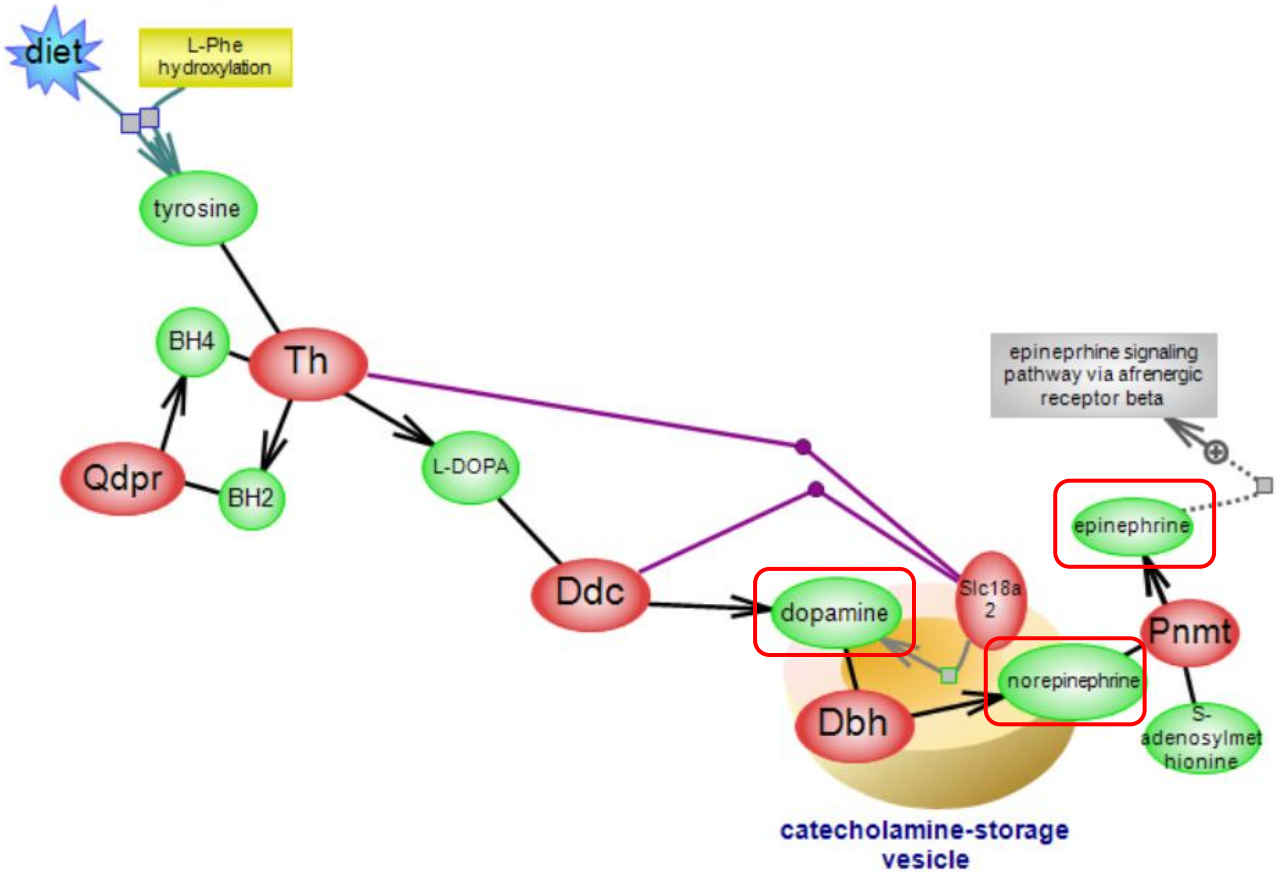
Relationships

- Binding
- UnknownRelation
- Regulation
- Expression
- MolSynthesis
- PromoterBinding
- ProtModification
- MolTransport
- DirectRegulation
- ChemicalReaction

Shapes

- Nuclear receptors
- Kinases
- Phosphatases
- Extracellular protein
- Ligands

Pathway Diagram:



ELSEVIER

GO TO:

- *Genes*
- *Additional Elements*
- *Disease annotations to Pathway Genes*
- *Pathway annotations to Pathway Genes*
- *References*
- *Ontology path Diagram*

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Genes (5)

norepinephrine biosynthetic pathway

	Symbol	Object Name	Evidence	Notes	Source	PubMed Reference(s)	RGD Reference(s)	Position
G	Dbh	dopamine beta-hydroxylase	ISO		RGD	PMID:19342614	RGD:4139904	NCBI chr 3:30,886,313...30,903,313 Ensembl chr 3:10,488,260...10,505,248
G	Ddc	dopa decarboxylase	ISO		RGD	PMID:19342614	RGD:4139904	NCBI chr14:86,378,685...86,469,189 Ensembl chr14:86,378,685...86,469,208

Disease Annotations Associated with Genes in the norepinephrine biosynthetic pathway

Diseases/Genes | Genes/Diseases

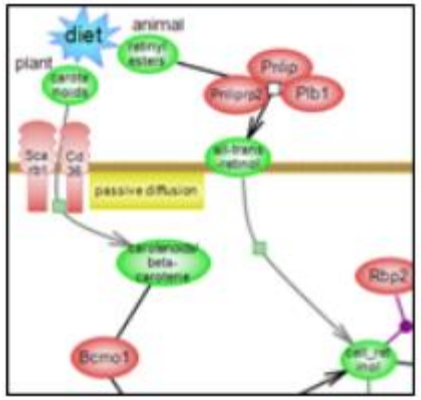
Disease Terms	Gene Symbols
Acute Liver Failure	Qdpr

Pathway Annotations Associated with Genes in the norepinephrine biosynthetic pathway

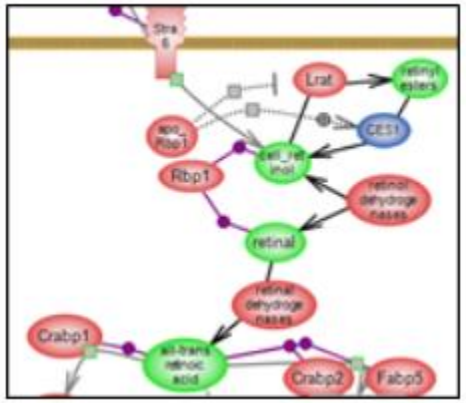
Pathways/Genes | Genes/Pathways

Pathway Terms	Gene Symbols
alkaptonuria pathway	Dbh , Ddc
aromatic L-amino acid decarboxylase deficiency pathway	Dbh , Ddc , Th
catecholamine biosynthetic pathway	Dbh , Ddc , Th
disulfiram pharmacodynamics pathway	Dbh , Ddc
dopa responsive dystonia pathway	Qdpr

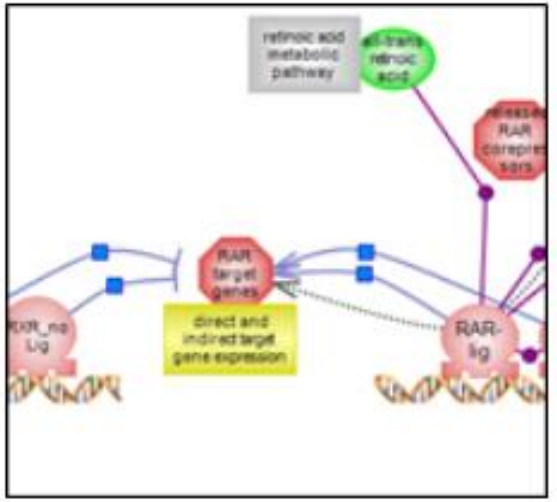
Retinol metabolic pathway



Retinoic acid metabolic pathway

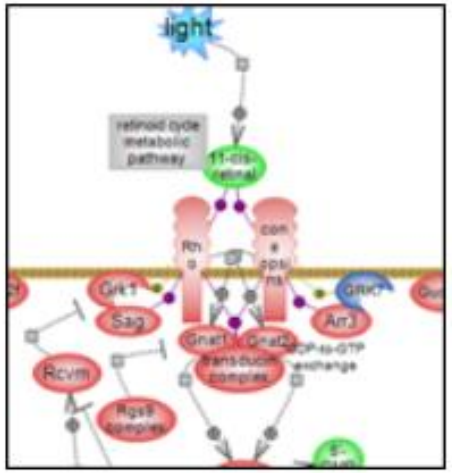


Retinoic acid signaling pathway

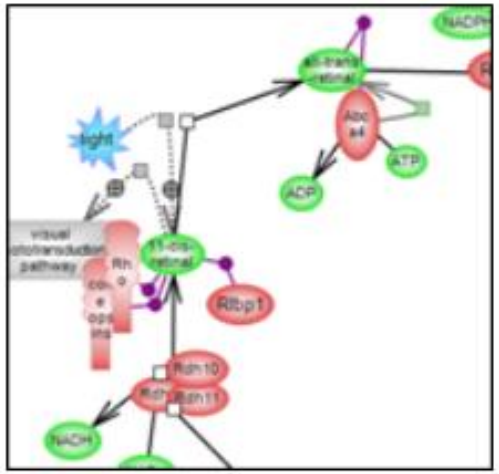


- Vitamin A and Metabolites Pathway Suite
  - Retinol metabolic pathway
  - Retinoic acid metabolic pathway
  - Retinoic acid signaling pathway
  - Visual phototransduction pathway
  - Retinoid cycle metabolic pathway

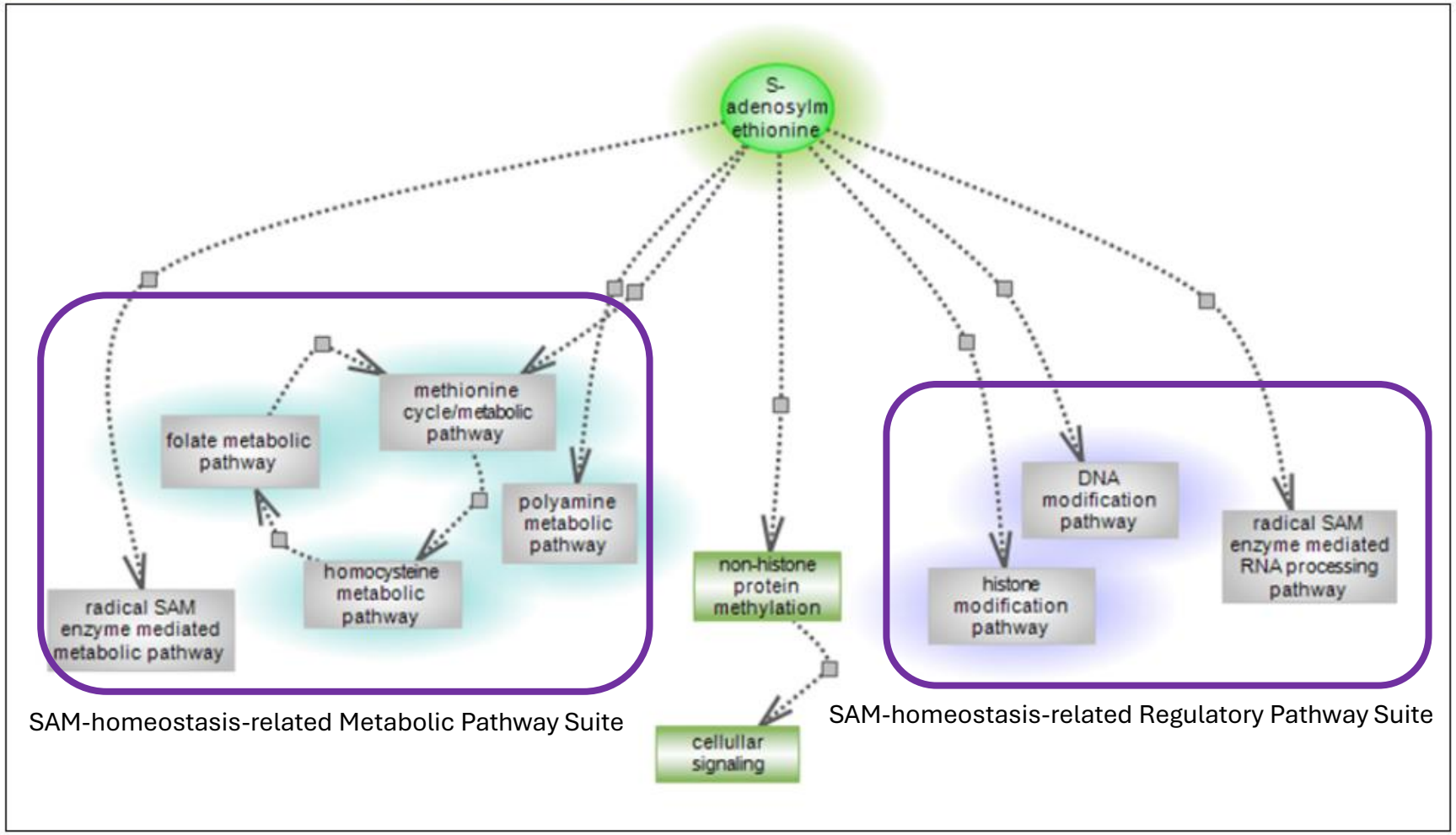
Visual phototransduction pathway



Retinoid cycle metabolic pathway



S-adenosylmethionine Homeostasis Pathway Suite Network



How PW diagrams were created at RGD

- Generate a diagram draft based on reviews
- Make GO, disease/phenotype annotations of these “pathway genes”
- Use Elsevier (originally Ariadne) Pathway Studio software to create PW diagrams
- Upload the PW diagrams to database using RGD pathway diagram tool to link genes, small molecules to RGD web pages or outside resources. And generate PW pages and components on the page.
- RGD also creates gene-pathway annotations for pathway terms that do not have diagrams.

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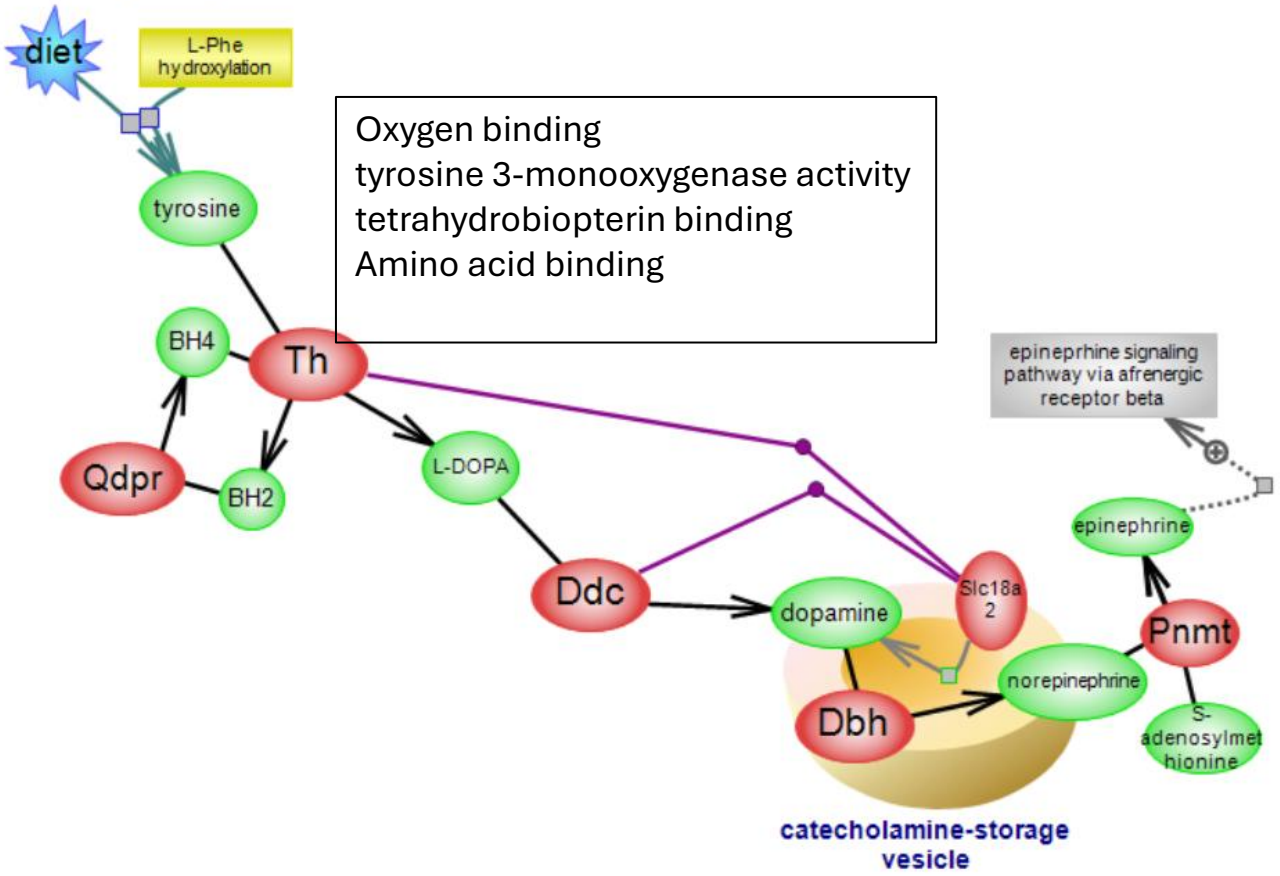

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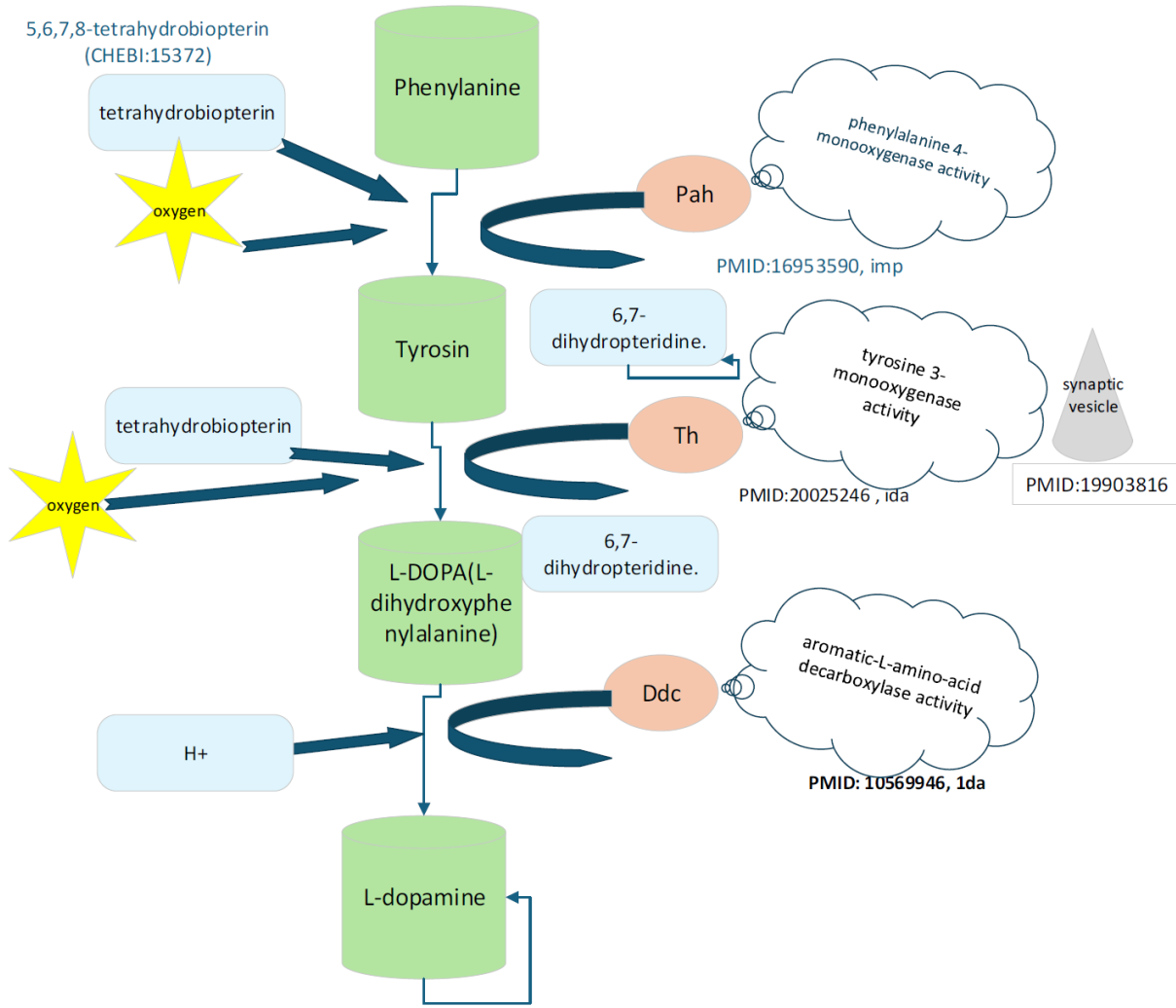
5,6,7,8-tetrahydrobiopterin
(CHEBI:15372)
tetrahydrobiopterin
oxygen
Phenylanine
Pah
phenylalanine 4-monooxygenase activity
PMID:16953590, imp
Tyrosin
6,7-dihydropteridine.
tyrosine 3-monooxygenase activity
synaptic vesicle
tetrahydrobiopterin
oxygen
Th
PMID:20025246 , ida
PMID:19903816
L-DOPA(L-dihydroxyphenylalanine)
6,7-dihydropteridine.
aromatic-L-amino-acid decarboxylase activity
Ddc
H+
PMID: 10569946, 1da
L-dopamine