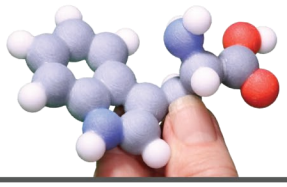
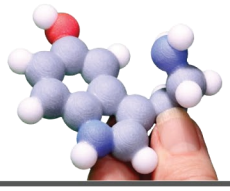


Serotonin Biosynthesis

Neurotransmitters Module: The Beery Twins' Story©

A Project-Based Learning Activity



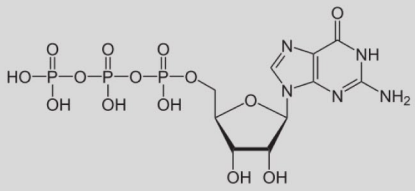
Sepiapterin reductase is the final enzyme in the biosynthetic pathway for **tetrahydrobiopterin** – a cofactor used by other enzymes in the synthesis of the neurotransmitters **dopamine** and **serotonin**.

In the case of **serotonin** biosynthesis, the enzyme **tryptophan hydroxylase** uses **tetrahydrobiopterin** to convert tryptophan to 5-hydroxytryptophan (5-HTP). In a second reaction, the enzyme **aromatic L-amino acid decarboxylase** converts 5-HTP into **serotonin**, the active neurotransmitter.

● Enzymes ● Neurotransmitters ● Cofactors

Tetrahydrobiopterin Pathway

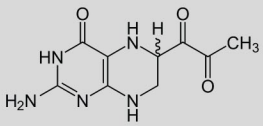
Guanosine Triphosphate (GTP)



GTP Cyclohydrolase I (GCH1)

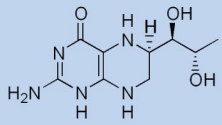
Pyruvoyl-Tetrahydropterin Synthase (PTPS)

6-Pyruvoyl-tetrahydropterin



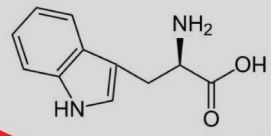
Sepiapterin Reductase (SPR)

Tetrahydrobiopterin



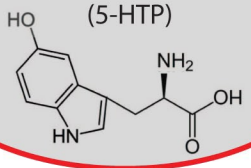
Serotonin Pathway

Tryptophan



Tryptophan Hydroxylase (TPH)
with Tetrahydrobiopterin Cofactor

5-Hydroxtryptophan (5-HTP)



Aromatic L-Amino Acid Decarboxylase (AAAD)
with Vitamin B6 Cofactor

Serotonin

Version 1.3 -10/2015

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