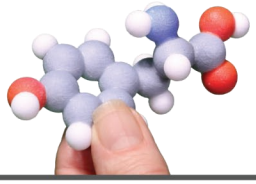
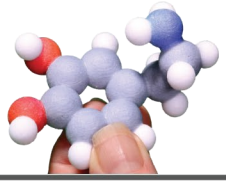


Dopamine Biosynthesis

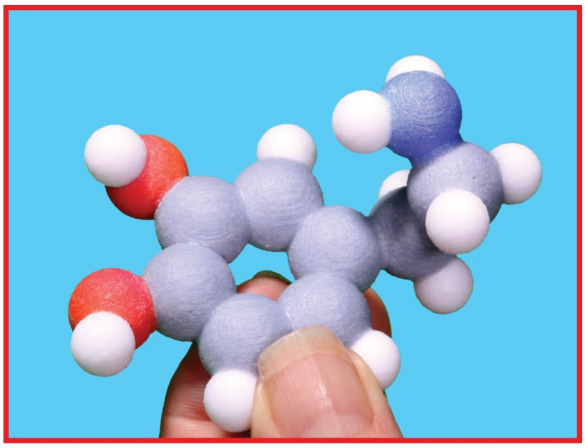
Neurotransmitters Module: The Beery Twins' Story©

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**.

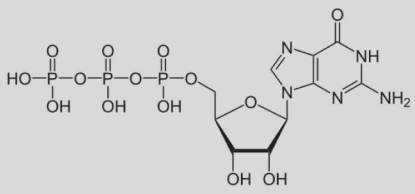
In the case of **dopamine** biosynthesis, the enzyme **tyrosine hydroxylase** uses **tetrahydrobiopterin** to convert tyrosine to L-DOPA. In a second reaction, the enzyme **aromatic L-amino acid decarboxylase** converts L-DOPA into **dopamine**, the active neurotransmitter.



Enzymes **Neurotransmitters** **Cofactors**

Tetrahydrobiopterin Pathway

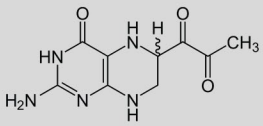
Guanosine Triphosphate (GTP)



GTP Cyclohydrolase I (GCH1)

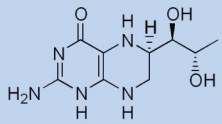
Pyruvoyl-Tetrahydropterin Synthase (PTPS)

6-Pyruvoyl-Tetrahydropterin



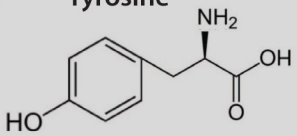
Sepiapterin Reductase (SPR)

Tetrahydrobiopterin



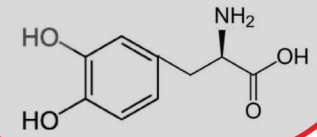
Dopamine Pathway

Tyrosine



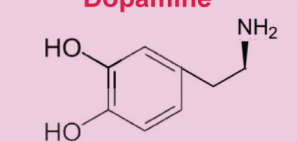
Tyrosine Hydroxylase (TH)
with Tetrahydrobiopterin Cofactor

L-DOPA



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

Dopamine



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