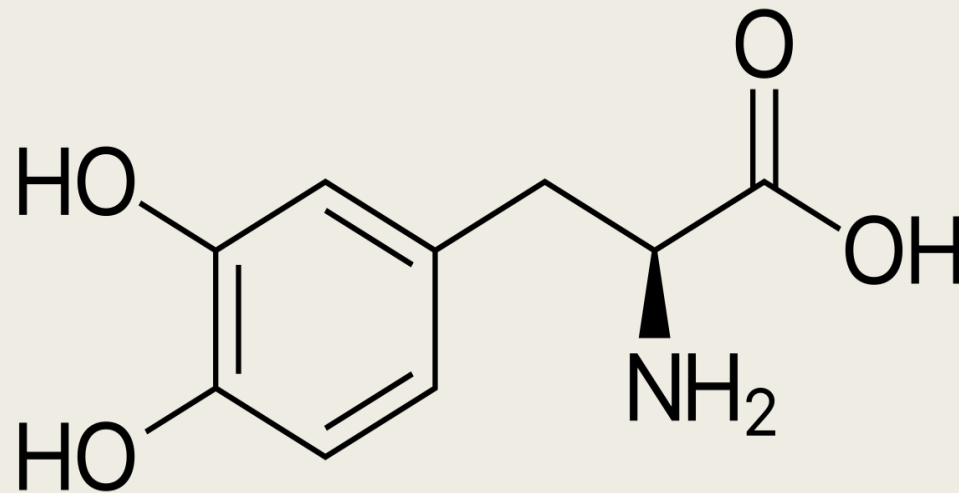


L-DOPA

Jacob Cabrera

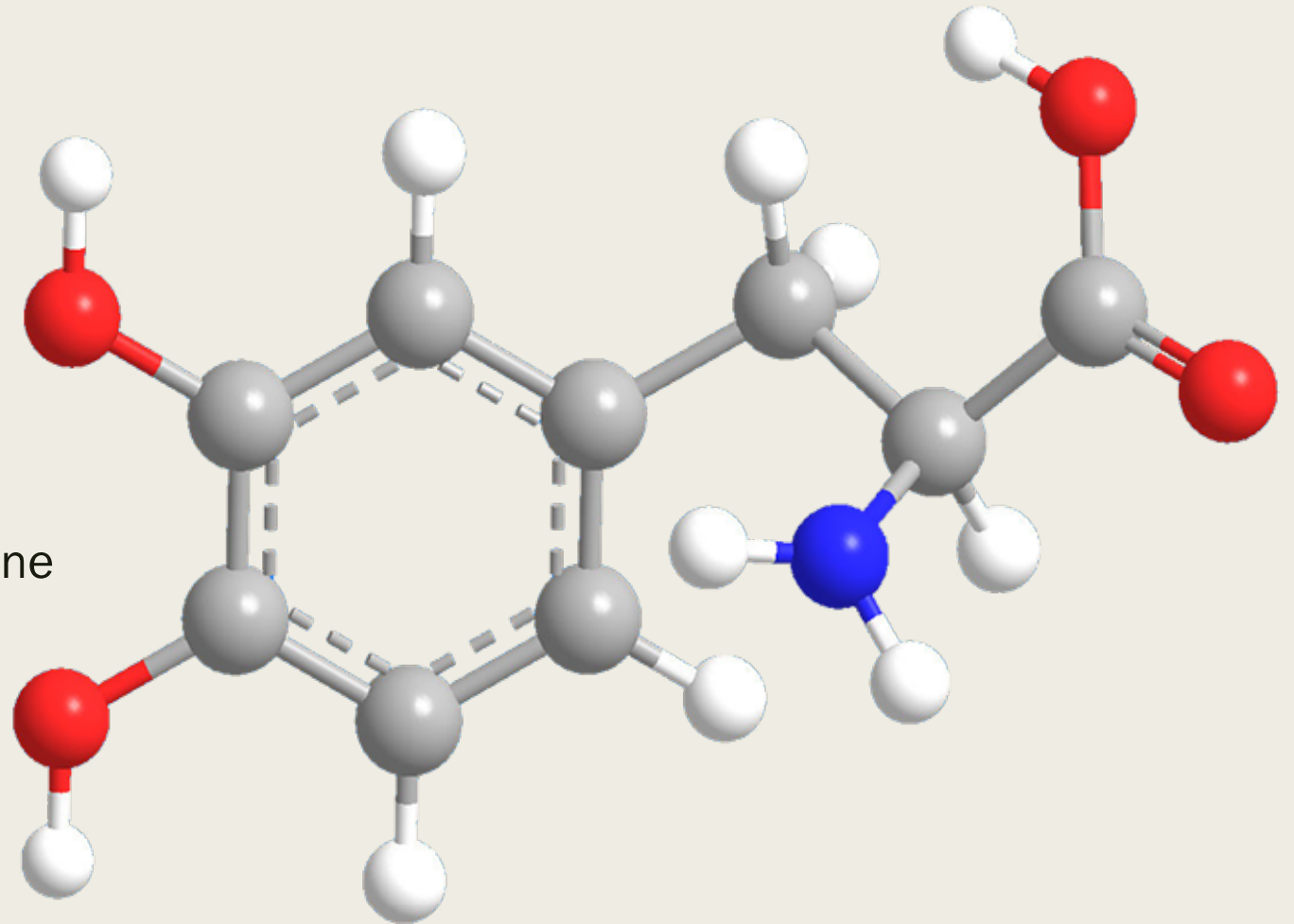
ANTIPARKINSONIAN
L-3,4 DIHYDROXYPHENYLALANINE



Western International High school 2022

L-Dopa Formula

- CH₉H₁₁NO
- Molar mass : 197.18 g/mol
- CAS Registry 59-92-7
- Other names: 3-Hydroxy-L-tyrosine

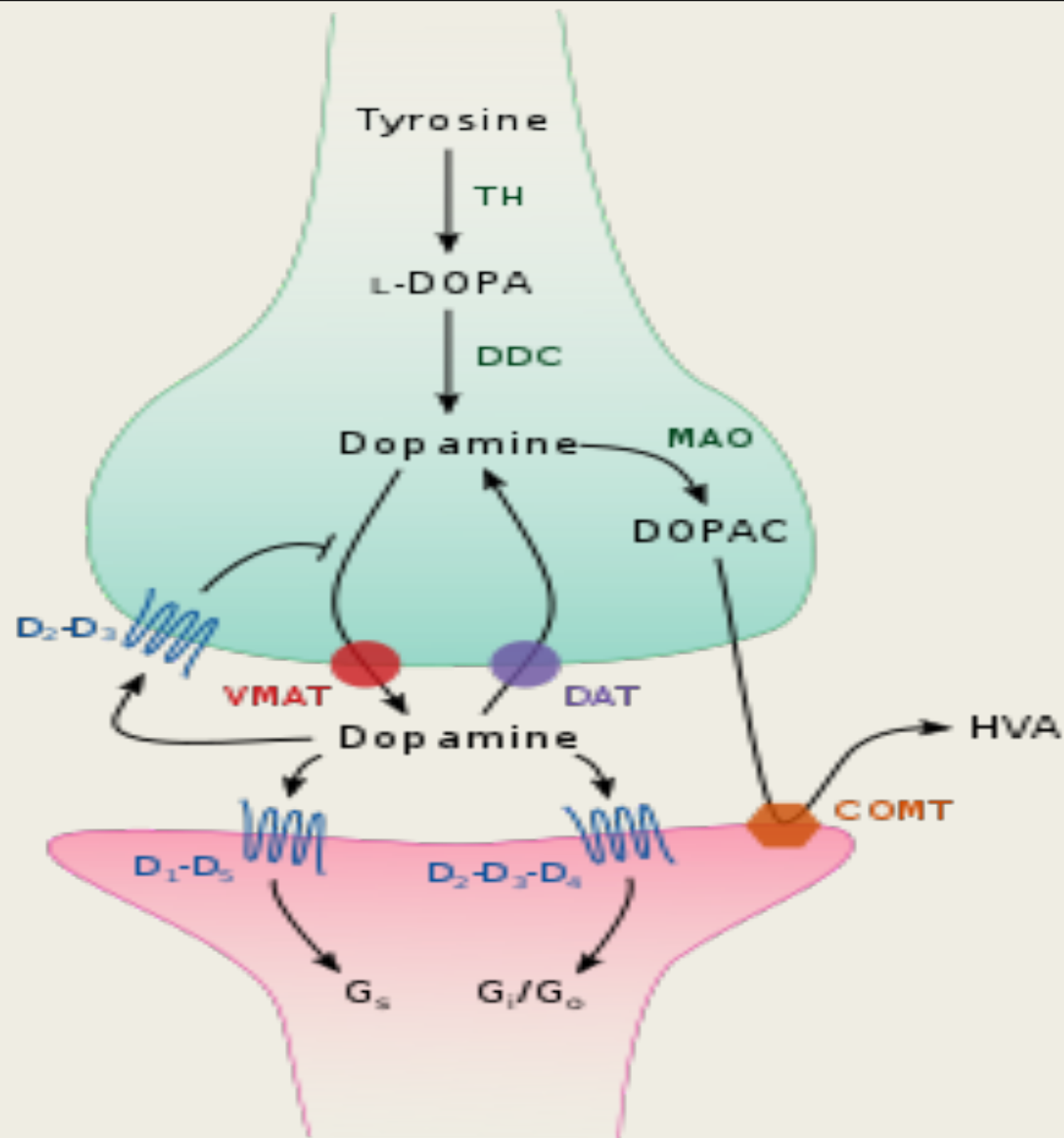


The History Of L-Dopa

- L-Dopa was first taken from Vicia Faba seedlings by Marcus Guggenheim in 1913
- In 1938 Peter Holz found that L-Dopa decarboxylizes into dopamine in mammalian tissue.
- In the 1950's it was found that L-dopa is active in the Brain and other tissues.
- Later on in 1959 it was discovered that dopamine is important for central motor function.
- In 1960, after discovering loss of dopamine in Parkinson patients, experiments were conducted and it improved their motor deficits
- In 1970 L-Dopa was approved by the FDA for Parkinson's disease therapy

What Is L-Dopa Used For

- L-Dopa treats Parkinson's disease which makes you to become stiff, and make involuntary movements. Parkinson's disease is caused by a loss of nerve cells in the Substantia Nigra which is a part of the brain which is responsible for the production of dopamine.
- L-Dopa was and is still used to treat Parkinson's because of it being able to be taken as a oral medication and that allows it to go through decarboxylation and release the dopamine to be stored in the Brain where it is needed.

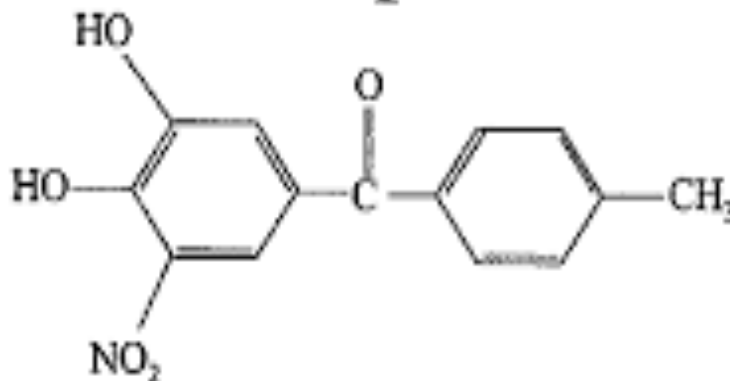


Other Medications Used With L-Dopa

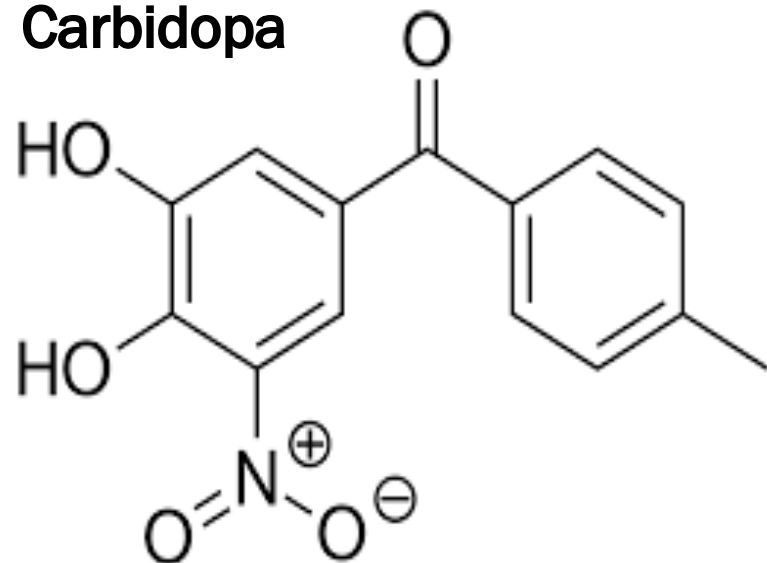
- When L-Dopa is used for Parkinson's, other medication is involved to help deliver L-Dopa to the brain and avoid its transition to dopamine before crossing the blood brain barrier.
- Carbidopa is a medication used with L-Dopa to treat symptoms caused by L-Dopa. It works as an enzyme inhibitor until it reaches the CNS (central nervous system).
- To avoid L-Dopa from being made into 3-O-methyldopa, which is useless, the drugs Tolcapone or Entacapone are used to stop that from happening. A big side effect from Tolcapone is the intoxication of the liver.
- The enzyme MAO-B turns the dopamine into inactive metabolites, so to prevent this people use Selegiline which inhibits the enzyme and makes dopamine more available

Medication Structures

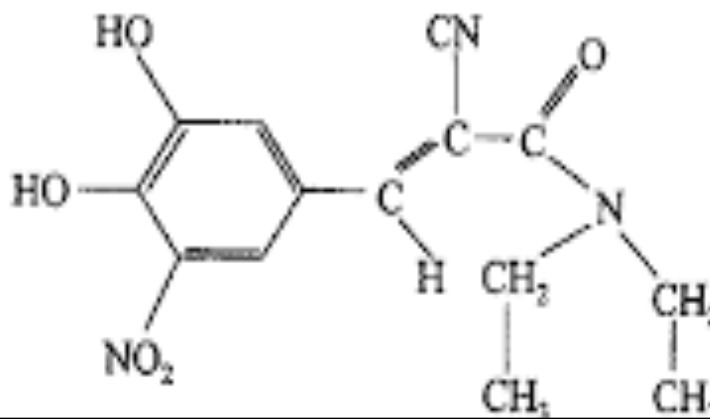
Tolcapone



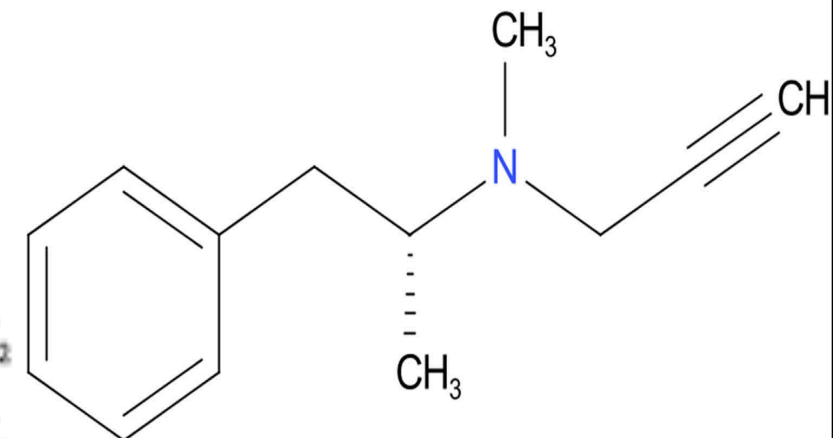
Carbidopa



Entacapone

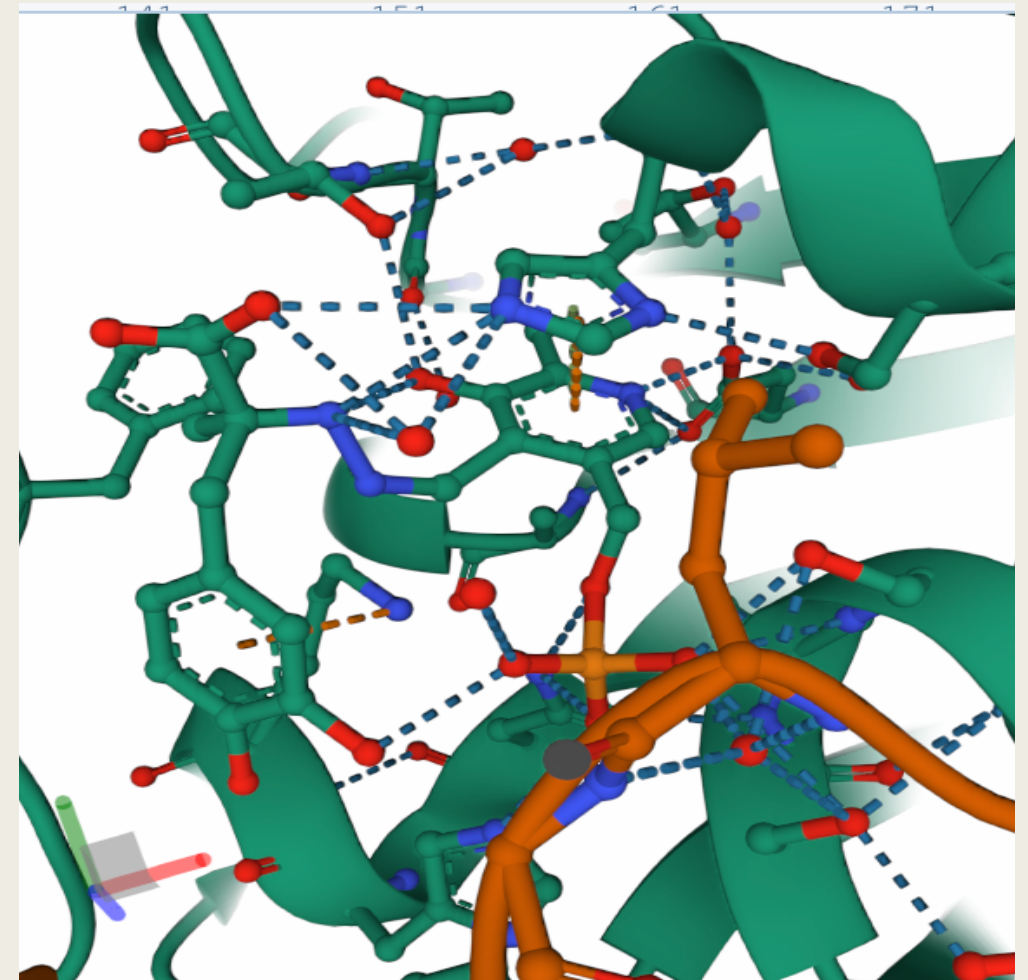
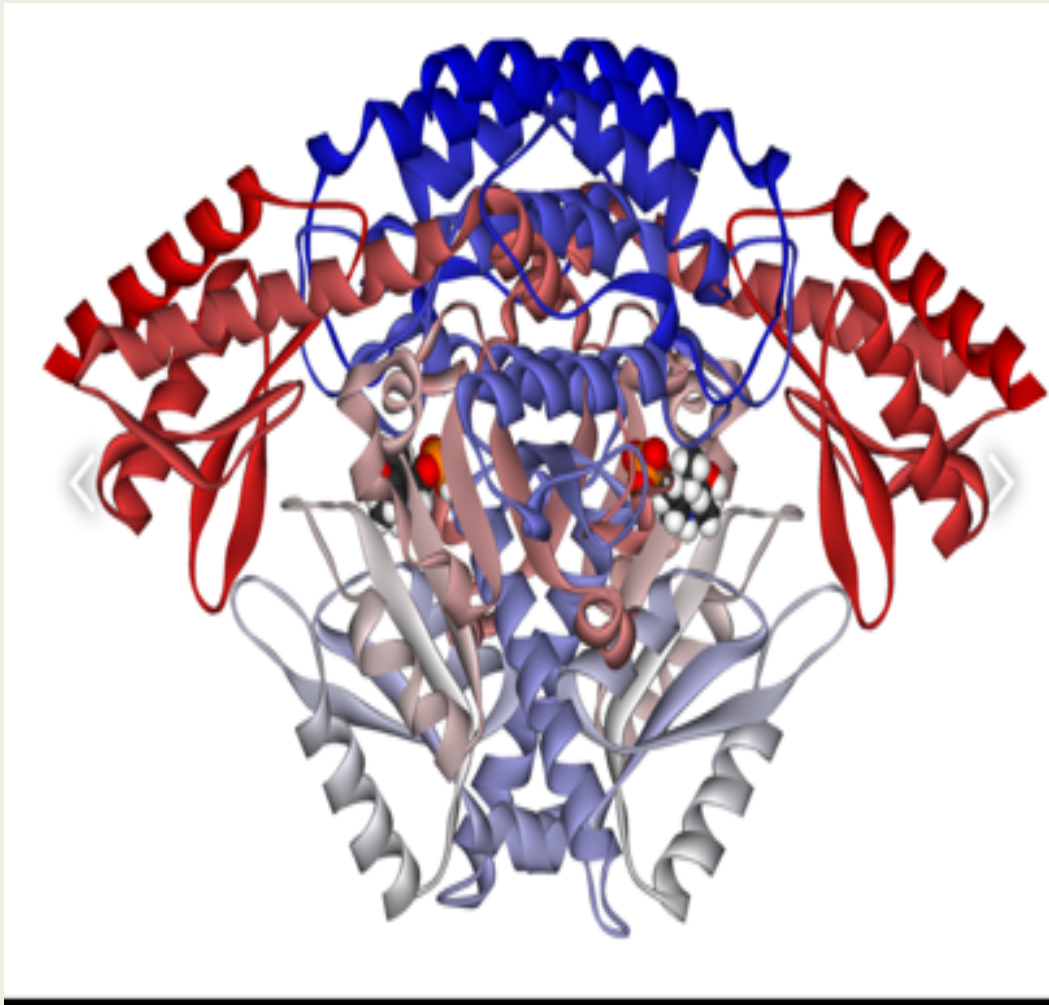


Selegiline

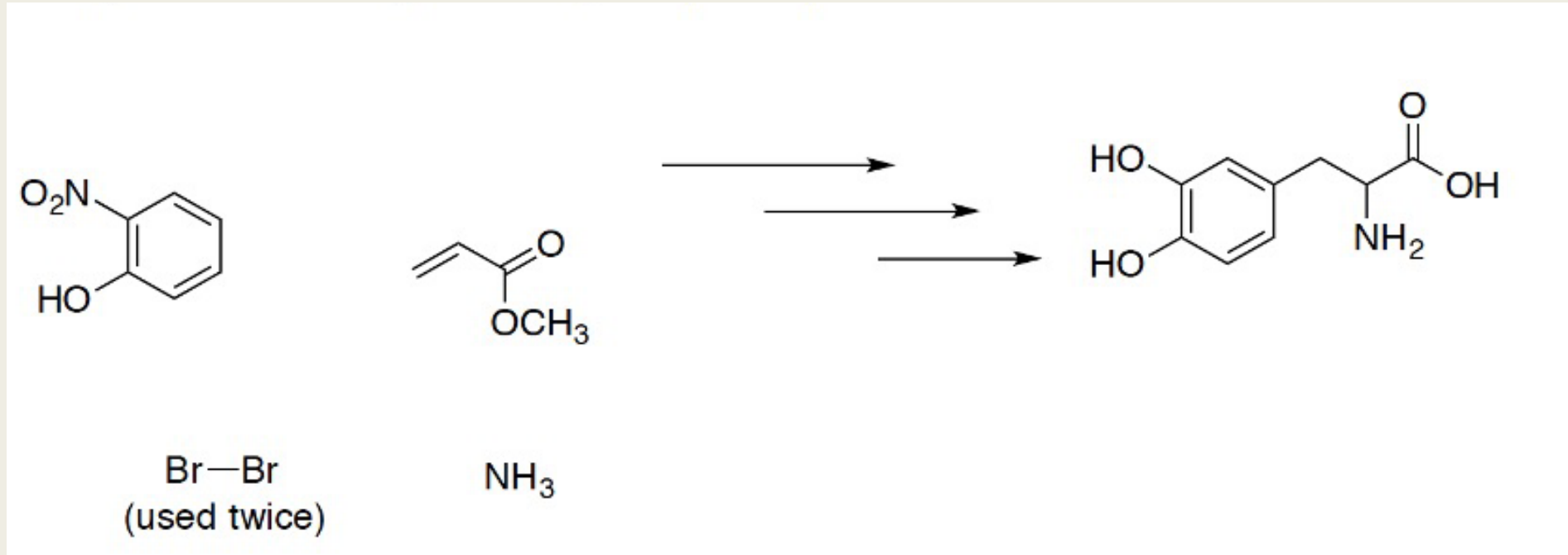


L-Dopa Traveling With Enzymes

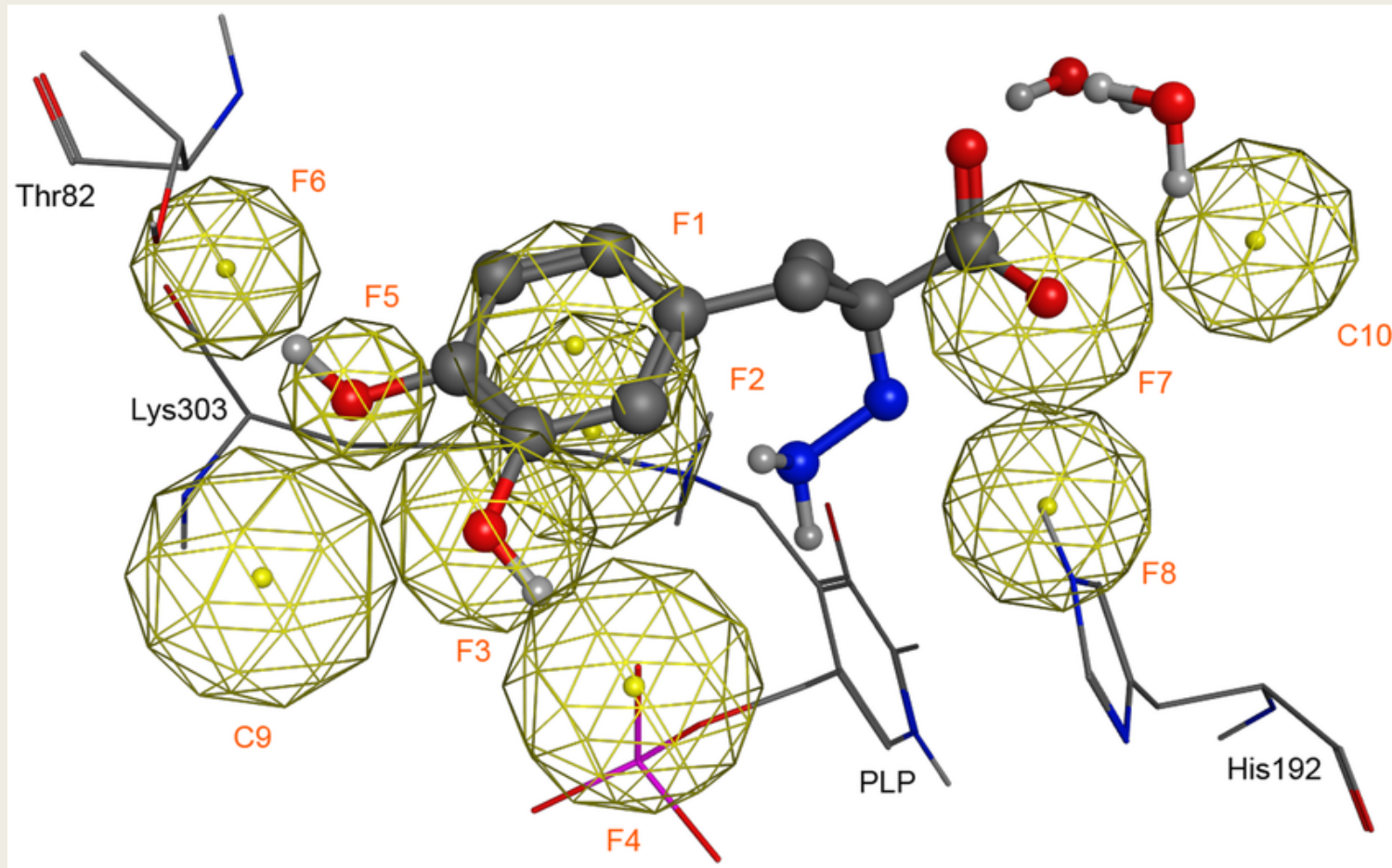
- Normally dopamine is created by having the amino acid, tyrosine, convert into another amino acid called L-Dopa and an enzyme called aromatic acid decarboxylase turns it into dopamine.

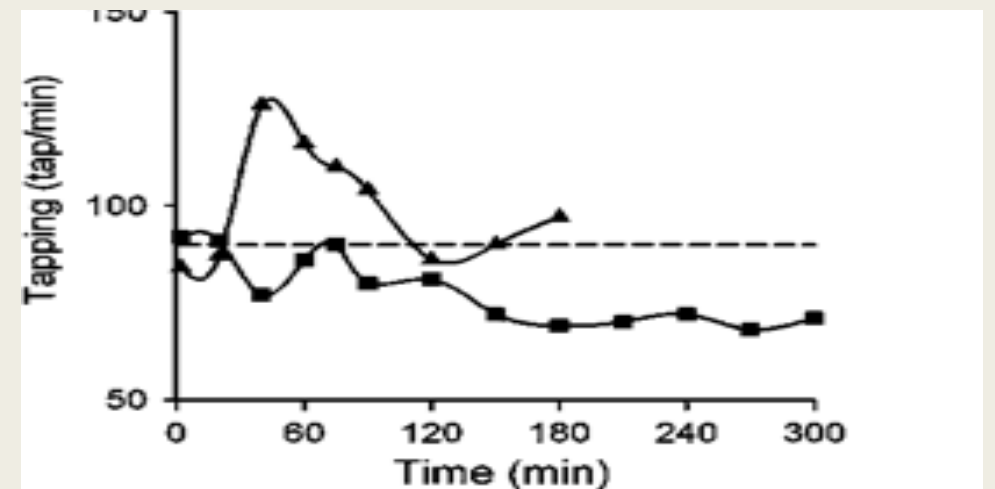
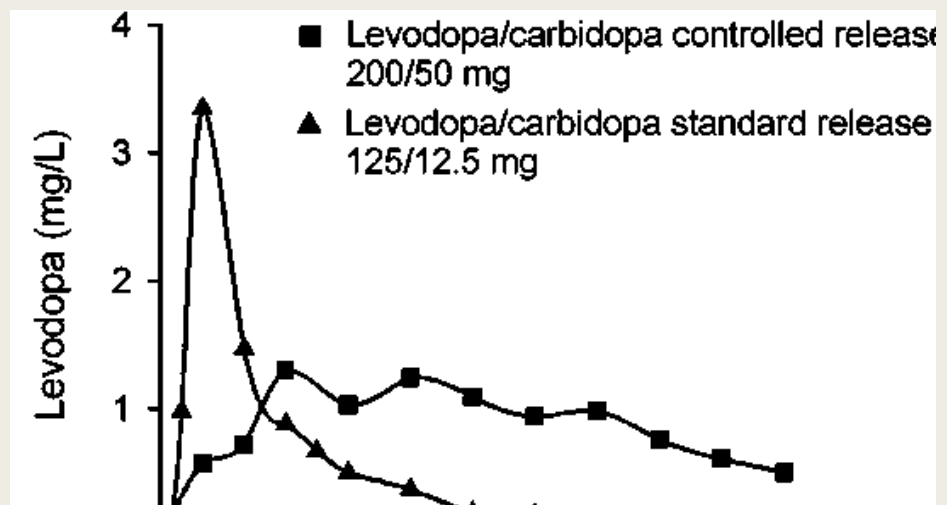


Synthesis Of L-Dopa



Pharmacophore Of L-Dopa





Sources:

- <http://pubsapp.acs.org/cen/coverstory/83/8325/8325l-dopa.html>
- https://www.rcsb.org/3d-view/1JS3?preset=ligandInteraction&label_asym_id=E
- <https://medlineplus.gov/druginfo/meds/a601068.html>
- <https://go.drugbank.com/drugs/DB01235>
- <https://pubchem.ncbi.nlm.nih.gov/compound/Levodopa>