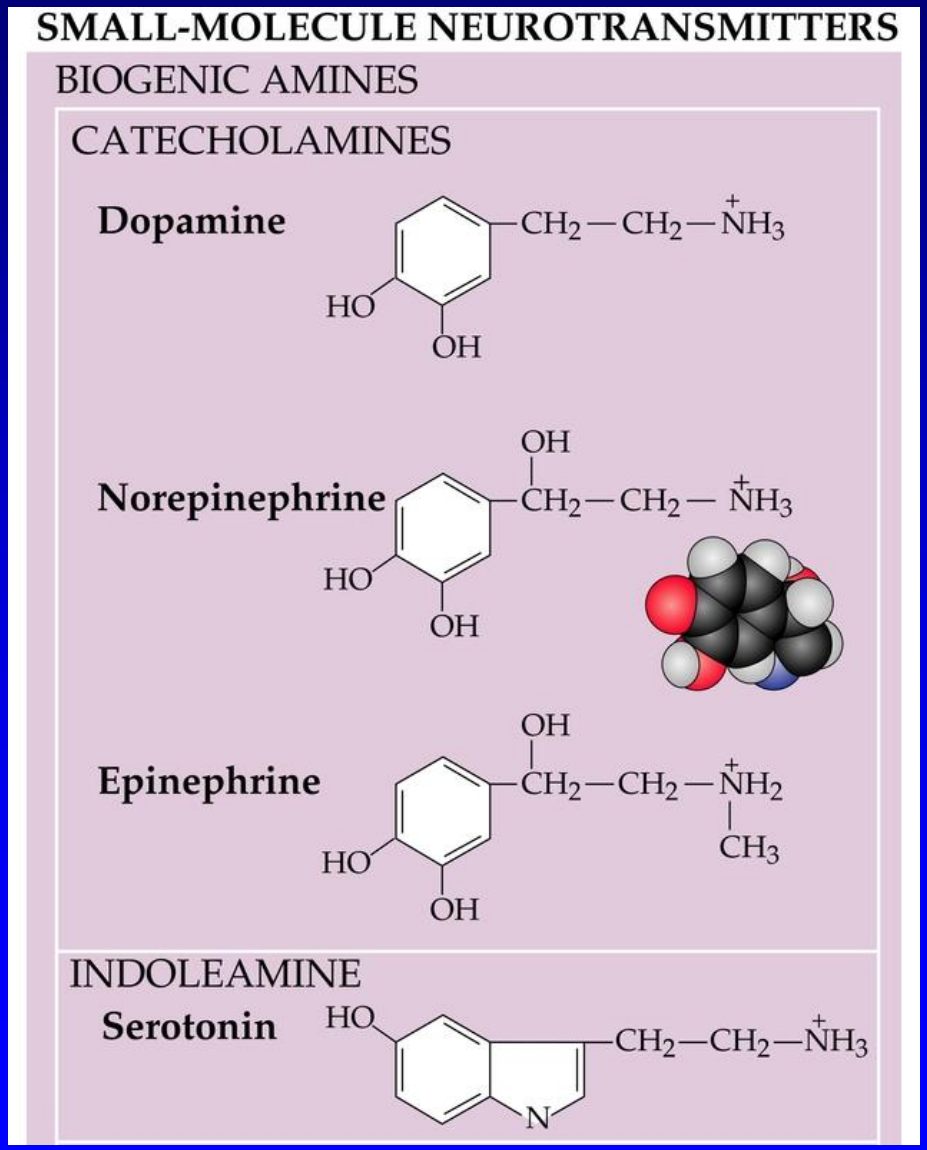
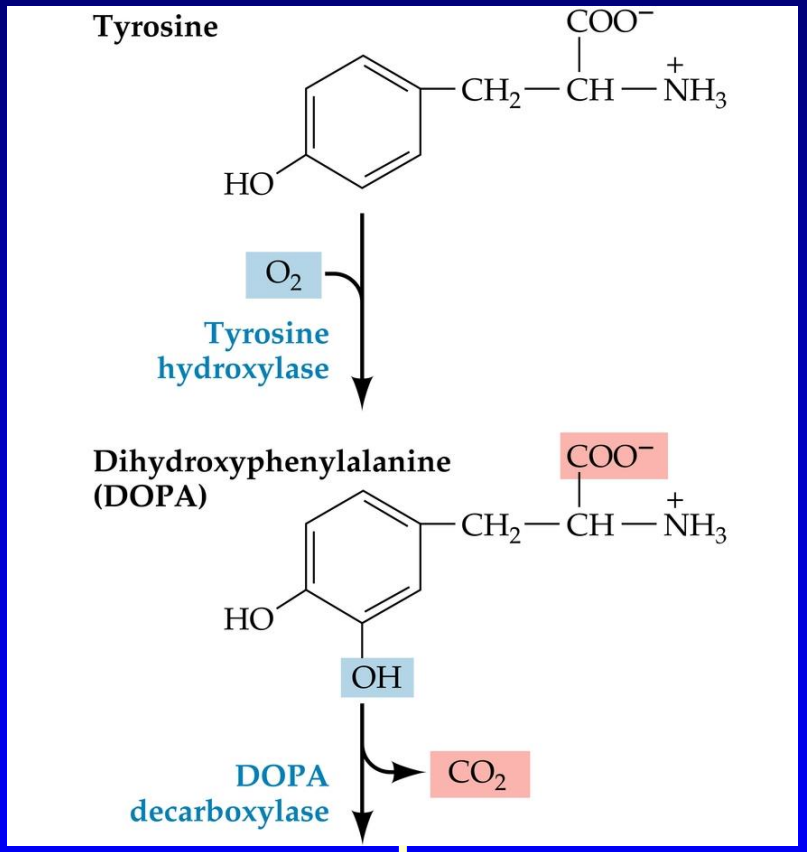
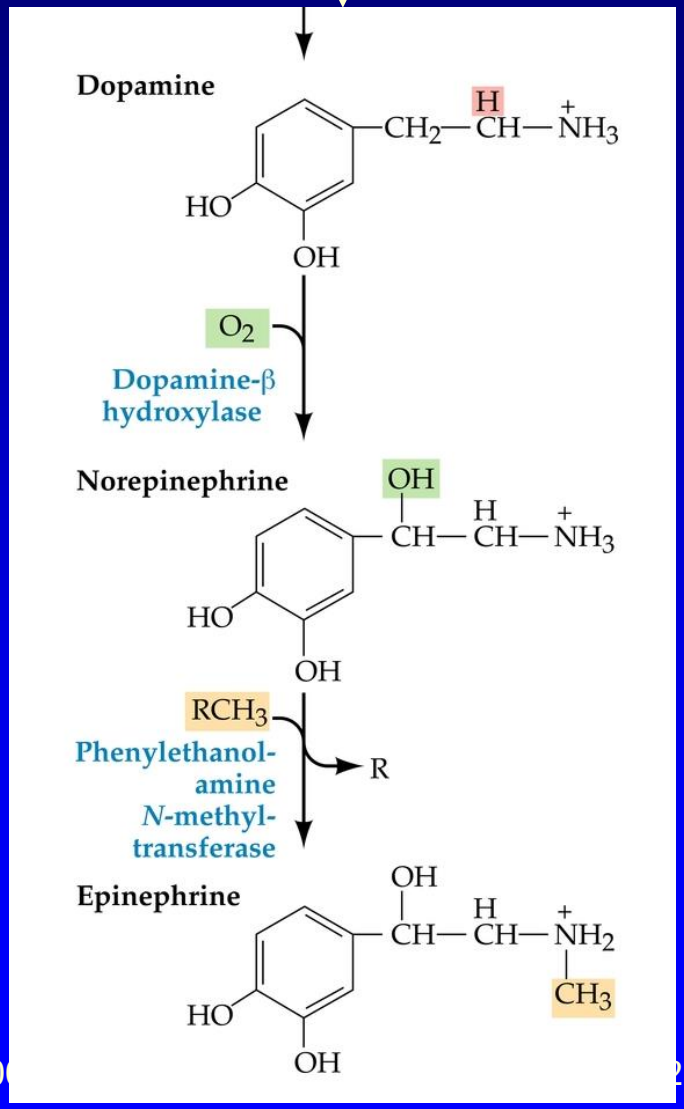
Biogenic Amines

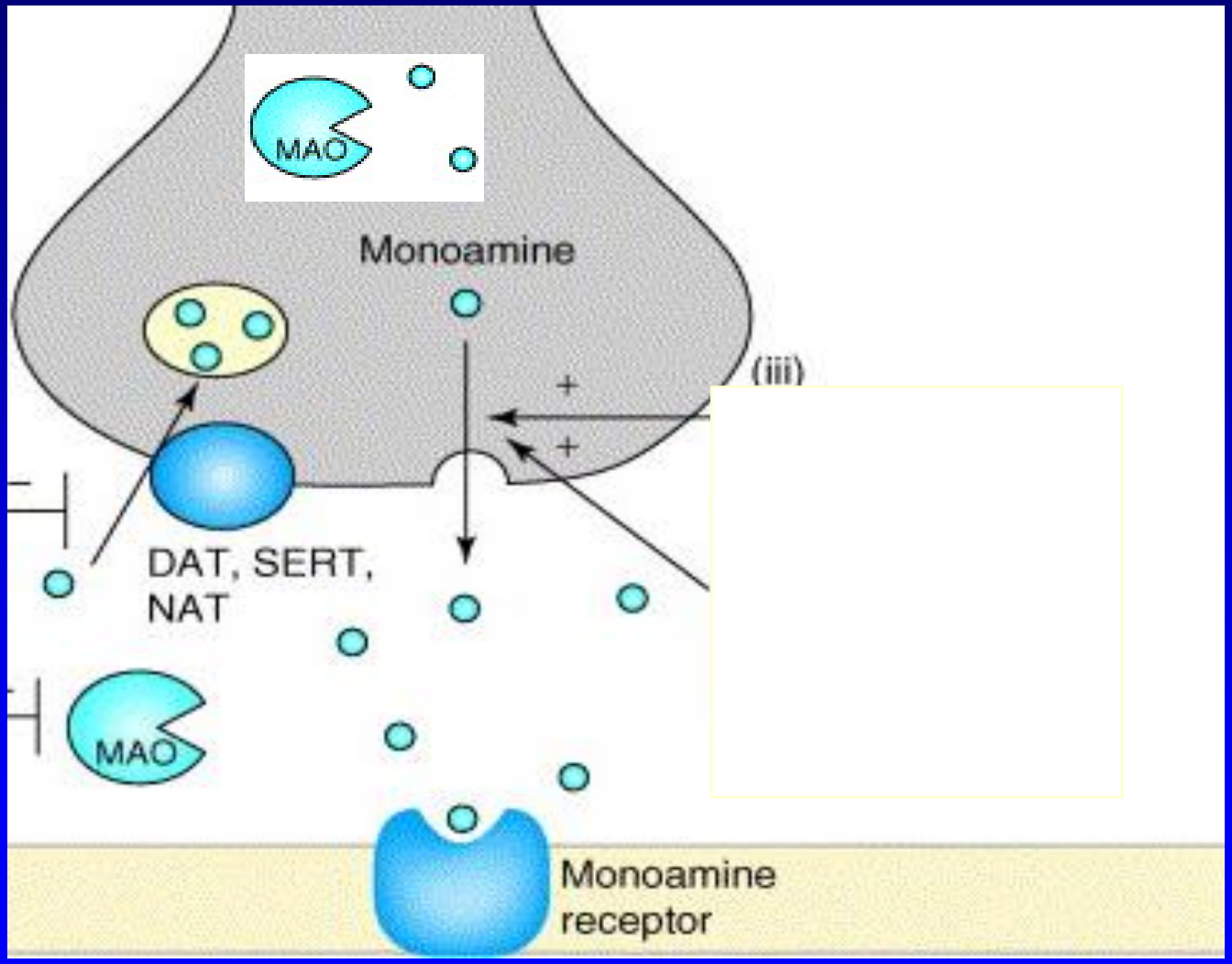


The biosynthetic pathway for the catecholamine neurotransmitters





Biogenic Amines Synapses



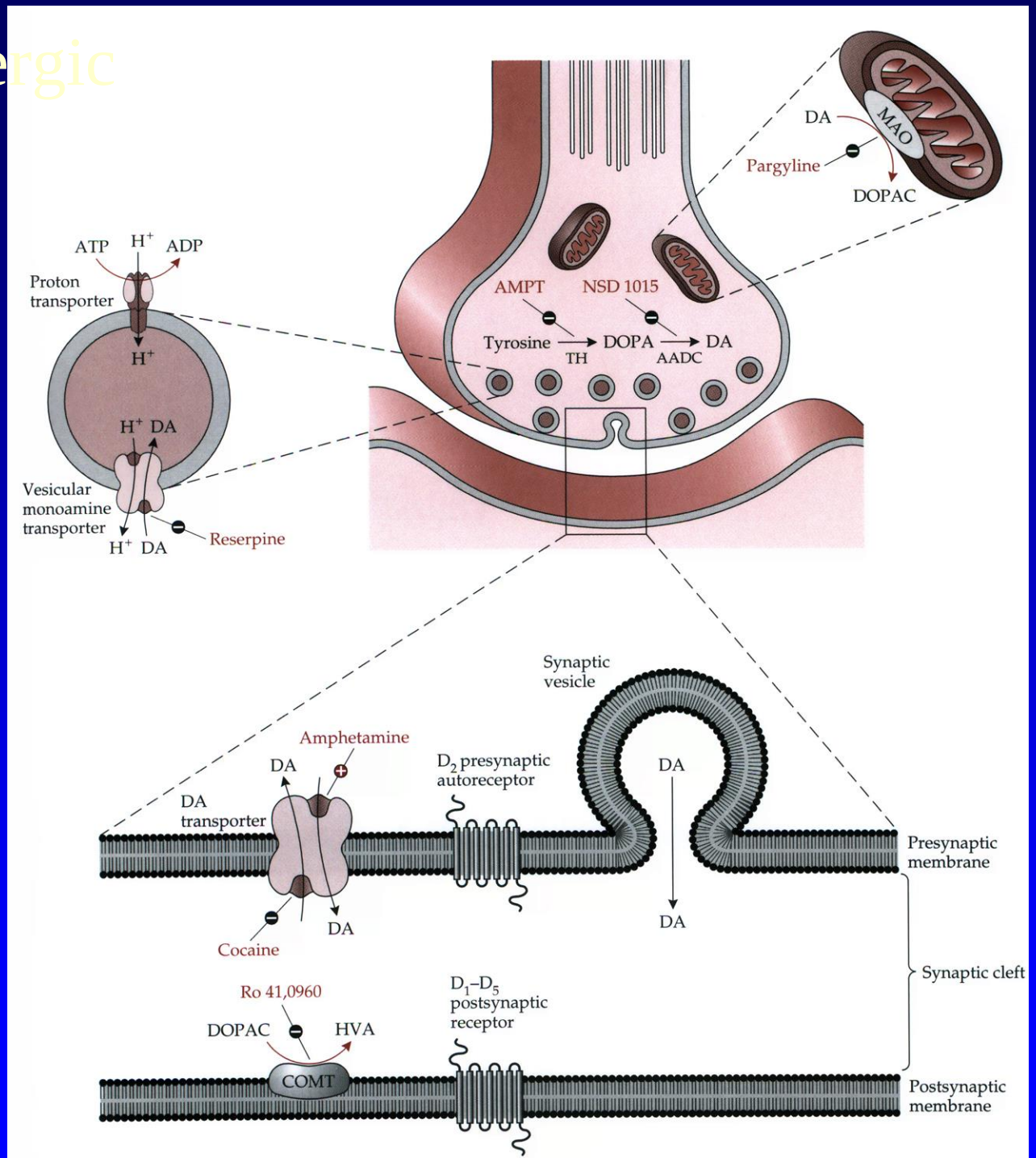
MAO : Monoamine Oxidase

Dopamine

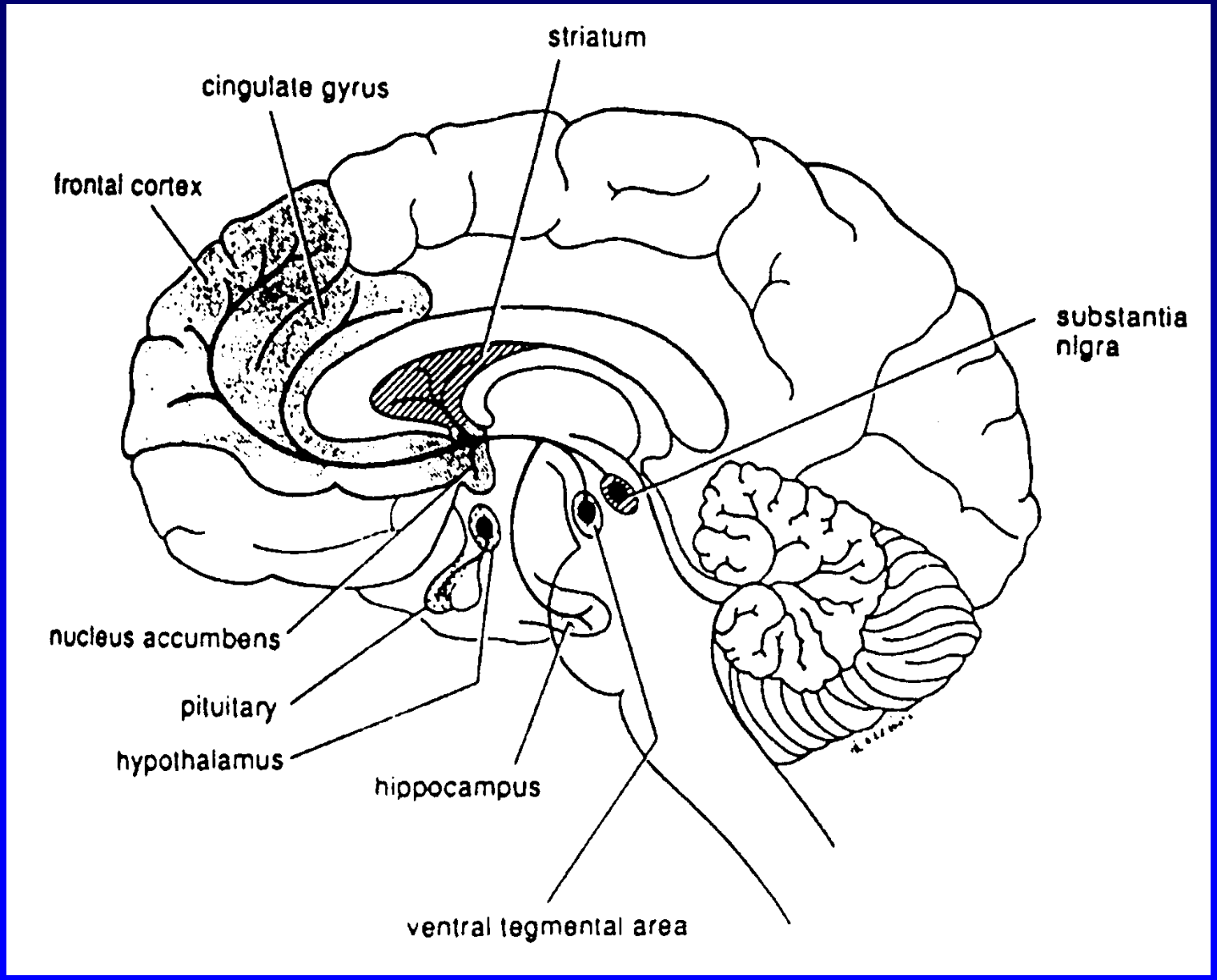
Dopamine receptors

- G protein-coupled receptors
- D1 → excite
- D2 → inhibit ★ Mainly presynabtic (Autoreceptor)
- D3 → inhibit
- D4 → inhibit
- D5 → excite

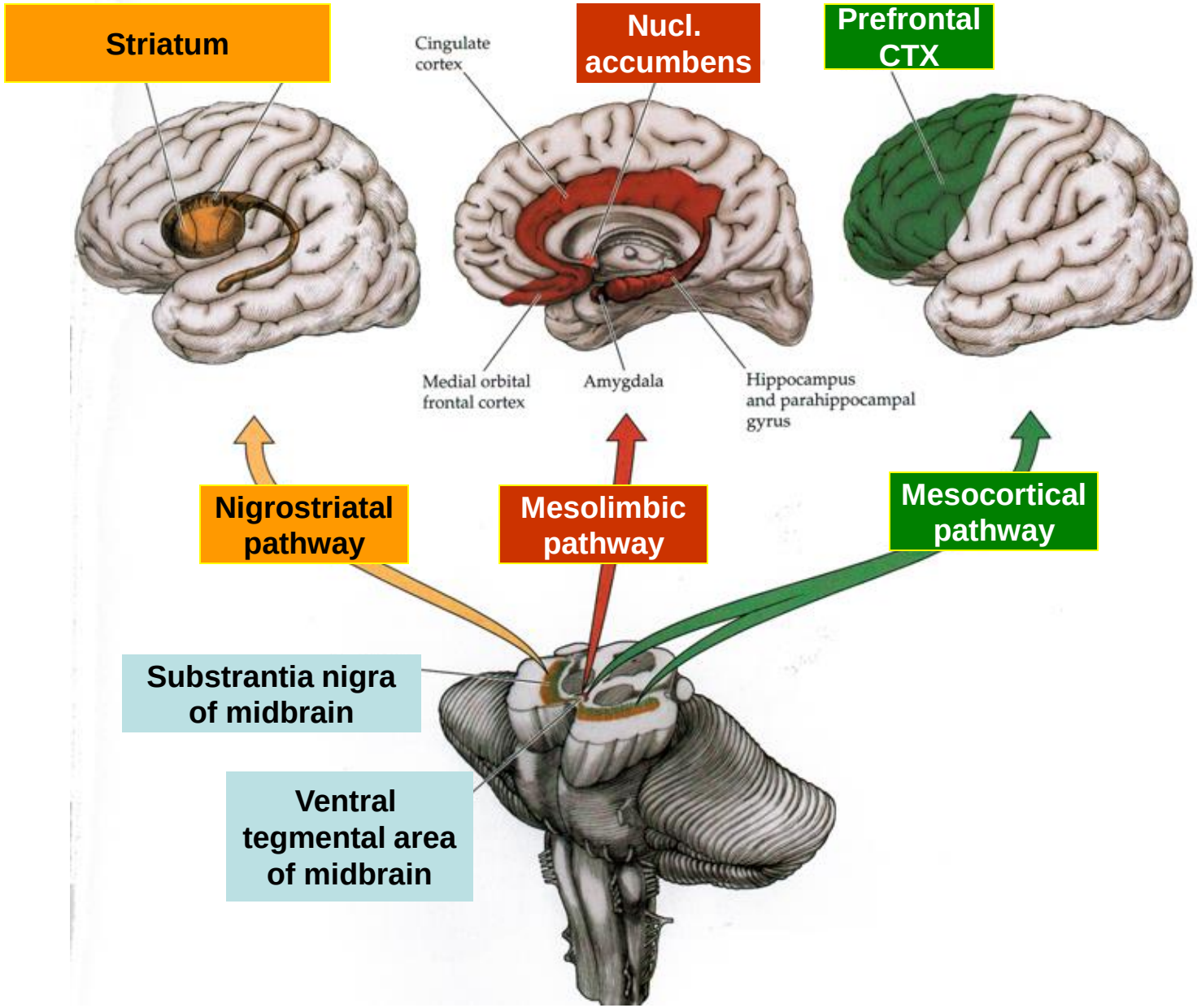
3. Dopaminergic (DA) synapse



Dopamine Pathways



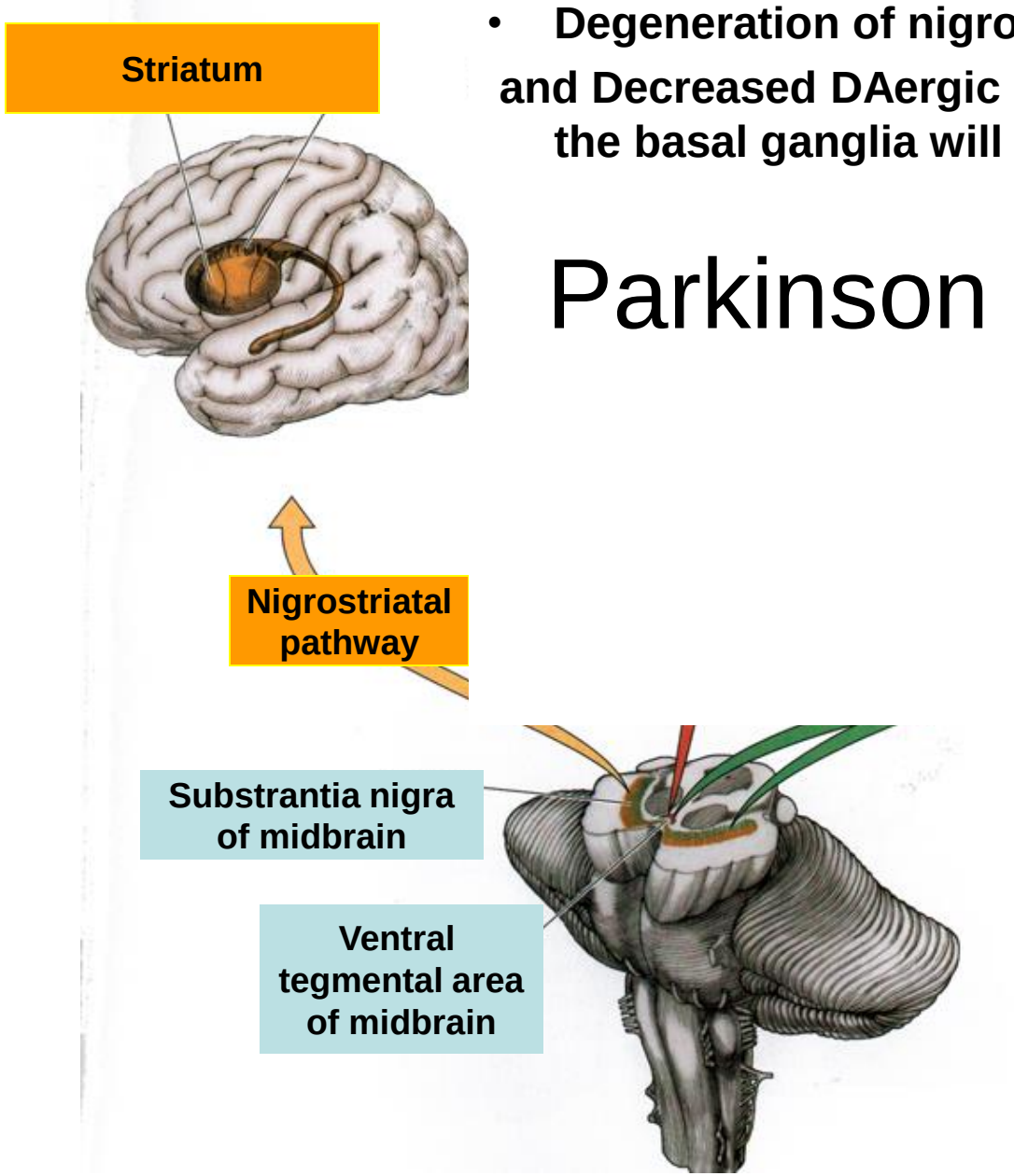
DOPAMINERGIC PATHWAYS



DOPAMINERGIC PATHWAYS

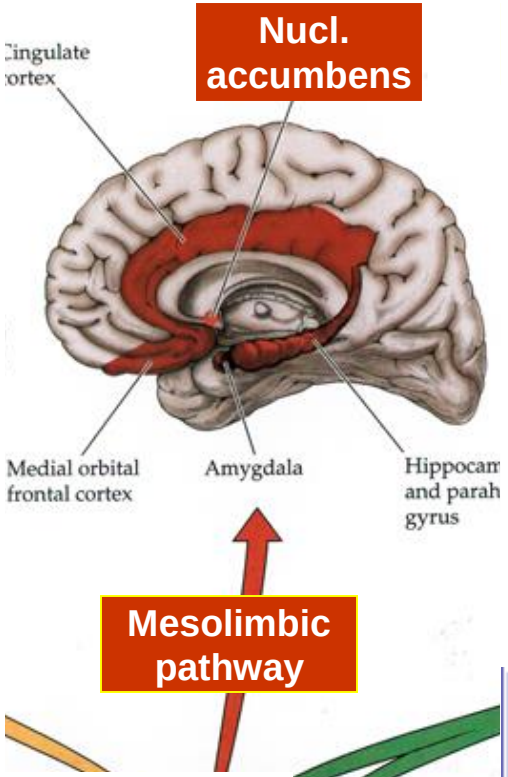
- **Degeneration of nigro-striatal DA system and Decreased DAergic trans-mission in the basal ganglia will lead to**

Parkinson Disease

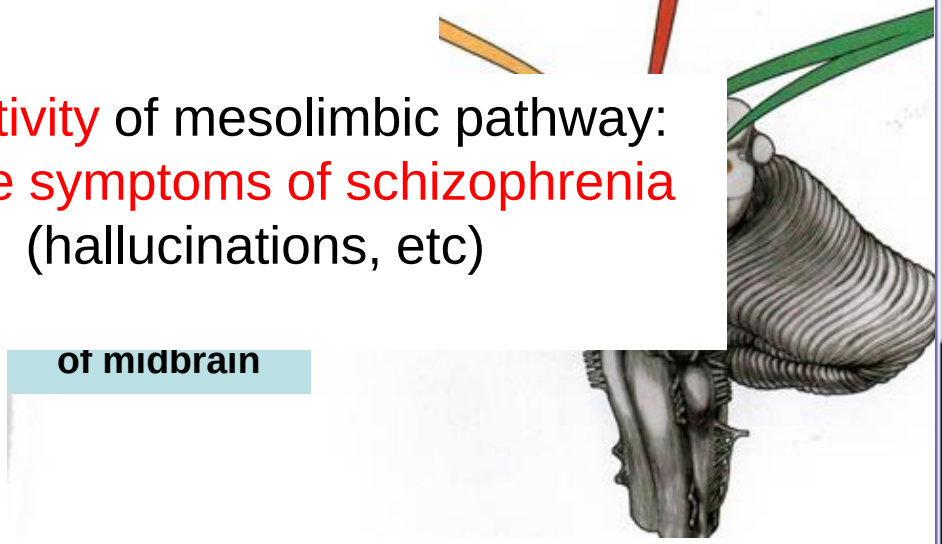


DOPAMINERGIC PATHWAYS

PLEASURE, REWARD AND BEHAVIOR REINFORCING PATHWAY



Hyperactivity of mesolimbic pathway:
- positive symptoms of schizophrenia (hallucinations, etc)

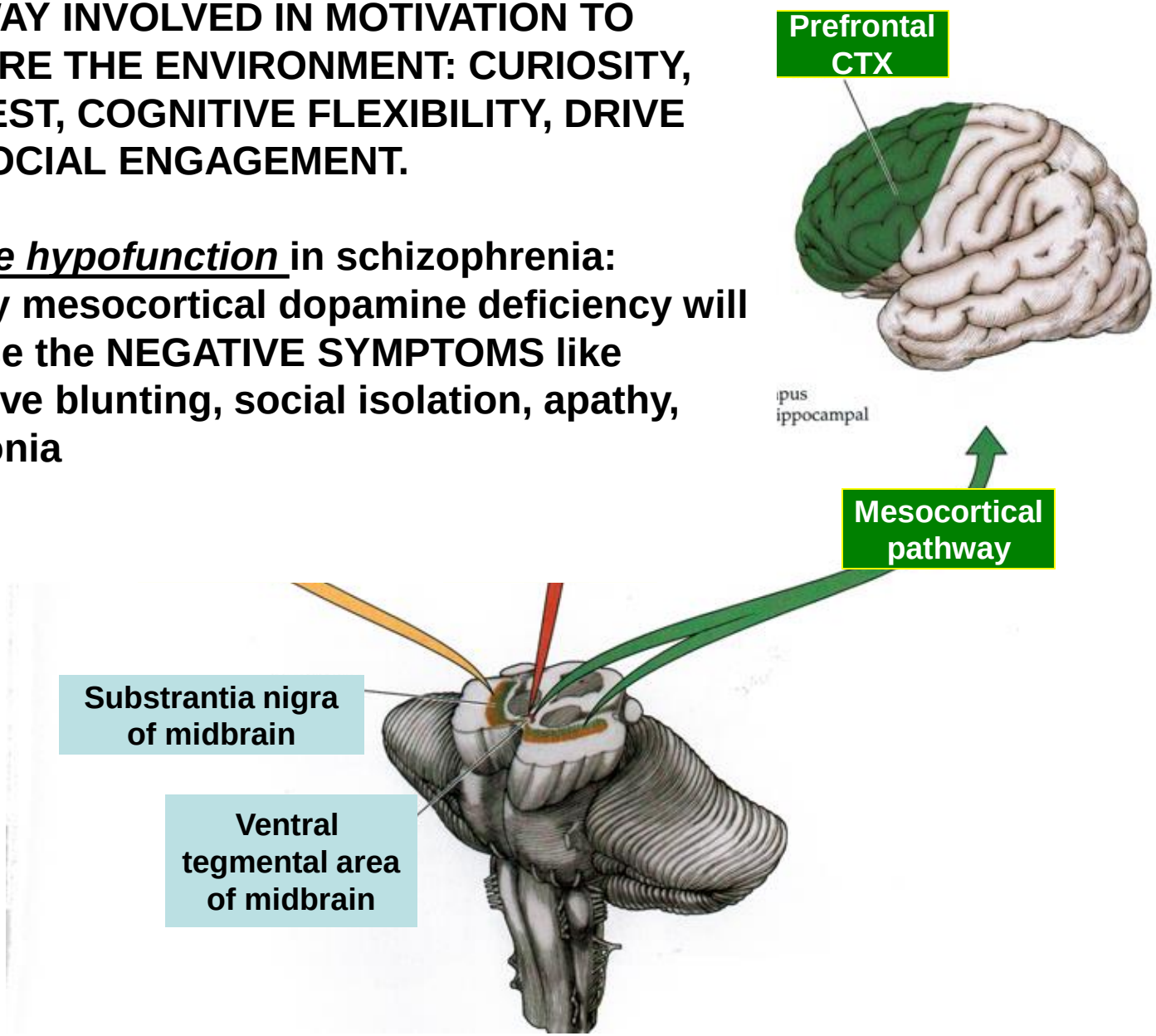


cocaine

DOPAMINERGIC PATHWAYS

PATHWAY INVOLVED IN MOTIVATION TO EXPLORE THE ENVIRONMENT: CURIOSITY, INTEREST, COGNITIVE FLEXIBILITY, DRIVE FOR SOCIAL ENGAGEMENT.

<u>Relative hypofunction</u> **in schizophrenia: Primary mesocortical dopamine deficiency will increase the NEGATIVE SYMPTOMS like Cognitive blunting, social isolation, apathy, anhedonia**

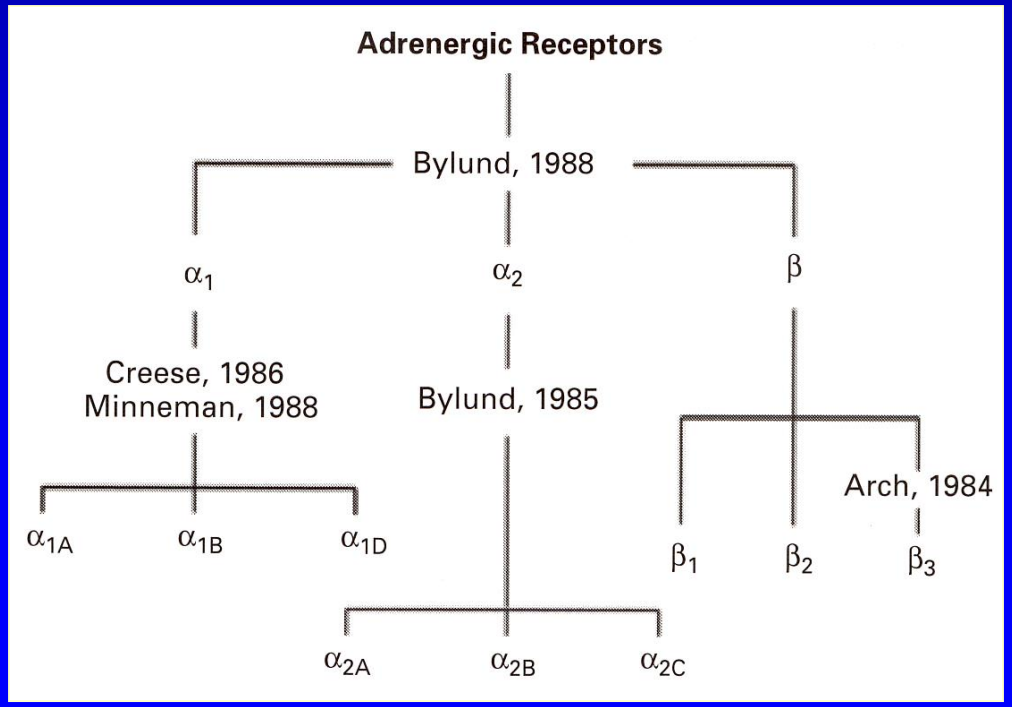


Norepinephrine

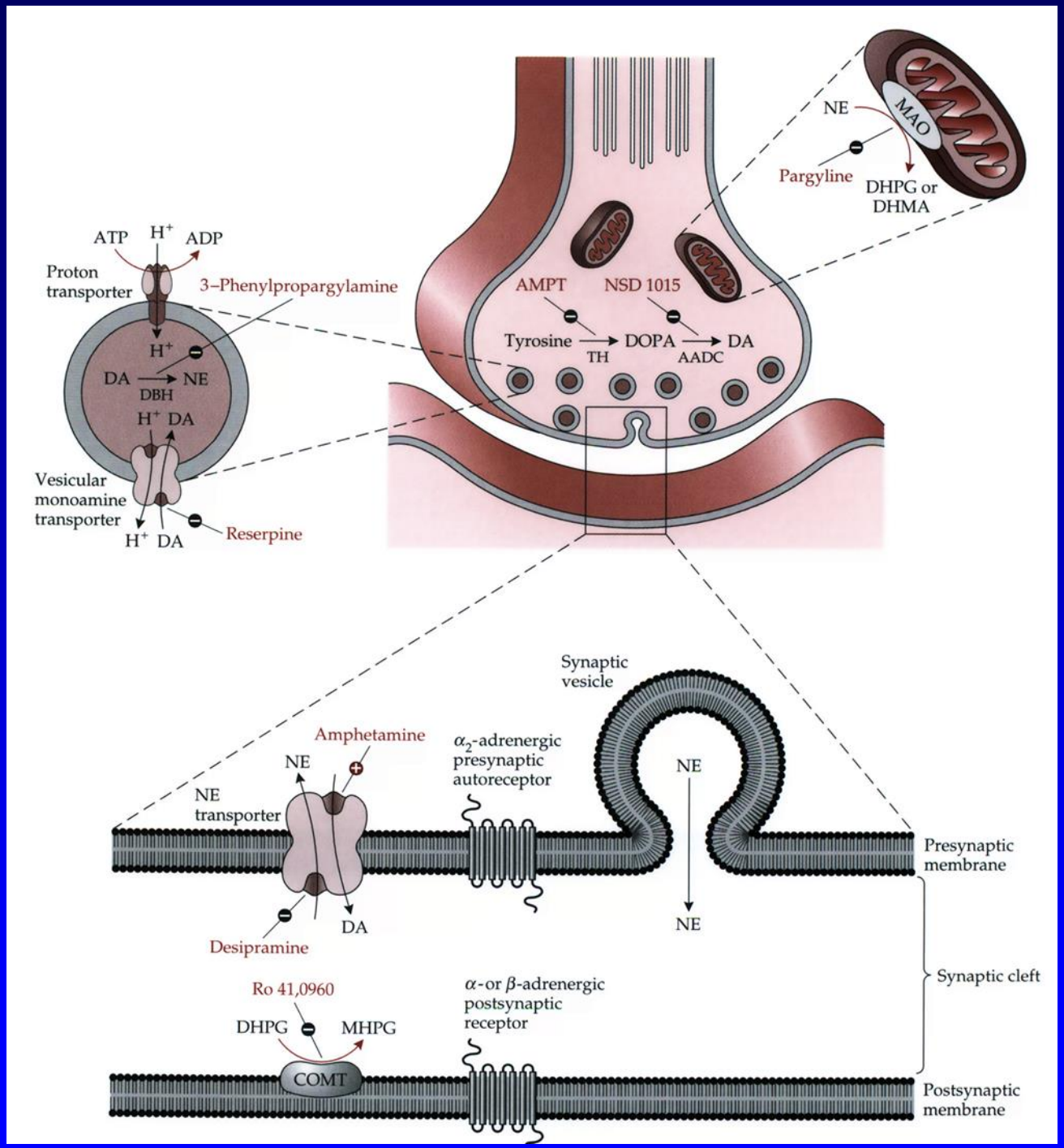
Norepinephrine receptors

- α family
- B family

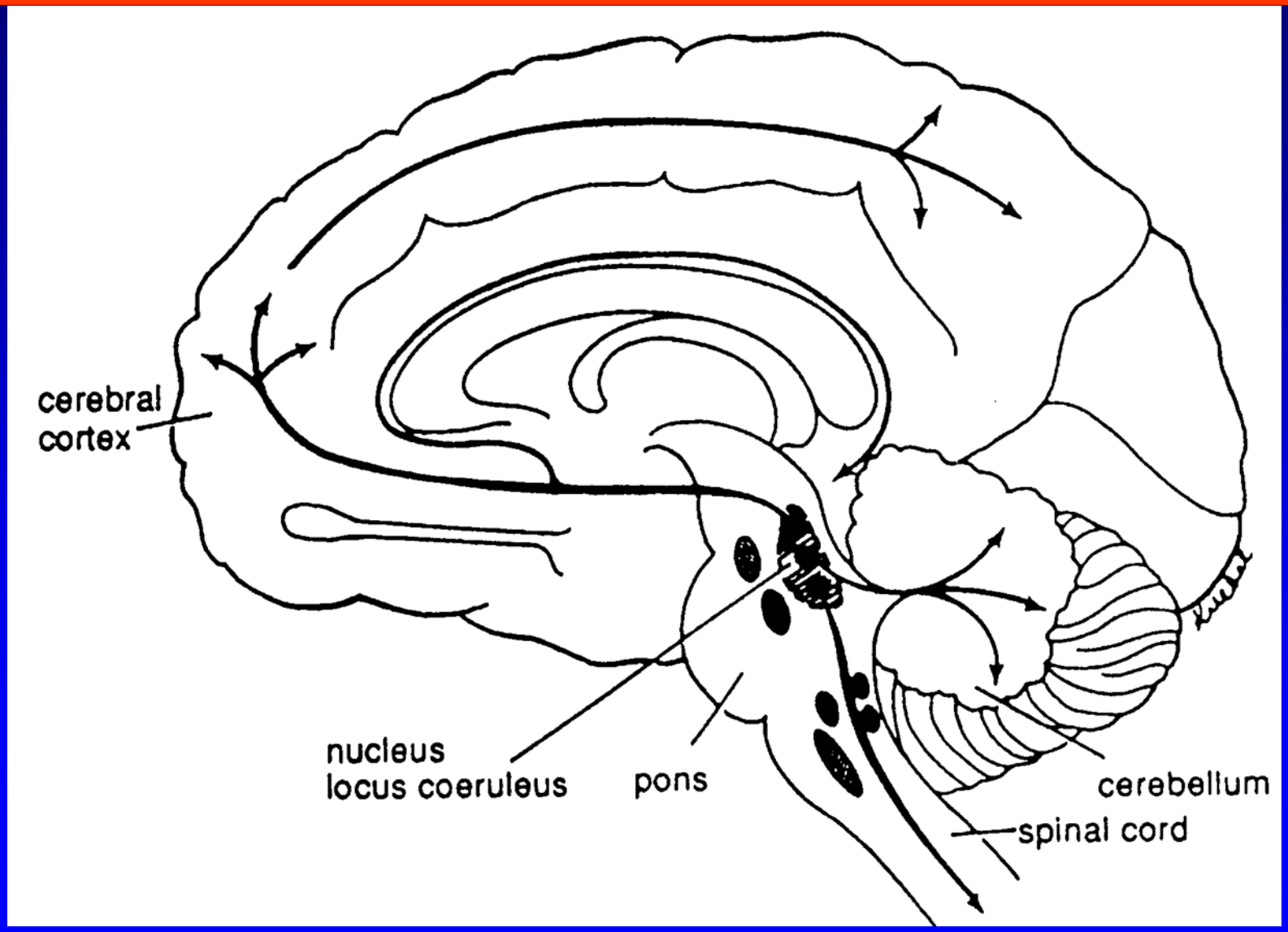
Current Nomenclature of Adrenergic Receptor Subtypes



Noradrenergic (NE) synapse

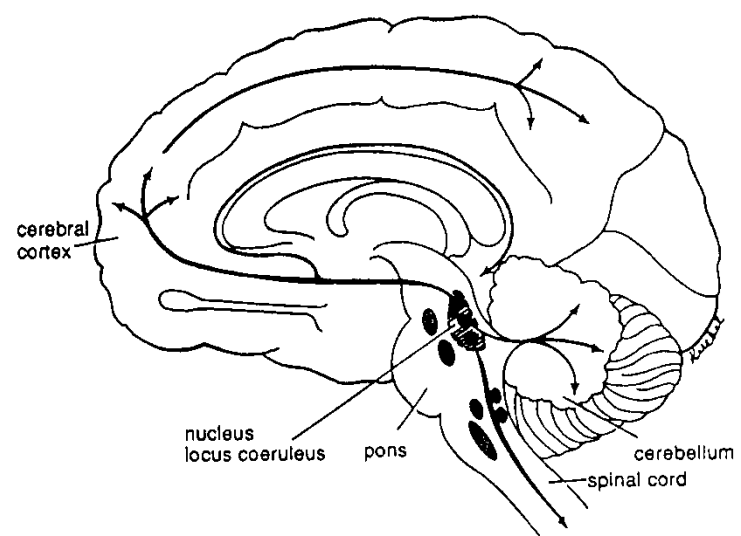


Norepinephrine Pathway



Norepinephrine Pathway

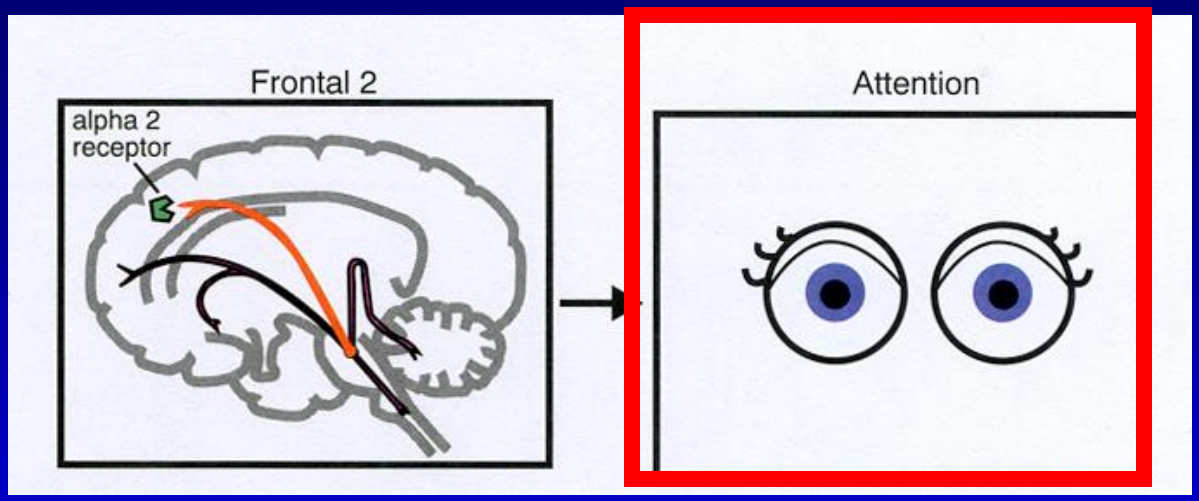
- LC noradrenergic system is highly responsive external stimuli → attention
- Learning/memory and seep/wake cycle
- Anxiety and stress response
- In FRONTAL CORTEX:
  - Mood regulation → Hypofunction of pathway→Depression



NE: Locus Ceruleus ➔ FRONTAL CTX

α2 postsynaptic receptor In FRONTAL CORTEX:

- Attention, working memory, information processing.

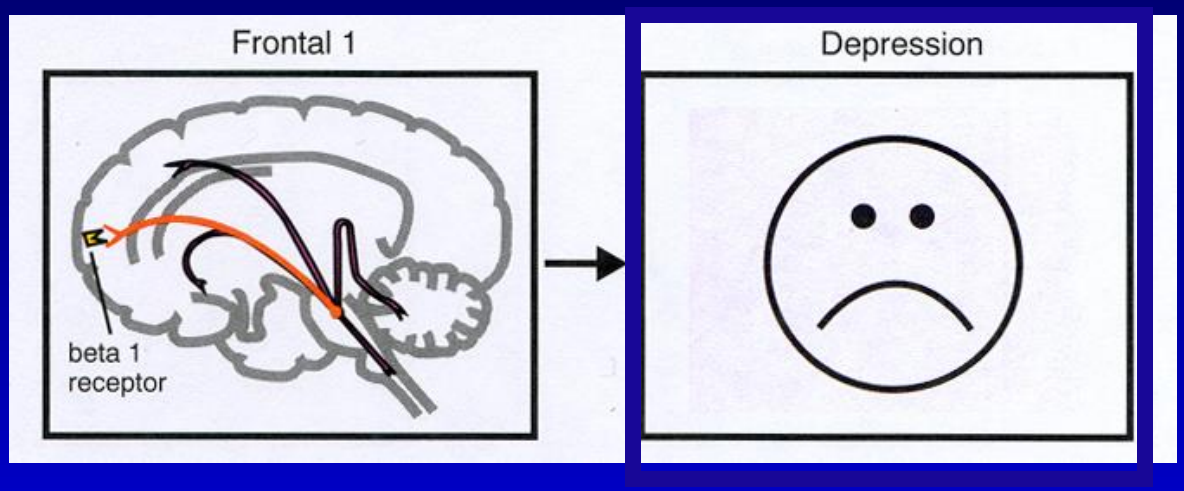


NE: Locus Ceruleus ➔ FRONTAL CTX

β1 postsynaptic receptor
In FRONTAL CORTEX:

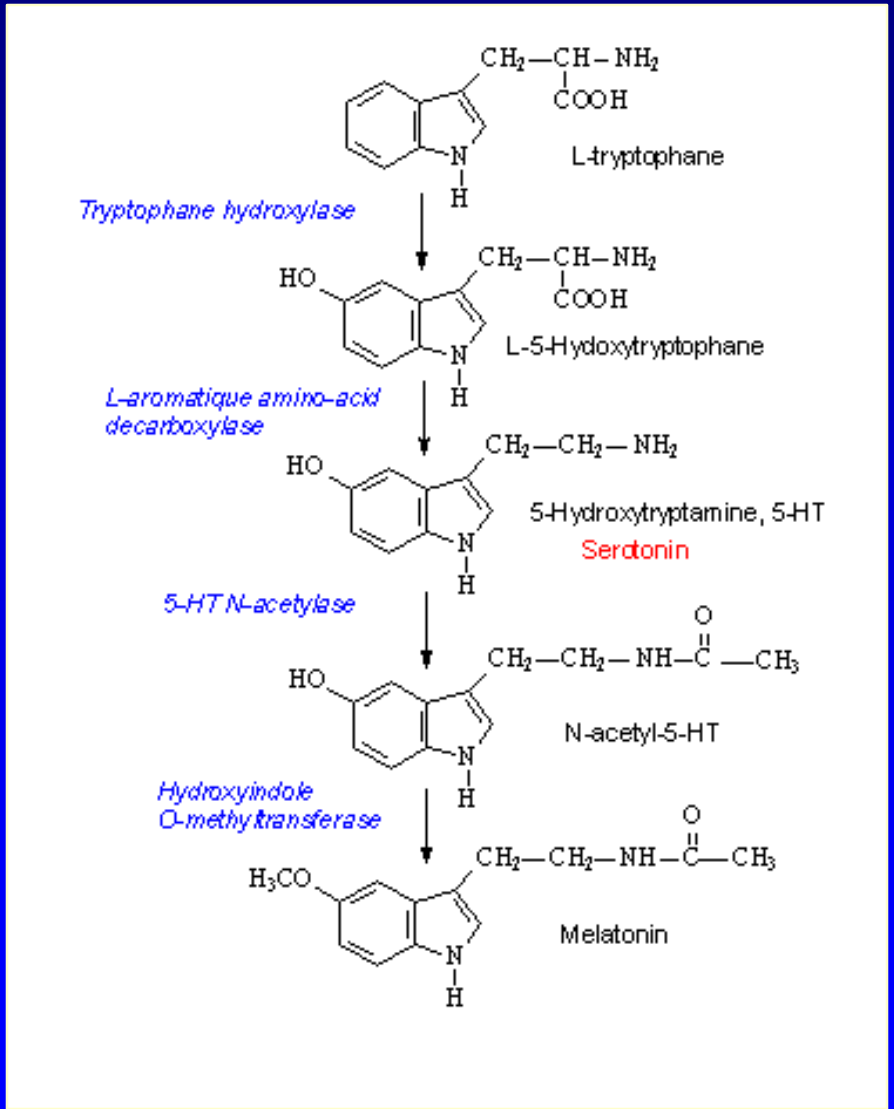
- Mood regulation.

- Hypofunction of pathway:
  - Depression

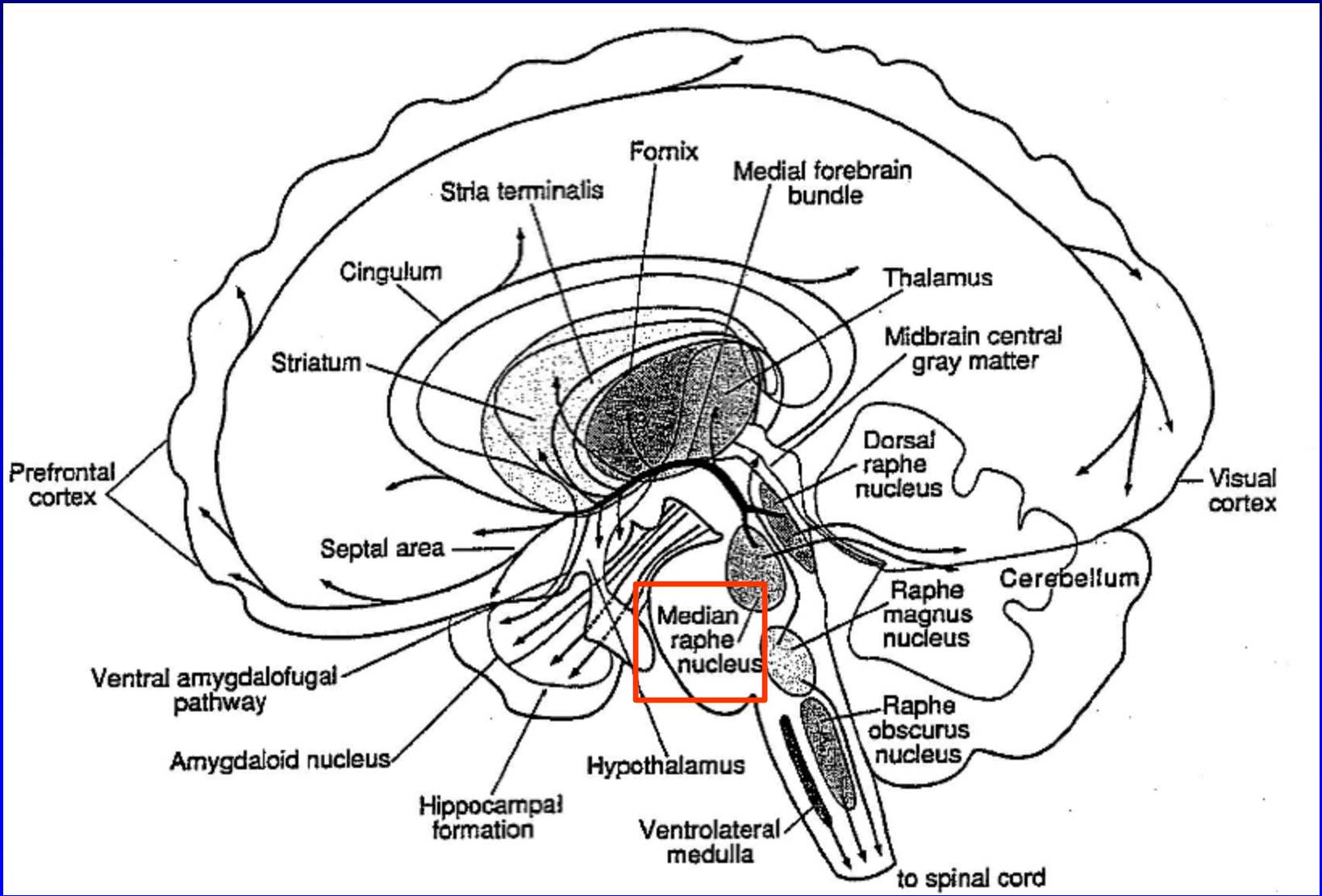


Serotonin

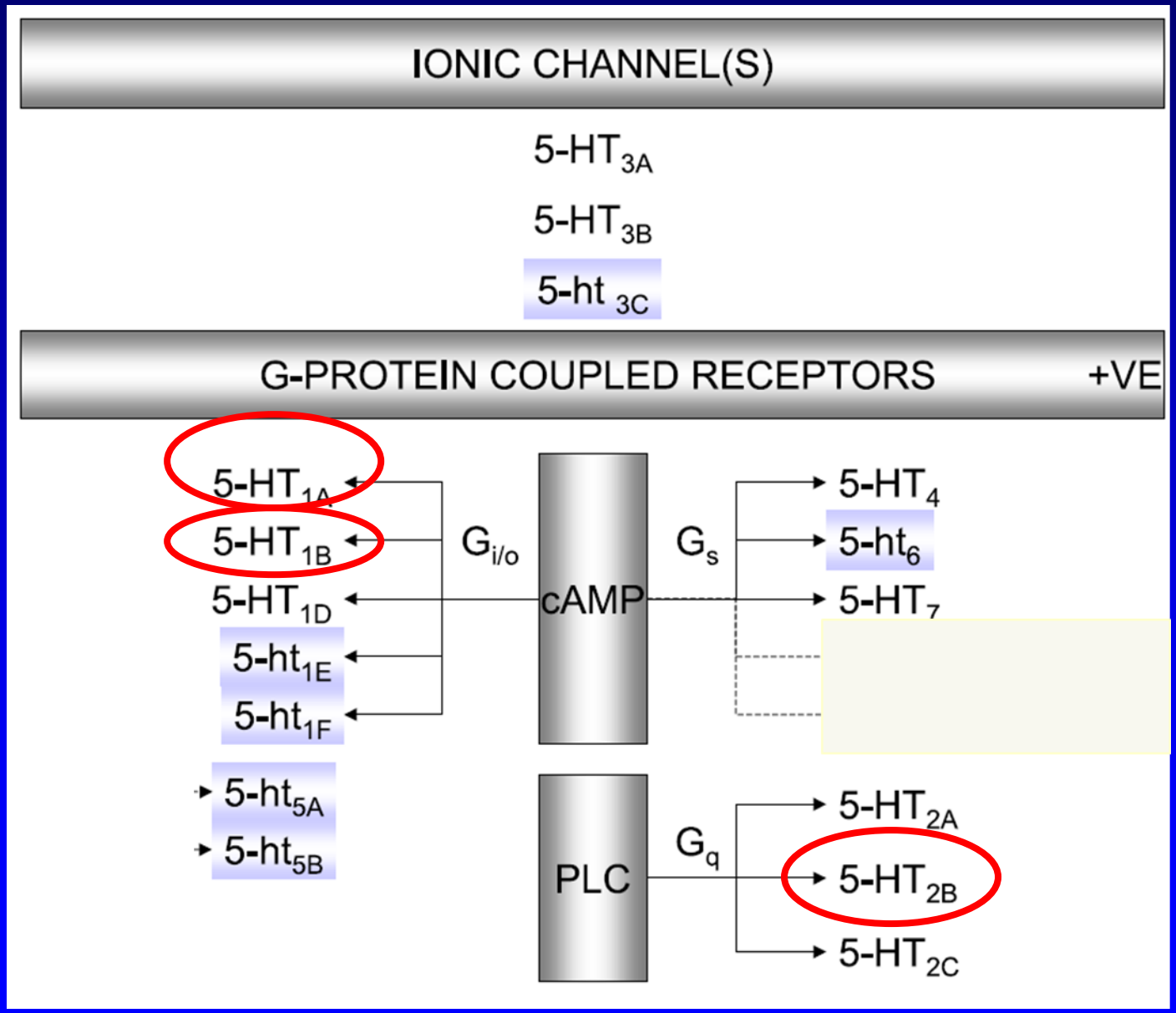
Serotonin synthesis



Serotonin Pathway

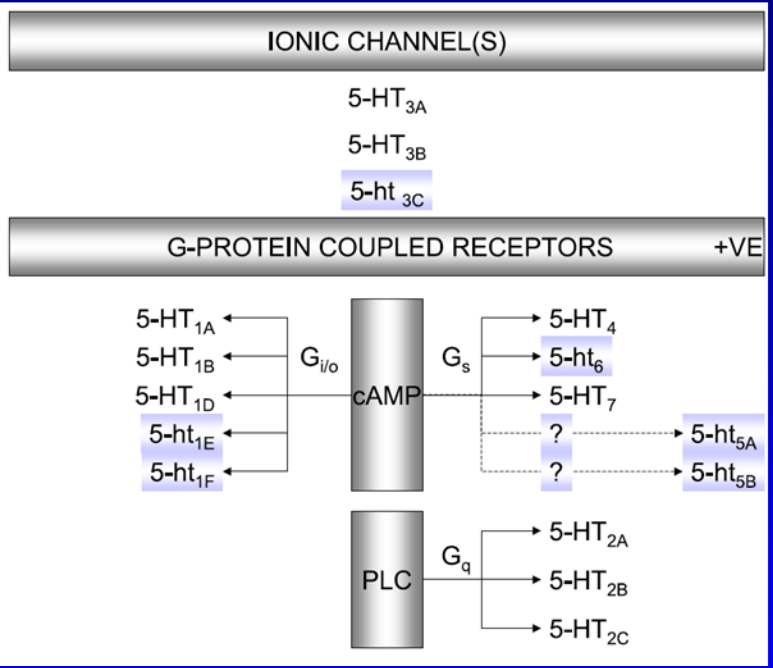


Serotonin Receptors

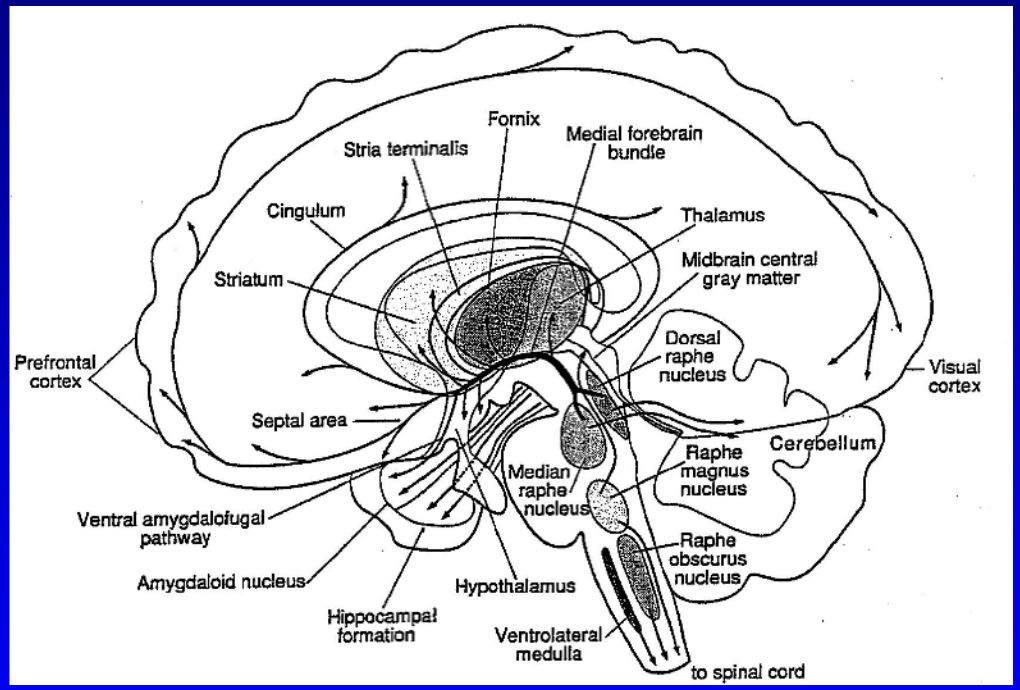


Serotonin Pathway

Almost 17 type of receptor



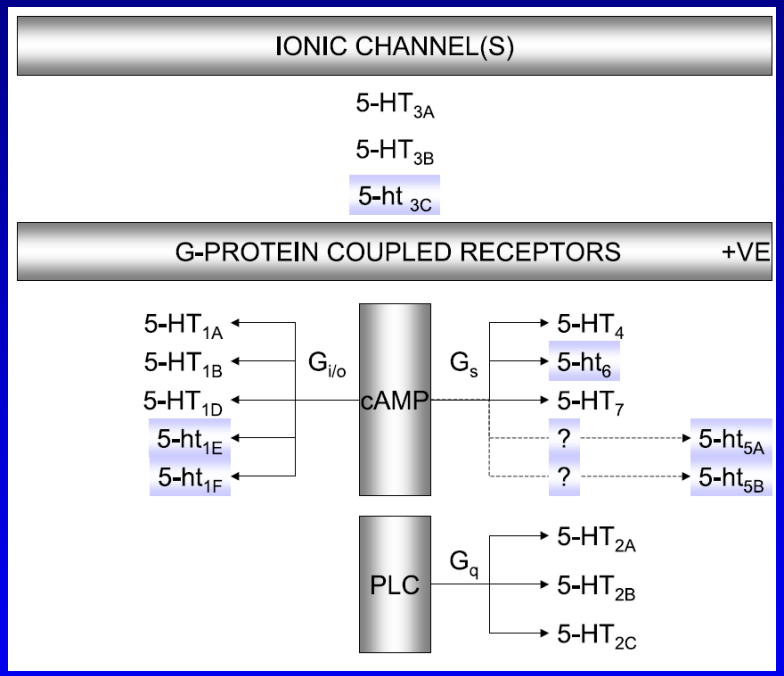
Wide spread



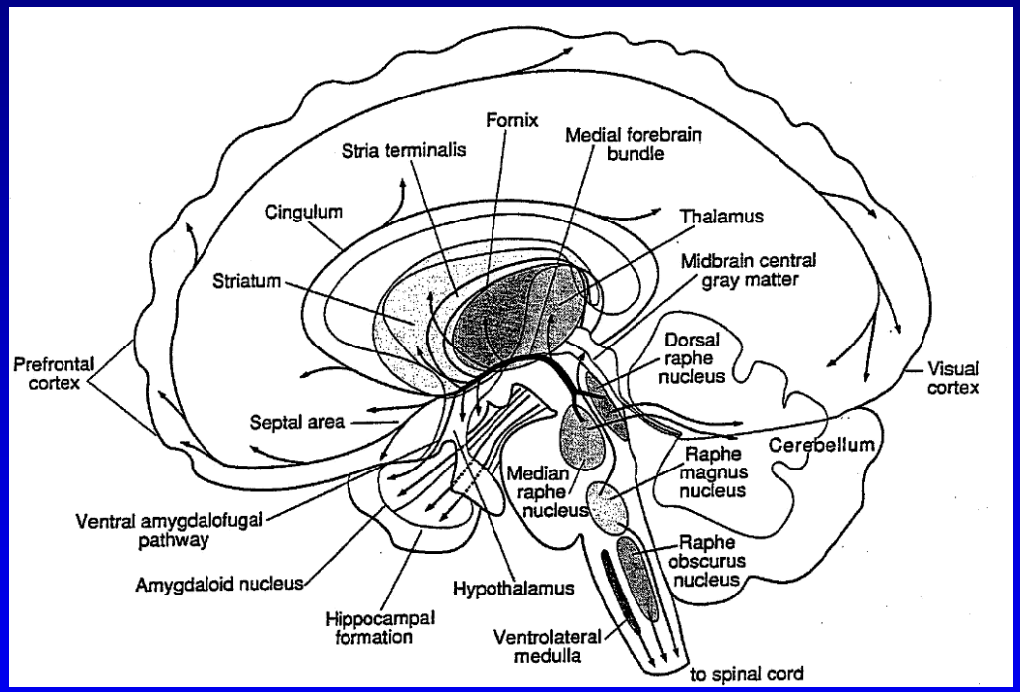
mood, sleep, sexuality, impulsivity, aggression, stress, drug abuse

Serotonin Pathway

Almost 17 type of receptor



Wide spread



Serotonin system *dysfunction* involve in :
Depression, Schizophrenia,
OCD, Eating Disorders, Autism