Name: Guwor-Niki Bolouere Michelle

Matric Number: 17/MHS03/018

Course Code: BCH 308

Answer:

**Neurotransmitters:**

A **Neurotransmitter** is a chemical substance which is released at the end of a nerve fibre by the arrival of a nerve impulse and, by diffusing across the synapse or junction, affects the transfer of the impulse to another nerve fibre, a muscle fibre, or some other structure.

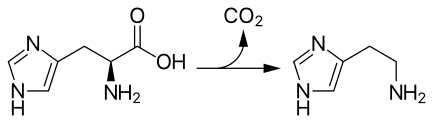
**Neurotransmitters include**:

* Acetylcholine,
* Dopamine,
* Gamma-aminobutyric acid ( GABA ),
* Glutamate,
* Histamine,
* Norepinephrine, and
* Serotonin.

**Synthesis of Histamine:**

**Histamine** is an organic [nitrogenous](https://en.wikipedia.org/wiki/Nitrogen) compound involved in local [immune responses](https://en.wikipedia.org/wiki/Immune_system), as well as regulating physiological function in the gut and acting as a [neurotransmitter](https://en.wikipedia.org/wiki/Neurotransmitter) for the brain, spinal cord, and uterus. Histamine is involved in the [inflammatory response](https://en.wikipedia.org/wiki/Inflammatory_response) and has a central role as a mediator of [itching](https://en.wikipedia.org/wiki/Itching)

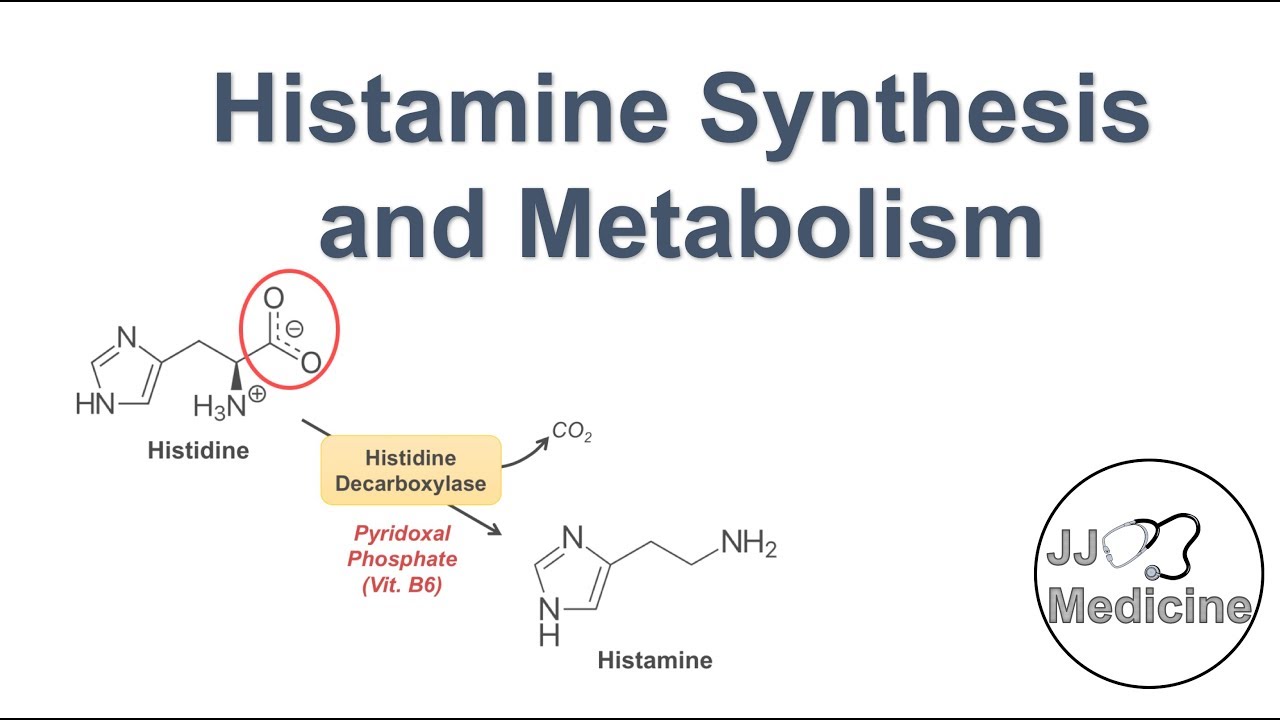
Histamine is derived from the [decarboxylation](https://en.wikipedia.org/wiki/Decarboxylation) of the [amino acid](https://en.wikipedia.org/wiki/Amino_acid) [histidine](https://en.wikipedia.org/wiki/Histidine), a reaction [catalyzed](https://en.wikipedia.org/wiki/Catalyst) by the [enzyme](https://en.wikipedia.org/wiki/Enzyme) [L-histidine decarboxylase](https://en.wikipedia.org/wiki/L-histidine_decarboxylase). It is a [hydrophilic](https://en.wikipedia.org/wiki/Hydrophilic) [vasoactive](https://en.wikipedia.org/wiki/Vasoactive) [amine](https://en.wikipedia.org/wiki/Amine).

[](https://en.wikipedia.org/wiki/File:Histidine_decarboxylase.svg)

Conversion of [histidine](https://en.wikipedia.org/wiki/Histidine) to histamine by [histidine decarboxylase](https://en.wikipedia.org/wiki/Histidine_decarboxylase)

Once formed, histamine is either stored or rapidly inactivated by its primary [degradative enzymes](https://en.wikipedia.org/wiki/Degradative_enzyme), [histamine-N-methyltransferase](https://en.wikipedia.org/wiki/Histamine-N-methyltransferase) or [diamine oxidase](https://en.wikipedia.org/wiki/Diamine_oxidase). In the central nervous system, histamine released into the [synapses](https://en.wikipedia.org/wiki/Synapse) is primarily broken down by [histamine-N-methyltransferase](https://en.wikipedia.org/wiki/Histamine-N-methyltransferase), while in other tissues both enzymes may play a role. Several other enzymes, including [MAO-B](https://en.wikipedia.org/wiki/MAO-B) and [ALDH2](https://en.wikipedia.org/wiki/ALDH2), further process the immediate metabolites of histamine for excretion or recycling.

Bacteria also are capable of producing histamine using histidine decarboxylase enzymes unrelated to those found in animals. A non-infectious form of foodborne disease, [scombroid poisoning](https://en.wikipedia.org/wiki/Scombroid_poisoning), is due to histamine production by bacteria in spoiled food, particularly fish. Fermented foods and beverages naturally contain small quantities of histamine due to a similar conversion performed by fermenting bacteria or yeasts. [Sake](https://en.wikipedia.org/wiki/Sake) contains histamine in the 20–40 mg/L range; [wines](https://en.wikipedia.org/wiki/Wine) contain it in the 2–10 mg/L range.



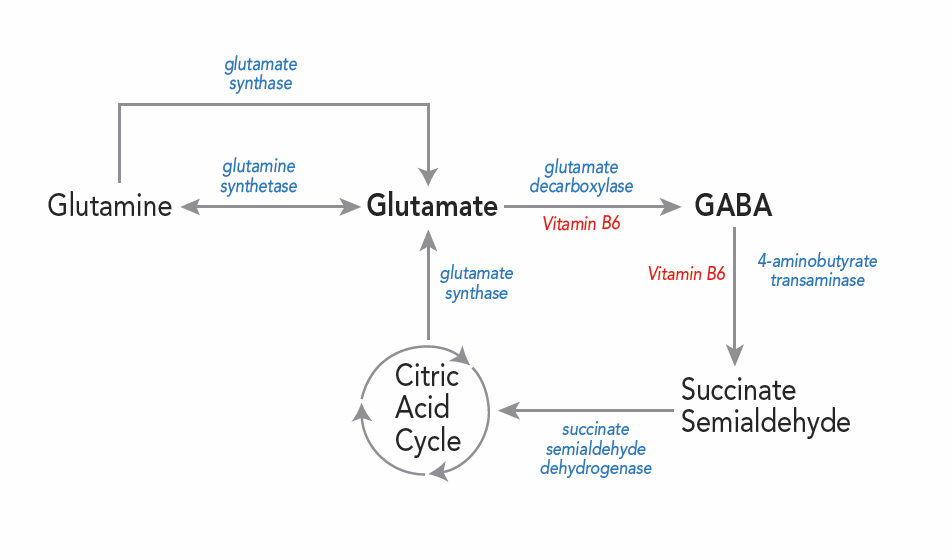
**Synthesis of Glutamate:**

**Glutamate** refers to the [anion](https://en.wikipedia.org/wiki/Anion) of [glutamic acid](https://en.wikipedia.org/wiki/Glutamic_acid) in its role as a [neurotransmitter](https://en.wikipedia.org/wiki/Neurotransmitter): a chemical that nerve cells use to send signals to other cells. It is by a wide margin the most abundant excitatory neurotransmitter in the [vertebrate](https://en.wikipedia.org/wiki/Vertebrate) [nervous system](https://en.wikipedia.org/wiki/Nervous_system). It is used by every major excitatory function in the vertebrate brain, accounting in total for well over 90% of the synaptic connections in the [human brain](https://en.wikipedia.org/wiki/Human_brain). It also serves as the primary neurotransmitter for some localized brain regions, such as [cerebellum granule cells](https://en.wikipedia.org/wiki/Cerebellum_granule_cell).

Glutamate is a major constituent of a wide variety of proteins; consequently it is one of the most abundant amino acids in the human body. Under ordinary conditions enough is obtained from the diet that there is no need for any to be synthesized. Nevertheless, glutamate is formally classified as a [non-essential amino acid](https://en.wikipedia.org/wiki/Essential_amino_acid), because it can be synthesized from [alpha-Ketoglutaric acid](https://en.wikipedia.org/wiki/Alpha-Ketoglutaric_acid), which is produced as part of the [citric acid cycle](https://en.wikipedia.org/wiki/Citric_acid_cycle) by a series of reactions whose starting point is [citrate](https://en.wikipedia.org/wiki/Citrate). Glutamate cannot cross the [blood-brain barrier](https://en.wikipedia.org/wiki/Blood-brain_barrier) unassisted, but it is actively transported out of the nervous system by a high affinity transport system, which maintains its concentration in brain fluids at a fairly constant level.

Glutamate is synthesized in the central nervous system from glutamine as part of the [glutamate–glutamine cycle](https://en.wikipedia.org/wiki/Glutamate%E2%80%93glutamine_cycle) by the enzyme [glutaminase](https://en.wikipedia.org/wiki/Glutaminase). This can occur in the presynaptic neuron or in neighboring glial cells.

Glutamate itself serves as metabolic precursor for the neurotransmitter [GABA](https://en.wikipedia.org/wiki/GABA), via the action of the enzyme [glutamate decarboxylase](https://en.wikipedia.org/wiki/Glutamate_decarboxylase).

****