

Olfactory System

CNI -

It is probably more important than we give it credit for

At the upper part of the nasal cavity

The part of the ethmoid bone is that is found here

Projecting thru the holes in the cribriform plate -

The olfactory nerve fibers from all the receptor cells travel

There is one nose,

The neurons in the bulb

These mitral axons now project backward under

These fibers divide into structures called

These axons make numerous connections in the brain

We lose about

CN I is

Olfactory System

CNI - Olfactory, sense of smell

It is probably more important than we give it credit for from a physiology point of view, but we don't really need it in the modern world. It occupies more of our brain than any other special sense.

At the upper part of the nasal cavity is found the ethmoid bone.

The part of the ethmoid bone is that is found here is called the cribriform plate.

Projecting thru the holes in the cribriform plate - Sense receptors for smell.

The olfactory nerve fibers from all the receptor cells travel up through the cribriform plate and synapse with the neurons in a structure called the olfactory bulbs

There is one nose, but there are two nostrils and two olfactory bulbs.

The neurons in the bulb which the olfactory receptor cells synapse with are called mitral axons

These mitral axons now project backward under the frontal lobe as a band of fibers called the olfactory tract.

These fibers divide into structures called the lateral and medial olfactory stria.

These axons make numerous connections in the brain, and are not well understood. Most of these pathways end up at the hypothalamus which is the center for coordinating many reflexes associated with emotions and senses..

We lose about 1% of smell each year.

CN I is just a two neuron pathway.

Reticular system (Descending)

Reticular System:

Both anatomically and physiologically it can be divided into two parts

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The functions of the descending portion:

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The Reticular system is found in

The tract to send messages to the rest of the body:

The name comes from

Reticular System

Reticular System: A “thing” found in the brain stem. – the oldest systems in animal nervous systems.

Both anatomically and physiologically it can be divided into two parts

- descending part is - motor
- ascending part is - sensory

The functions of the descending portion:

- To relay impulses from the hypothalamus to the preganglionic neurons in the autonomic nervous system.
- functions as a relay station, relaying involuntary motor impulses from the sub-cortical area to the voluntary muscles.

The Reticular system is found in the brain stem. It is made up of numerous nuclei (groups of nerve cell bodies)

The tract to send messages to the rest of the body: the lateral and medial reticulospinal tracts.

The name comes from the fact that it has an almost spider web net appearance that connects to a lot of things.

Since it sends out a lot of messages that influence a lot of things it must have some incoming message that tell it what needs to be done.

Reticular System (Ascending)

Reticular Activating System

The RAS's major function

All of the major sensory pathways

The more impulses from the RAS

The less stimulus from the outside world

Reticular System (Ascending)

Reticular Activating System – RAS – the ascending part of the the reticular system that receives incoming messages. This goes to the thalamus and then to the cortex.

The RAS's major function that we are aware of is the control of the – levels of consciousness and sleep

All of the major sensory pathways, both general and special, send a few axons to the RAS's nuclei in the brain stem. These nuclei in turn send axons to our old friend the thalamus which in turn sends impulses to the cortex.

The more impulses from the RAS to more awake we are. The less, the more lethargic.

The less stimulus from the outside world, the less need for the organism to be in high gear burning hard to come by calories.

Hypothalamus

The diencephalon:

The location in relation to the thalamus

Its location in relation to the optic chiasm

Pituitary

The following 8 functions are moderated by hypothalamic control

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Hypothalamus

The diencephalon: A very small part of the brain, controls or mediates a very large part of what the brain does.

The in diencephalon the hypothalamus is a major player.

The location in relation to the thalamus – inferior to the thalamus

Its location in relation to the optic chiasm is – posterior to the chiasm.

Pituitary hangs off the hypothalamus

The following 8 functions are moderated by hypothalamic control

- body temperature
- sleep
- water metabolism
- secretion of many different hormones
- major player in control of blood pressure
- location for control center of hunger (We don't really know where it is, but damage to the hypothalamus can influence hunger.)
- Autonomic nervous system balance (between sympathetic and parasympathetic)
- Plays a part in emotional reactions

Number 9 is the things we don't know about.

Hypothalamus Functions (Body Temp)

Measuring:

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The descending tract leaving the hypothalamus

To Warm –

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To Cool -

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Hypothalamus Functions (Body Temp)

Measuring:

- Anterior Hypothalamic area – measures the blood and sees if it is too high.
- Posterior Hypothalamic area – measures the blood and sees if it is too cool.

The descending tract leaving the hypothalamus called the Dorsal longitudinal fasciculus (DLF).

To Warm – messages go out the DLF to

- Dilation of peripheral blood vessels under the skin
- Increase in sweating
- Increase in respiratory rate
- Decrease in body's metabolic rate (slow down the engine)
- Increase in blood flow to the periphery of the body.

To Cool - Messages go out the DLF to

- Peripheral vasoconstriction
- Decrease in peripheral blood flow
- increase in body's metabolism (turns up the engine)
- Shivering (of voluntary muscles – to produce heat)
- Decrease the respiratory rate.

Hypothalamus Functions (Water Balance)

Kidneys Function:

Hormone brake:

The hypothalamus can sense :

ADH is release

The hypothalamus has direct control

Pituitary Portal system –

Other Hypothalamus Functions likely include:

Hypothalamus Functions (Water Balance)

Kidneys Function: Normally let water out of the body unless a hormonal brake is applied.

Hormone brake: Anti-diuretic hormone (ADH). This comes from the hypothalamus.

The hypothalamus can sense : The degree of hydration of the body by reading the degree of hydration of the blood. This is done by the posterior lobe of the pituitary gland

ADH is release when you want to maintain water, it is withheld when you want to get rid of water.

The hypothalamus has direct control over the posterior lobe of the pituitary lobe. ADH is produced, in part, by the supra-optic nucleus. It is then sent to the posterior pituitary gland to be stored/released as needed.

Pituitary Portal system – blood bypasses the normal return to the heart. (Hormones from the hypothalamus take a side trip to over portions of the hypothalamus.

Other Hypothalamus Functions likely include: Various emotional states, many/most reflexes, respiration, cardiac centers, appetite, etc...