

Unit - 3

Neural conduction -

A neuron that is at rest, that is not firing a nerve impulse of message is actually electrically charged.

There is a jelly like - solution, inside and outside the cell which consist of charged particles called ions.

There are electrically charges across neural membran which consist the positively charged called cations and negatively charged called anions.

Both cations and anions present outside and inside the cell. The anions are mostly inside and cations are mostly outside.

— due
— due
The + ions consist of sodium (Na⁺), calcium, potassium (K⁺) and chlorine chloride (Cl⁻)

There are relatively more positive charge near to plasma membrane and a relatively more negative charge on inside of the membrane.

This difference in electrical ~~and~~ charge across the membrane is called membrane potential.

Resting state → Polarised state → Resting polar

Action state - Depolarized state → Action potential

In way → Repolarized → Polarize state

Synaptic Transmission.

The information processes from one neuron to another through synapses.

So the action potential reaches the end of the axon, it reaches the terminal buttons.

The point where terminal button comes in contact from one neuron to the dendrites of another neuron is called synapse.

Information passes at these junctions formed with the next neuron.

Synapse occurs at three places on the next neuron
 soma dendrites
~~axon~~ soma
 axon.

These synapses are known as
 axodendritic
 axosomatic
 axoaxonic synapse.

There are 2 types of synapses
 1/ Electrical synapse
 2/ Chemical synapse.

Electrical synapse is rare. In this case the information passed from ~~one~~ the transmitting neuron to another neuron via certain channels that comes close to one another. By coming next to one another the ions pass through the neurons easily & directly and more efficiently and more

Chemical synapse involves the transfer of neurotransmitters from one neuron to the other.

When the membrane of the cell that sends the information comes in contact with the membrane of the cell that is receiving the information there is a slight gap known as synaptic cleft.

Few transmitters

- endorphines - provide relief from pain
feeling of pleasure and well being
- Dopamine - pleasure, learning, attention
- Epinephrine - glucose energy release during exercise

Neurotransmitters are released by the axon terminals in the terminal button of the pre synaptic neuron and they go into the cleft.

Then they reach receptors that are located on the membrane of the post synaptic neuron. This is a chemical synapse.

commonly occur.

Structure of a Synapse.

Three structures

- 1/ Synaptic knob
- 2/ Synaptic cleft
- 3/ Post synaptic membrane of neuron

1/ Synaptic knob.

is a tiny bulge at the end of ~~post synaptic~~ terminal buttons.

There are numbers of neurotransmitter in the numerous vesicles ^{sacs} in the bulge.

The synaptic cleft - a space b/w neurons (post synaptic neuron dendrite and axon terminal of pre synaptic neuron)

The information can not pass directly from one neuron to another.

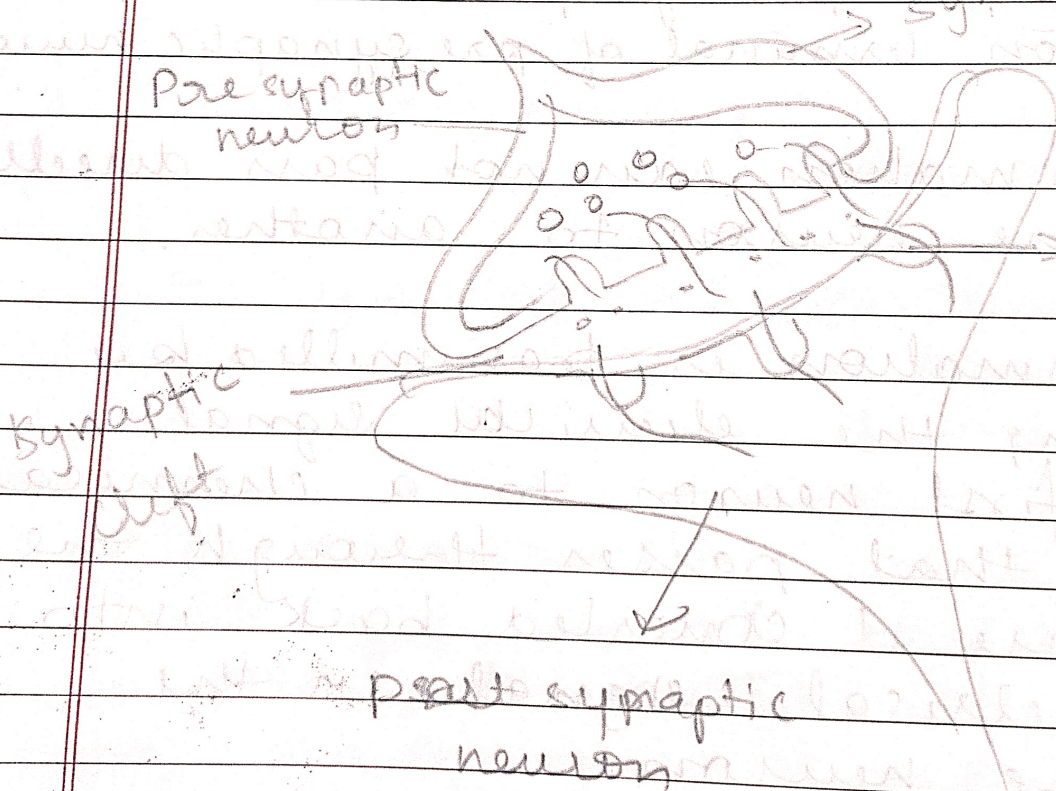
The information is transmitted by converting the electrical signal of the first neuron to a chemical signal that passes through the gap before it converted back into an electrical signal in the second neuron.

Presynaptic terminals consist of synaptic vesicles (fluid filled sac)

The neurotransmitters are released and move towards the postsynaptic neuron with the help of extracellular fluid present in the cleft.

The plasma membrane of the postsynaptic neurons is the membrane of the neuron where information is going.

Certain receptors are present on this membrane where the neurotransmitter molecules come and attach themselves.



Neuromuscular Transmission

It is a chemical synapse between a motor neuron and a muscle fiber.

It allows the motor neuron to transmit a signal to the muscle fiber causing muscle contraction.

The information flows from the motor nerve ending to the muscle fiber via neuromuscular junction. It is the processes it which the motor impulses starts the contraction of the muscles.

Nerve impulses cause the release of neurotransmitter ACh (acetylcholine) into the junction of b/w the nerve cell and muscle cell.

Diseases regarding them are called NMT disorders because they are caused due to the dysfunction in the transmission of ACh at the nerve muscle synapse.

Acc. to the site of dysfunction the disorders are classified into 3 types.

- postsynaptic disorders
- presynaptic disorders
- combined of postsynaptic and presynaptic disorders

The process of NMT.

- 1) Nerve impulse opening gate of voltage calcium channels influx of calcium increases inside the cell. Acetylcholine release due vesicle opening. ACh comes to cleft.
- 2) Acetylcholine action - ACh binds with nicotinic receptors to form ACh receptor complex opening of sodium channels the cell.
- 3) Increase influx of sodium ions. Increasing end plate potential.
- 4) Potential for miniature endplate development. General muscle action potential. Muscle contraction take place.
- 5) Acetylcholine is destroyed. So that muscle is relaxed again.