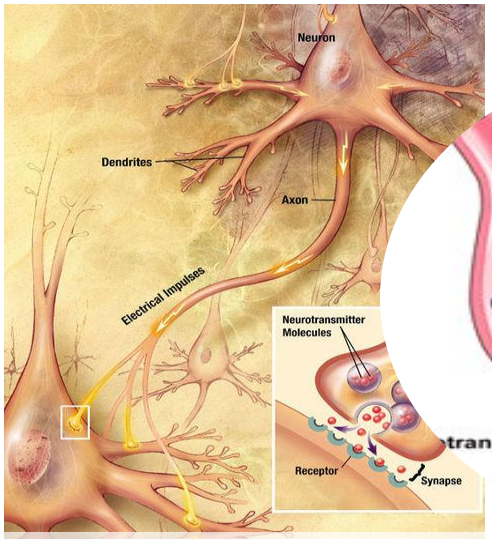
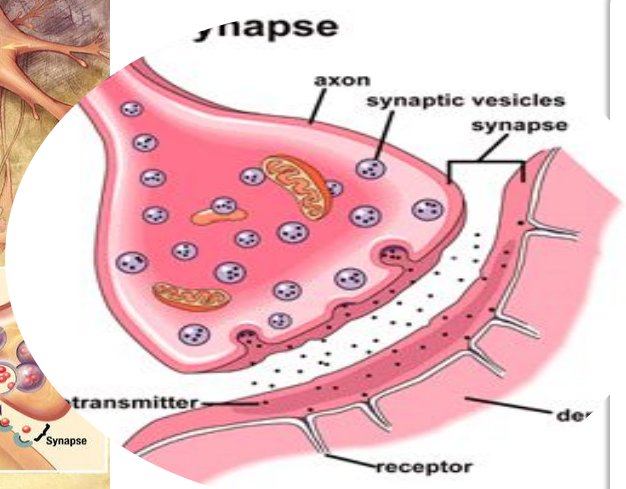
С.Ж. АСФЕНДИЯРОВ АТЫНДАҒЫ ҚАЗАҚ ҰЛТТЫҚ МЕДИЦИНА УНИВЕРСИТЕТІ

KAZAKH NATIONAL MEDICAL UNIVERSITY NAMED AFTER S.ZH.ASFENDIYAROV

General physiology





A Theme : Synapse and structure

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Course: 2
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PLAN

I.Introduction

Synapse

II.Main Part

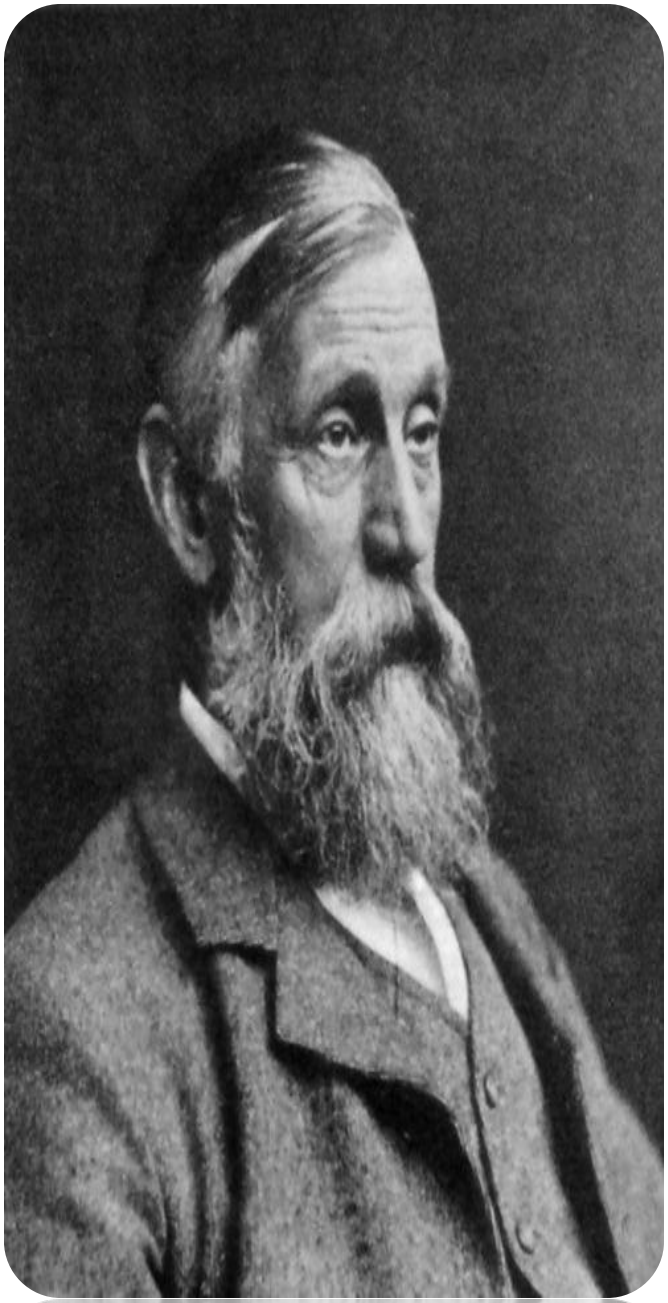
Structure

Classification synapses

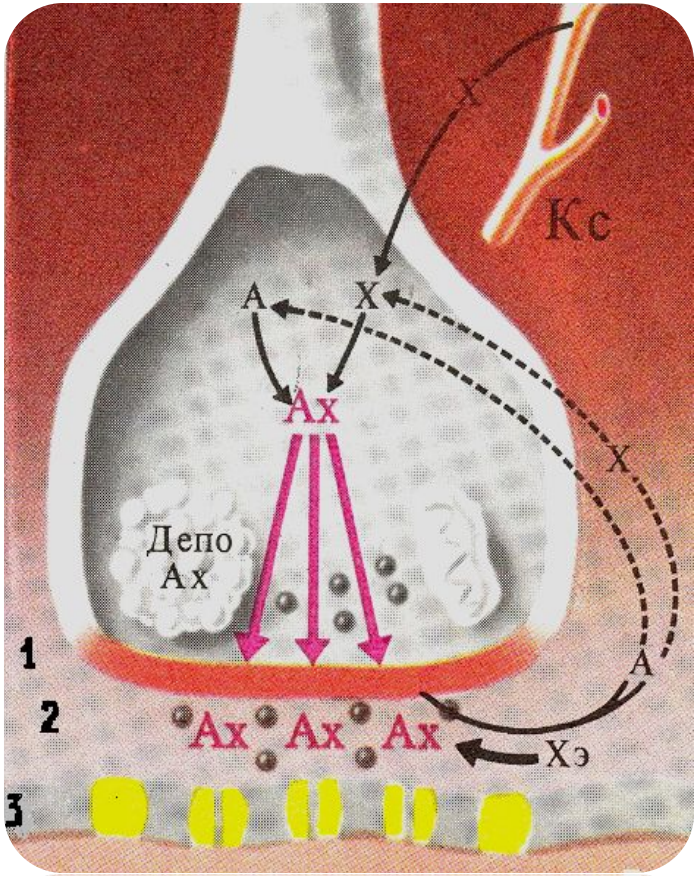
III.Conclusion

IV.References

The word "synapse" – from the Greek *synapsis* (*συνάψις*), meaning "conjunction", in turn from *συνάπτειν* (*συν*("together") and *ἅπτειν* ("to fasten")) – was introduced in 1897 by English physiologist Michael Foster at the suggestion of English classical scholar Arthur Woollgar Verrall



In the nervous system, a synapseis a structure that permits a neuron (or nerve cell) to pass an electrical or chemical signal to another neuron.



STRUCTURE OF SYNAPSE

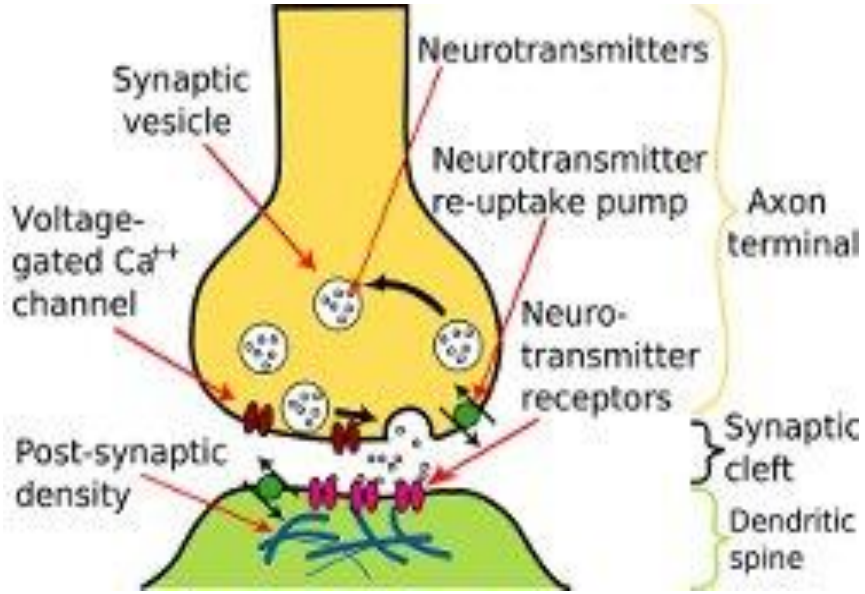
1. Presynaptic membrane
2. Synaptic cleft
3. Postsynaptic membrane receptors.

Receptors: cholinergic receptors (cholinergic M and N) adrenergic receptors - α and βeuron.

CLASSIFICATION SYNAPSES:

1. Location:

- Axon axonal
- Axo dendritic
- neuromuscular
- dendro dendritic
- aksosomaticheskie



2. The nature of: excitatory and inhibitory.

3. In a method of signal transmission:

- electric
- chemical

Types of interfaces

- Synapses can be classified by the type of cellular structures serving as the pre- and post-synaptic components. The vast majority of synapses in the mammalian nervous system are classical axo-dendritic synapses (axon synapsing upon a dendrite), however a variety of other arrangements exist. These include but are not limited to axo-axonic, dendro-dendritic, axo-secretory, somato-dendritic, dendro-somatic, and somato-somatic synapses.
- The axon can synapse onto a dendrite, onto a cell body, or onto another axon or axon terminal, as well as into the bloodstream or diffusely into the adjacent nervous tissue.

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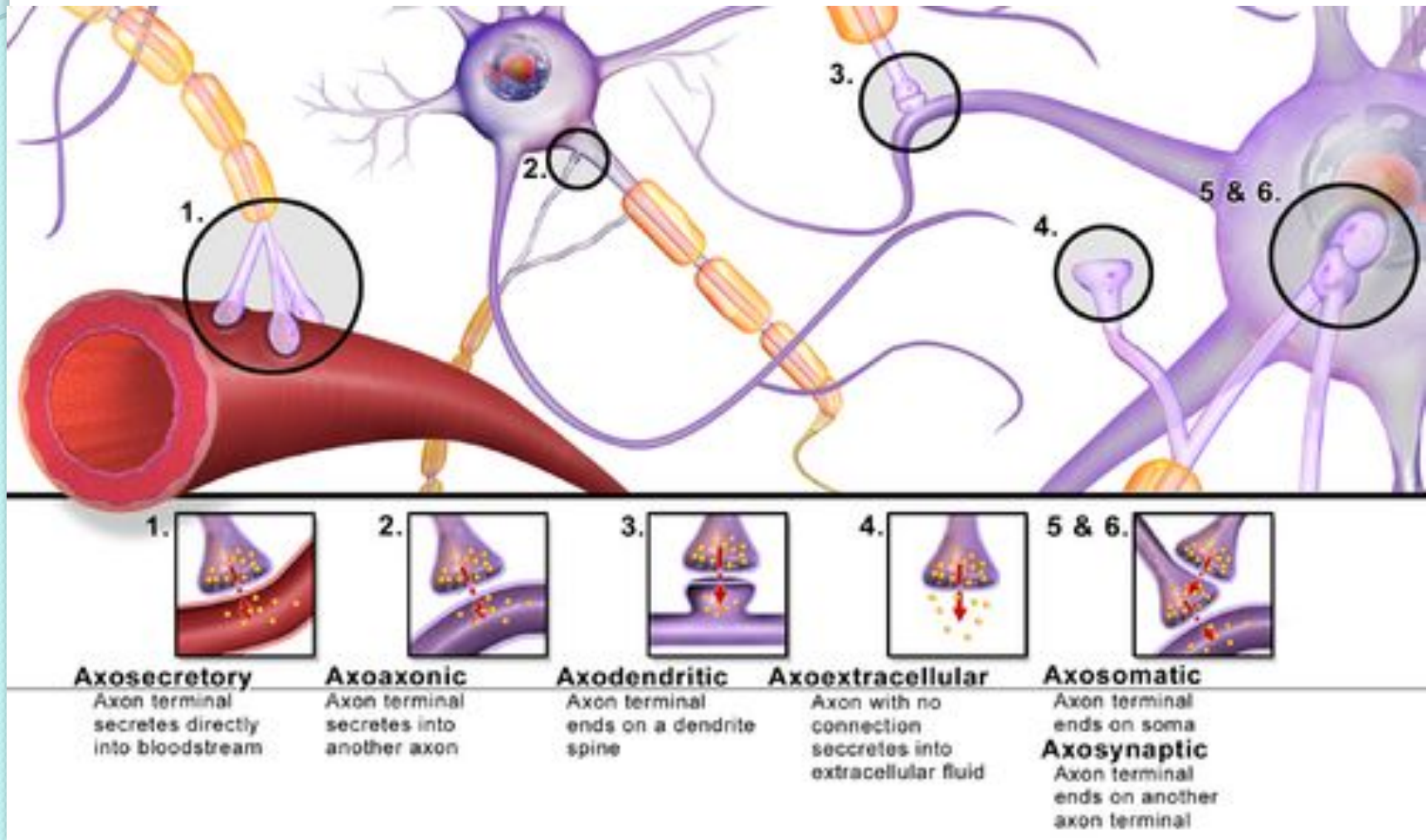
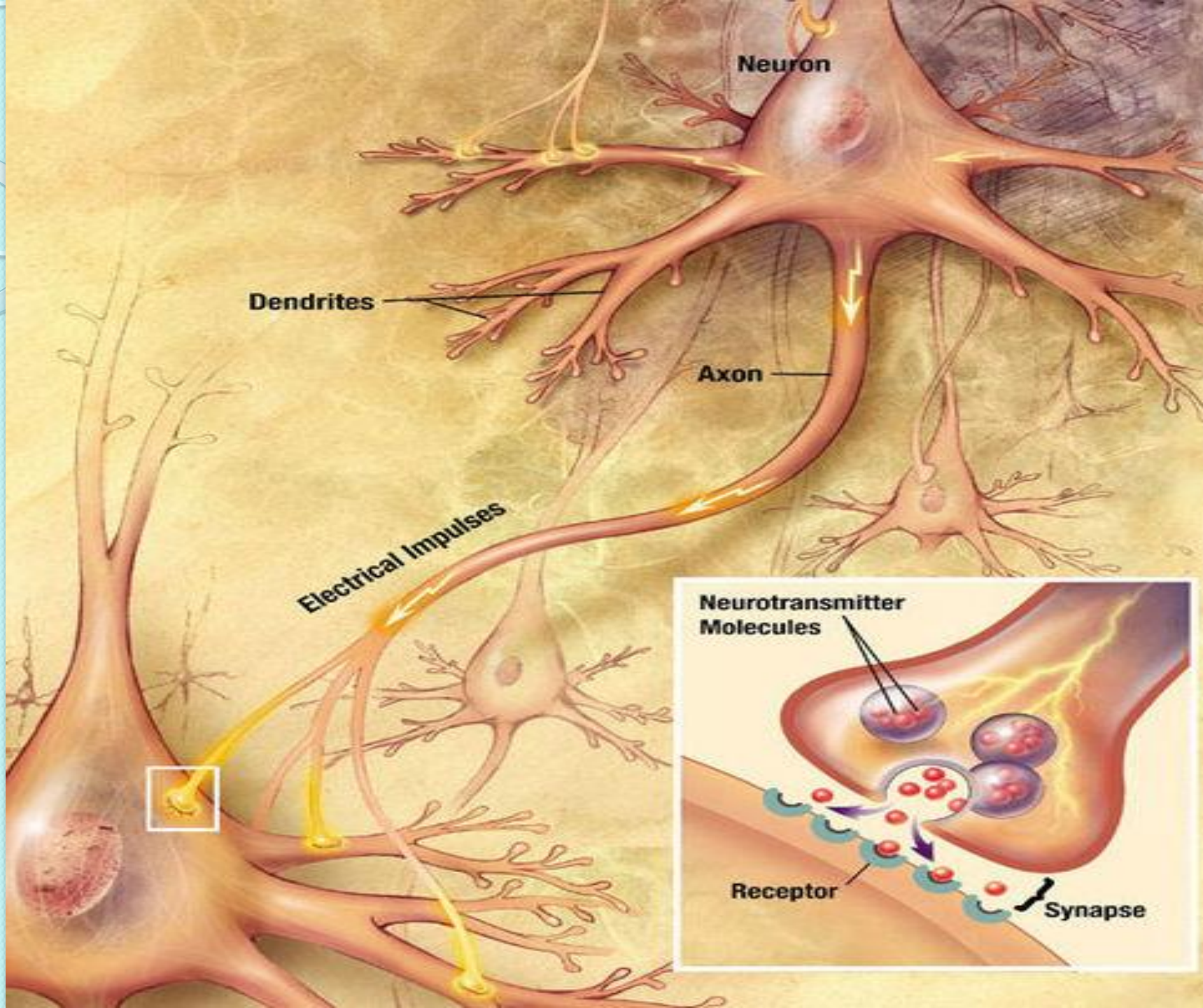


- **Synapses are essential to neuronal function: neurons are cells that are specialized to pass signals to individual target cells, and synapses are the means by which they do so. At a synapse, the plasma membrane of the signal-passing neuron (the presynaptic neuron) comes into close apposition with the membrane of the target (postsynaptic) cell. Both the presynaptic and postsynaptic sites contain extensive arrays of molecular machinery that link the two membranes together and carry out the signaling process. In many synapses, the presynaptic part is located on an axon, but some postsynaptic sites are located on a dendrite or soma.**


Neuron
Dendrites
Axon
Electrical Impulses
Neurotransmitter Molecules
Receptor
Synapse

There are two fundamentally different types of synapses:Chemical or electrical

- In a chemical synapse, electrical activity in the presynaptic neuron is converted into the release of a chemical called aneurotransmitter that binds to receptors located in the plasma membrane of the postsynaptic cell. Chemical synapses can be classified according to the neurotransmitter released: glutamatergic(often excitatory), GABAergic (often inhibitory), cholinergic(e.g. vertebrate neuromuscular junction), and adrenergic (releasing norepinephrine). Because of the complexity of receptor signal transduction, chemical synapses can have complex effects on the postsynaptic cell.

- In an electrical synapse, the presynaptic and postsynaptic cell membranes are connected by special channels called gap junctions or synaptic cleft that are capable of passing electric current, causing voltage changes in the presynaptic cell to induce voltage changes in the postsynaptic cell. The main advantage of an electrical synapse is the rapid transfer of signals from one cell to the next.

Physiological properties of che synapses:

- **Excitation is passed through mediators.**
- **Have bilateral conduction of excitation.**
- **Fatigue (depletion of the neurotransmitter).**
- **Low lability 100-125 imp. / Sec.**
- **summation of excitations**
- **beaten path**
- **Synaptic delay (0.2-0.5 m / s).**
- **Selective sensitivity to pharmacological and biological substances.**
- **Sensitive to changes in temperature.**
- **The exclusion There depolarization.**

References

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