* Action Potential: It is a rapid sequence of change in the voltage accross a membrane.

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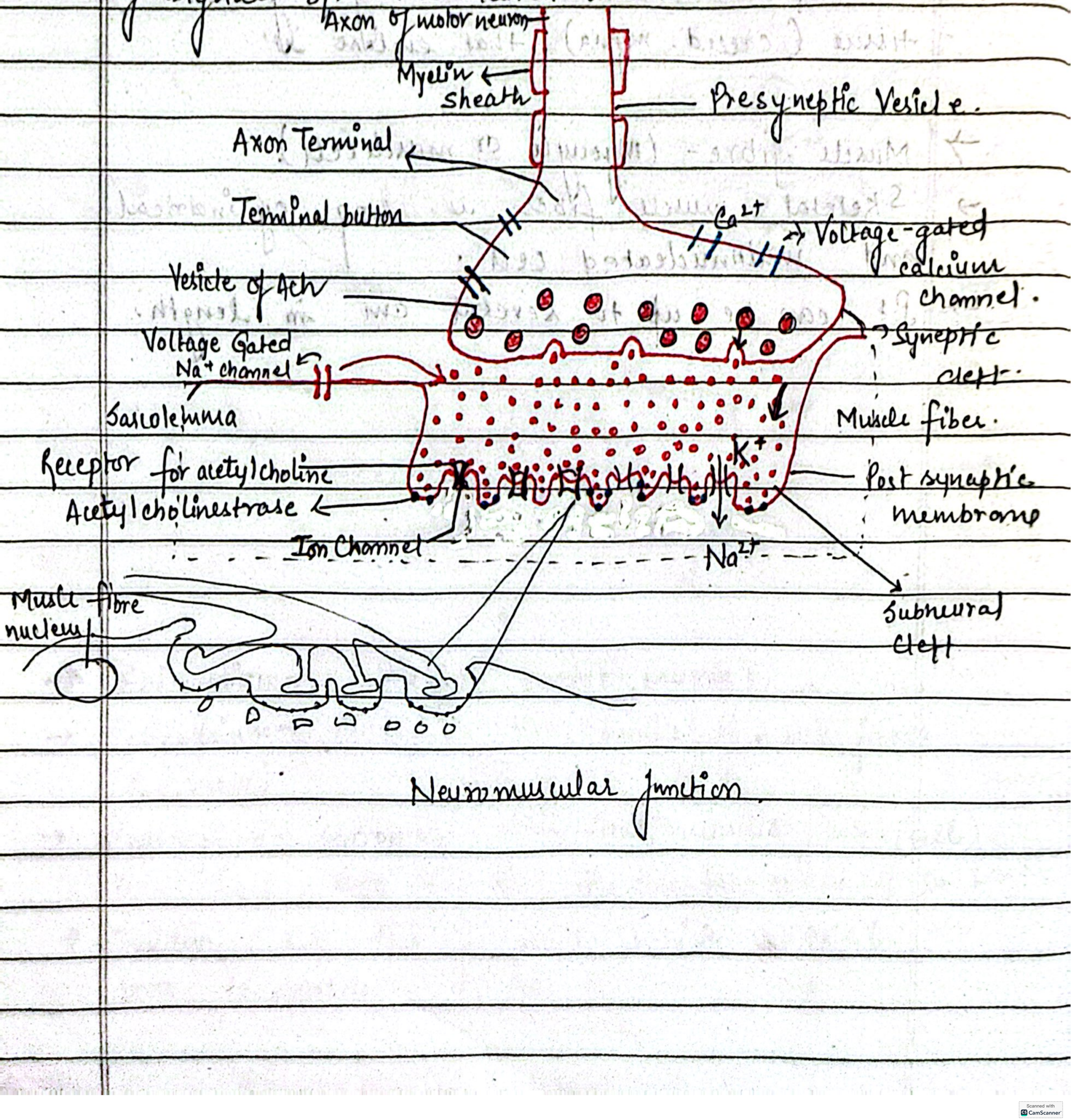
NEUROMUSCULAR JUNCTION

Neuromuscular junction refers to the junction between the motor nerve and muscle fibers through which motor nerve can communicate with the muscle fibres.

* Synapse is the Gap or space present b/w motor neuro and the skeletal muscle cell.

* Contraction and Relaxation of muscle is due to transmiss of signals b/w the neuron and muscle via nerve cells.



Neuromuscular junction.

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Structure :→ Skeletal muscle fibres are innervated by the motor nerve fibres. Each nerve fiber (Axon) divided into many branches innervates one muscle fiber through the neuromuscular junction.

→ **Axon Terminal and Motor End Plate**

Terminal branch of nerve fiber is called Axon terminal When the axon comes close to muscle fiber, it loses myelin sheath. So, the axis cylinder is exposed.

This portion of the axis cylinder is expanded like a bulb, which is called motor end plate.

Axon terminal consist mitochondria and synaptic vesicles. Synaptic vesicles contain the neurotransmitter substance, Acetylcholine (Ach). The Ach is synthesize by mitochondria present in the axon terminal & stored in the vesicles. Mitochondria contain ATP which is a source of energy for the synthesis of Acetylcholine.

→ **Synaptic Trough or Gutter**

Motor endplate invaginates inside the muscle fiber & forms a depression, which is known as synaptic trough or synaptic gutter. The membrane of muscle fiber below the motor end plate is thickened.

→ **Synaptic Cleft**

Membrane of the nerve ending is called presynaptic cleft or membrane. Membrane of muscle fiber is called post synaptic membrane. The space b/w these two membrane is called synaptic cleft.

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Synaptic cleft contain basal lamina. It is the thin layer of spongy reticular matrix through which the extracellular fluid diffuses. An enzyme called acetylcholinesterase (AchE) is attached to mesh of basal lamina in large quantities.

→ **Subneural Cleft**

Post synaptic membrane is the membrane of the muscle fiber. It is thrown into numerous folds called subneural clefts. Post synaptic membrane contains the receptor called nicotinic Acetylcholine receptor.

* Event of Neuro Transmission.

1. Release of Acetylcholine.
2. Action of Ach
3. Development of end plate Potential.
4. Development of miniature end plate potential.
5. Destruction of Ach.

Motor Nerve fiber - Action Potential

↓

Axon Terminal — Opening of Voltage-gated Ca^{2+} channel

↓

Entry of Ca^{2+} ion from ECF

↓

Opening of vesicles & release of Ach.

↓

Synaptic Cleft → Passage of Ach

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↓

Binding of Ach with receptor & formation of Ach-Receptor complex

↓

Postsynaptic membrane.

Opening of Ligand-gated sodium channel.

↓

Entry of Sodium ion from ECF.

↓

Development of End plali potential.

↓

Muscle fiber

Generation of Action Potential

↓

Excitation – Contraction Coupling

↓

Muscle Contraction.