MOTOR END PLATE

Branching Nerve Terminals

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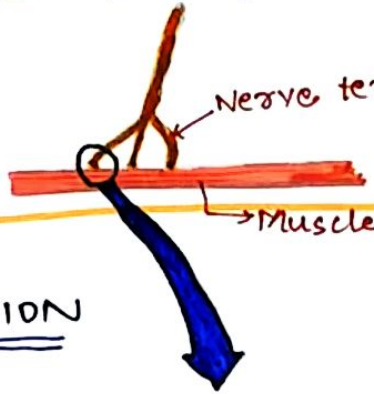
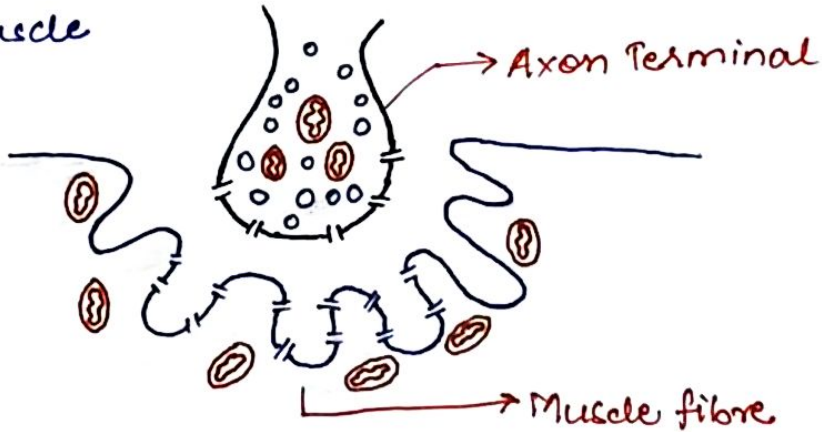
Invaginate into surface of muscle fibre



NEURO-MUSCULAR JUNCTION

Junction Between Nerve Ending & Muscle fibre.

Generally, 1 NMJ per muscle fibre.



PHYSIOLOGICAL ANATOMY OF N.M.J.

Synaptic Gutter / Synaptic Trough :-

- Invaginated membrane of muscle fibre.

Subneural clefts :-

- Folds of muscle membrane at bottom of gutter.

Synaptic cleft / space :-

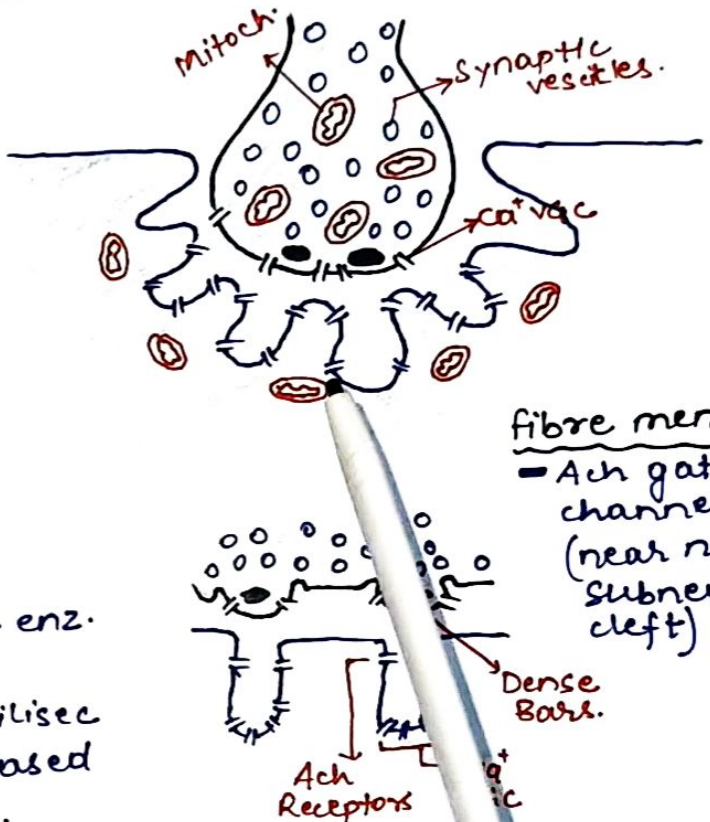
- Space B/w Axon terminal & fibre membrane
- Approx ⇒ 20-30nm
- Contains Acetylcholinesterase enz.

⇩

Destroys Ach a few milisec after it has been released from synaptic vesicle.

Axon terminal :-

- ↑ mitochondria (for ATP supply) ⇒ Syn. of Ach.
- Linear dense bars
- Synaptic vesicles
- Ca^{++} VGC



fibre membrane :-

- Ach gated ion channels (near neck of subneural cleft)

MECHANISM OF NEUROMUSCULAR TRANSMISSION

Action Potential reaches Axon Terminal.

⬇

Opening of Ca^{++} VGC

⬇

Entry of Ca from synaptic space to interior of nerve terminal.

⬇

Ca activates Ca^{++}-calmodulin dependent protein kinase

⬇

Phosphorylation of (Synapsin) → Anchors the Ach vesicles to cytoskeleton of presynaptic terminal.

⬇

Frees Ach vesicles from cytoskeleton.

⬇

Vesicles move to active zone of presynaptic neural membrane adjacent to dense bars.

⬇

Vesicles • Docks; fuses; empties Ach By Exocytosis

Ach Removed From Space :- To prevent persistent depolarisation

⇒ Mostly by Acetylcholinesterase.

⇒ Small amount by diffusing out of synaptic space & no longer available.

Fatigue :- when

- Rate of impulse > 100 times per sec
- for several minutes

↓

Consumption of Ach >> Ach production for transmission

↓

Depletion of Ach

↓

Fatigue of NMJ.

Myasthenia Gravis :-

- Autoimmune disorder
- Occurence :- 1 in 20,000 person
- Antibodies against Ach receptors.
- Muscle weakness d/t inability of NMJ to transmit enough signals from n. fibre to muscle fibre.
  - Reduced Ach receptors
  - Loss of post junctional folds
  - ↑sed synaptic space.
- Tx :- Frequent dosage of Neostigmine
  - ⊖ Achesterase.