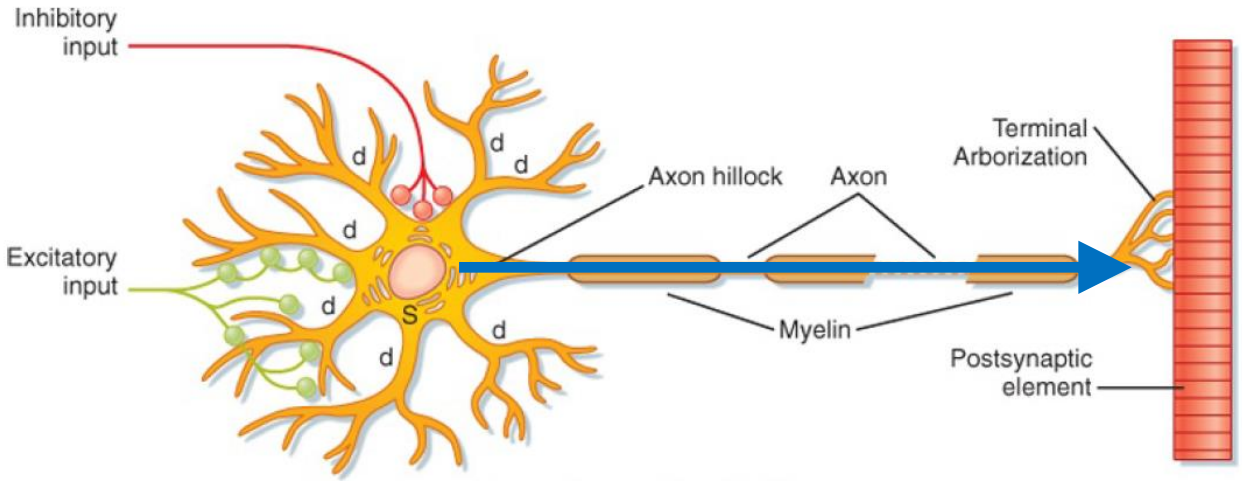
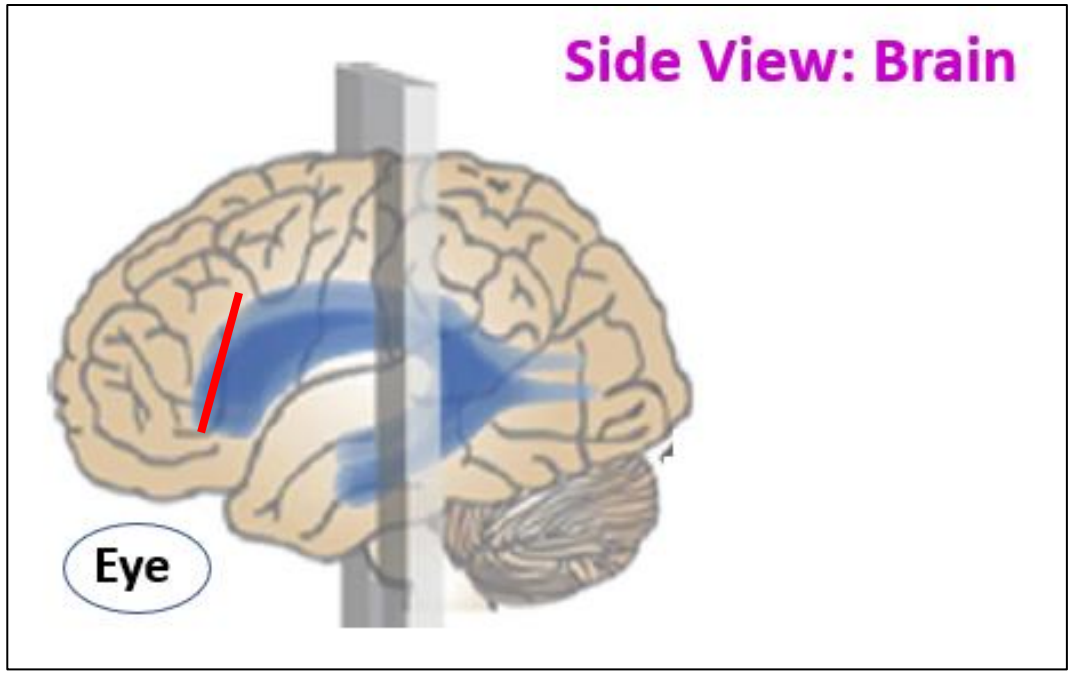
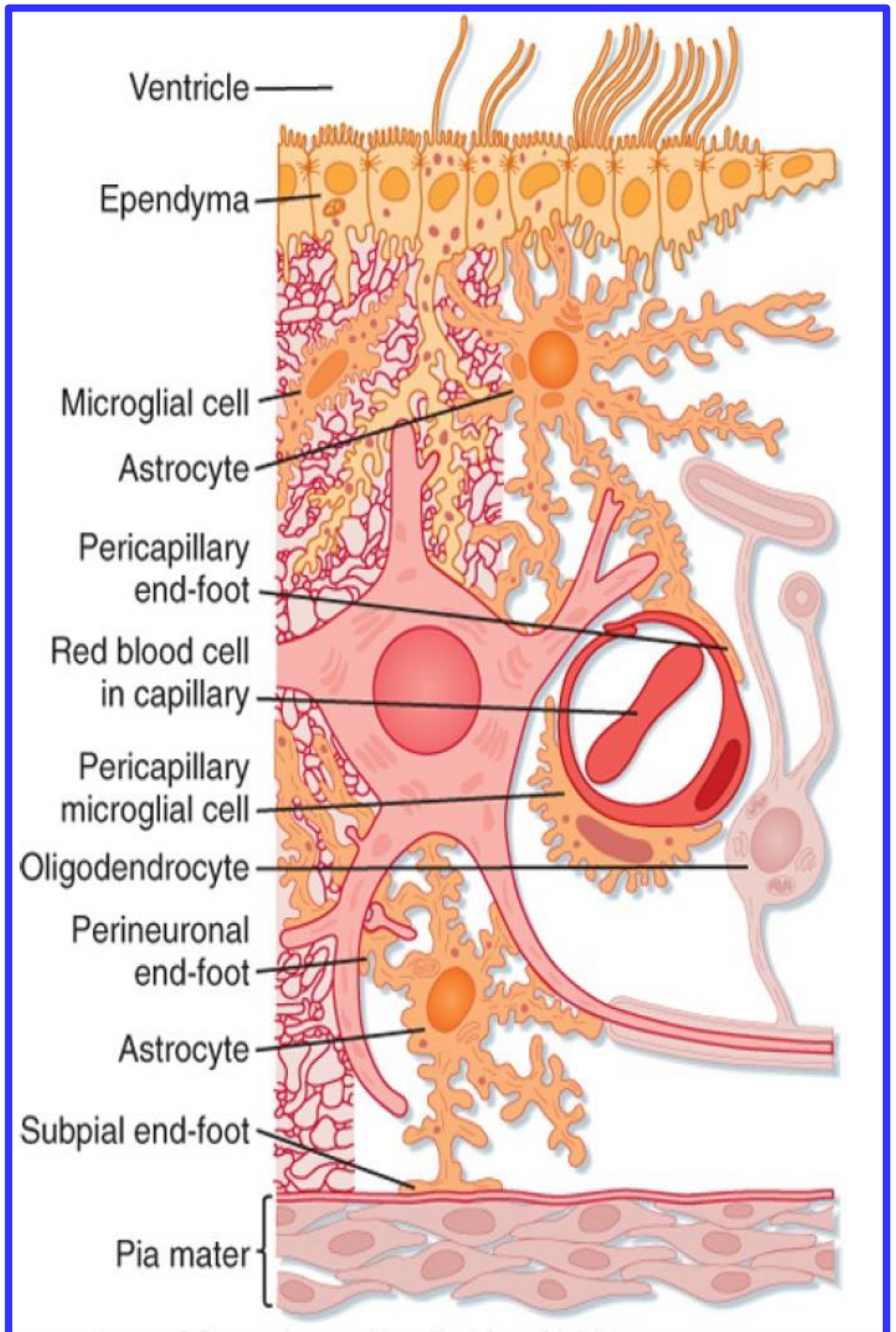
Neuron – Myo Fibril Processing

Recap.

Neuron & Other Cells in Brain Tissue

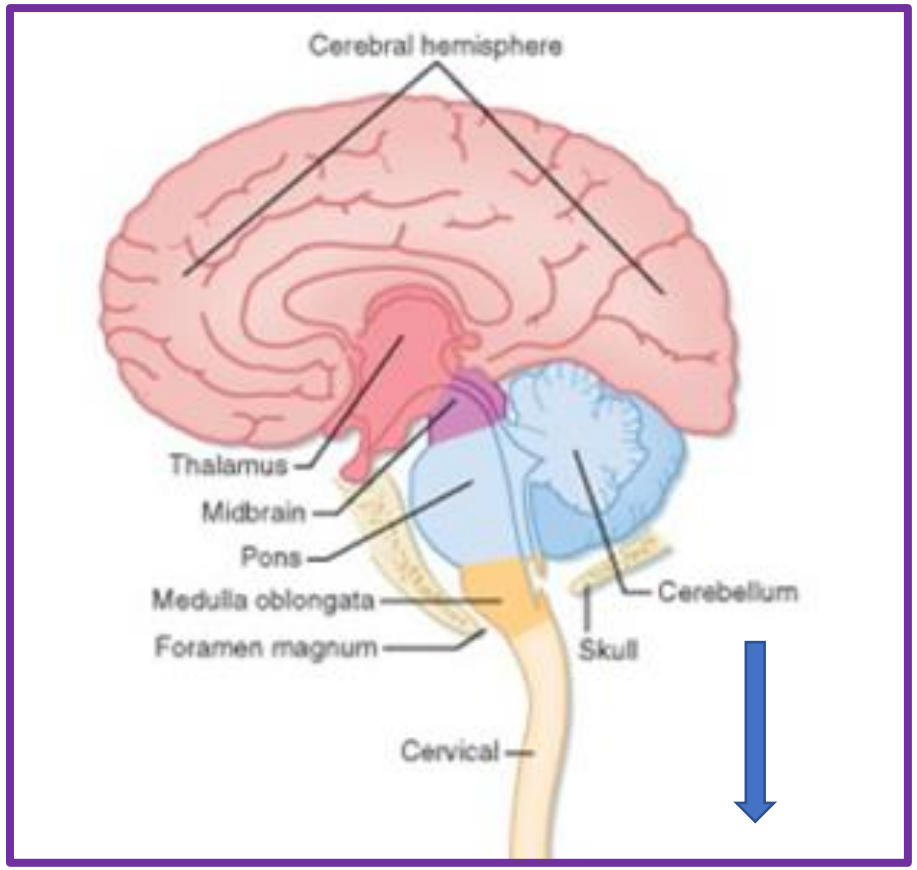


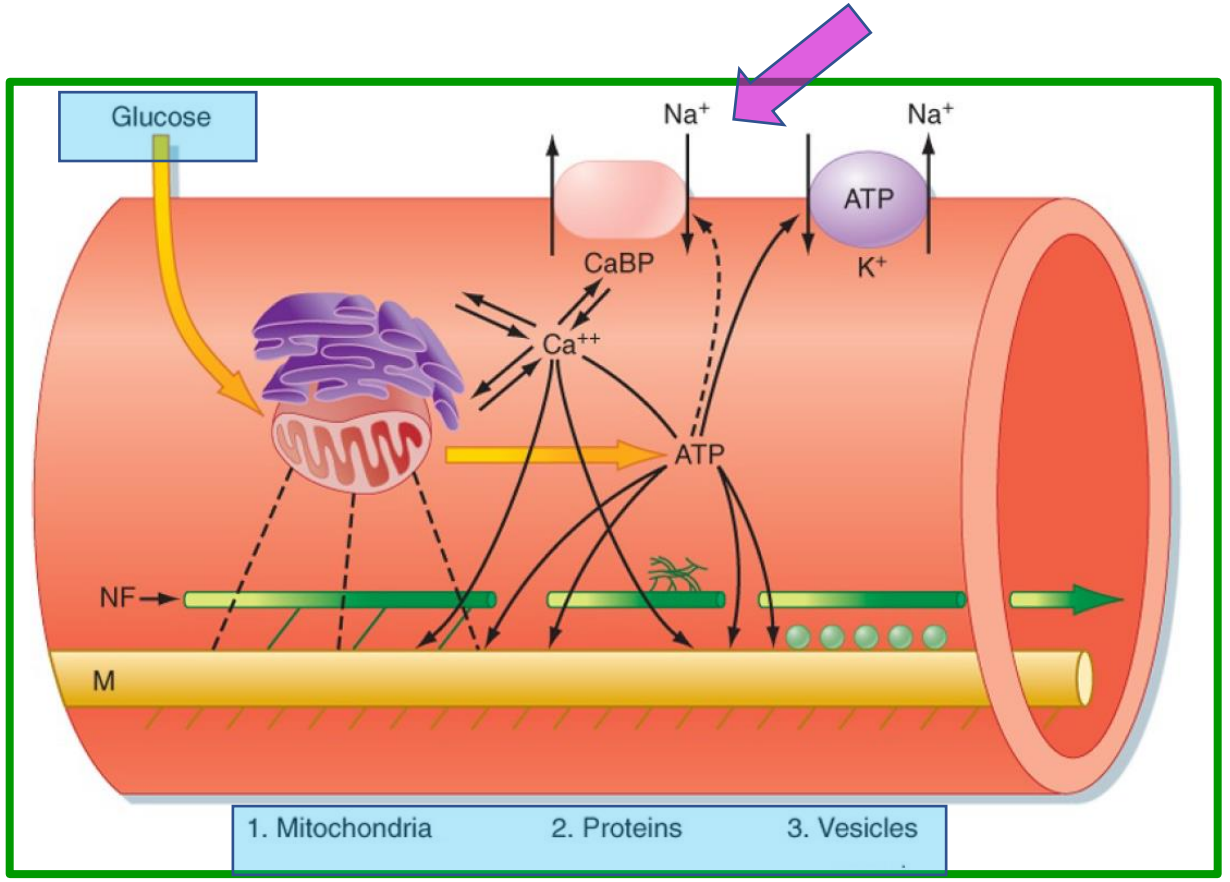




Recap. Neuronal Transmission

M: Micro-tubules
NF: Neuro-filaments





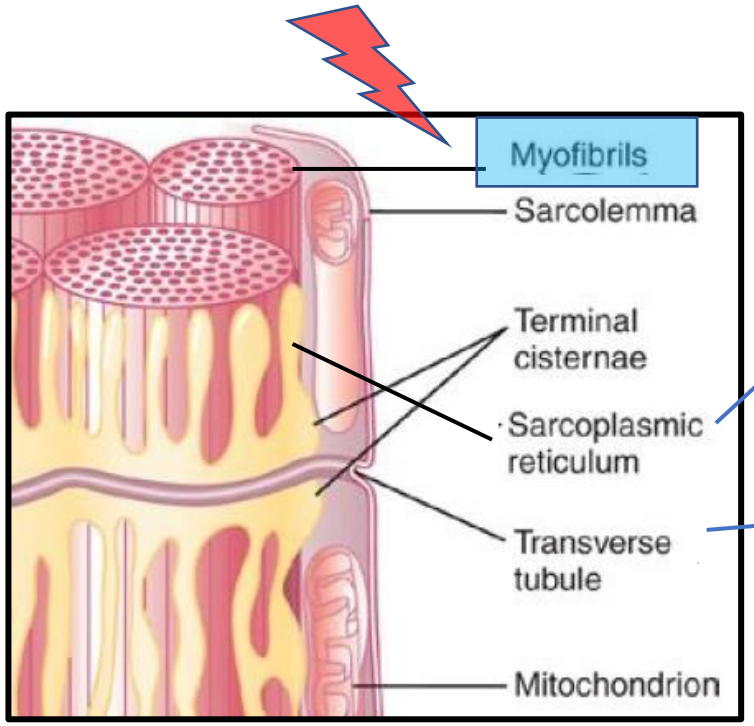
Recap. (Myo-Fibrils)

Neuron's Spike → Muscular Contraction

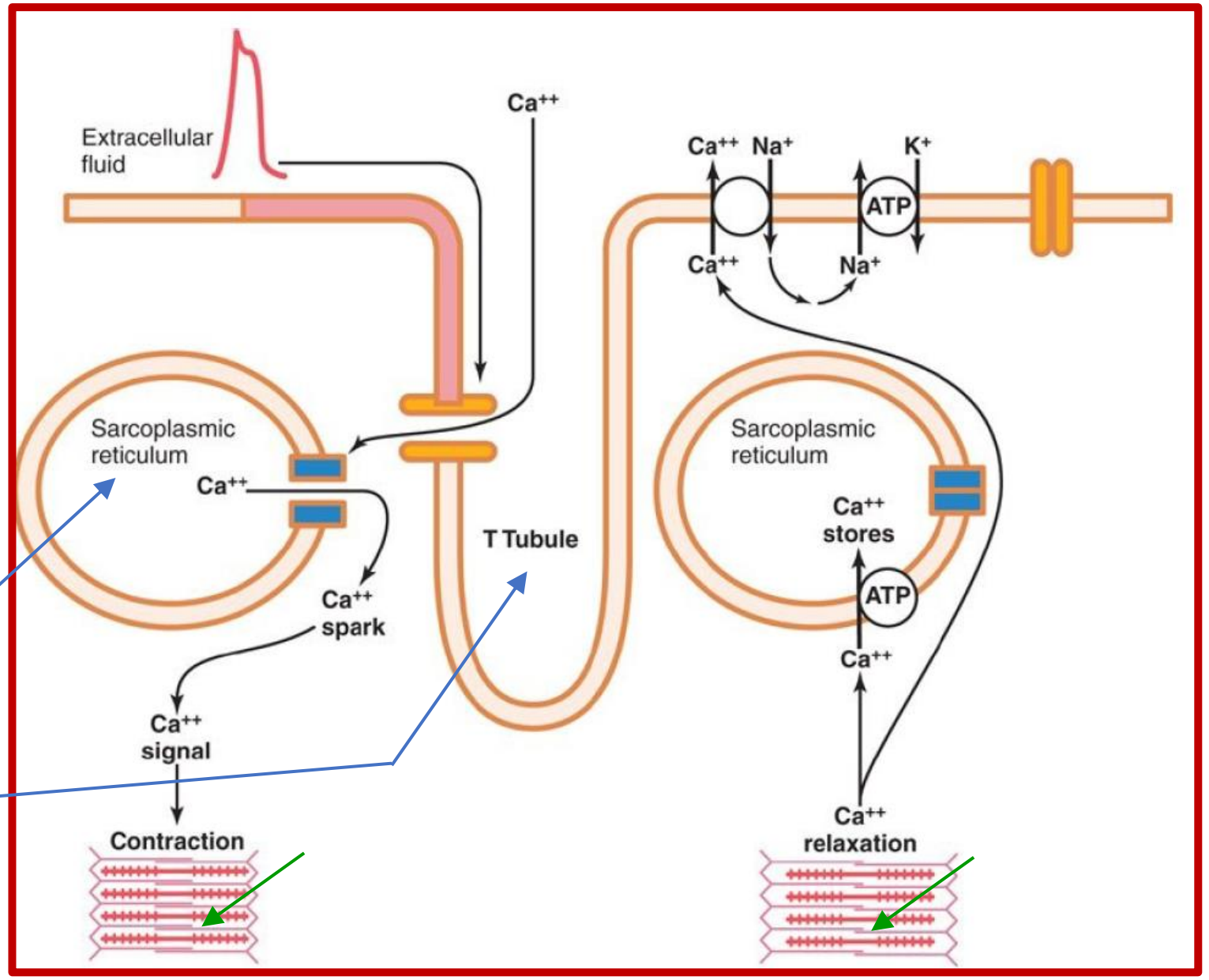
Periodic Electrical Stimulation

↓

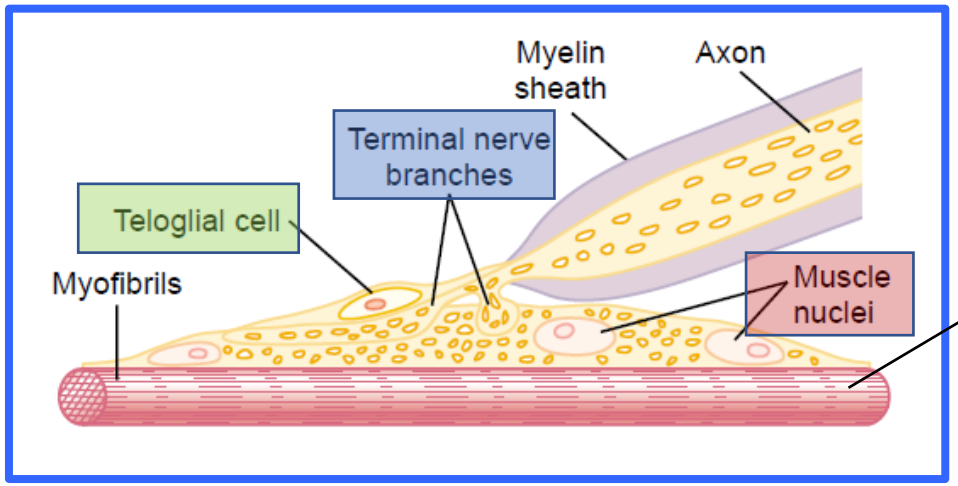
Periodic Muscular Contraction



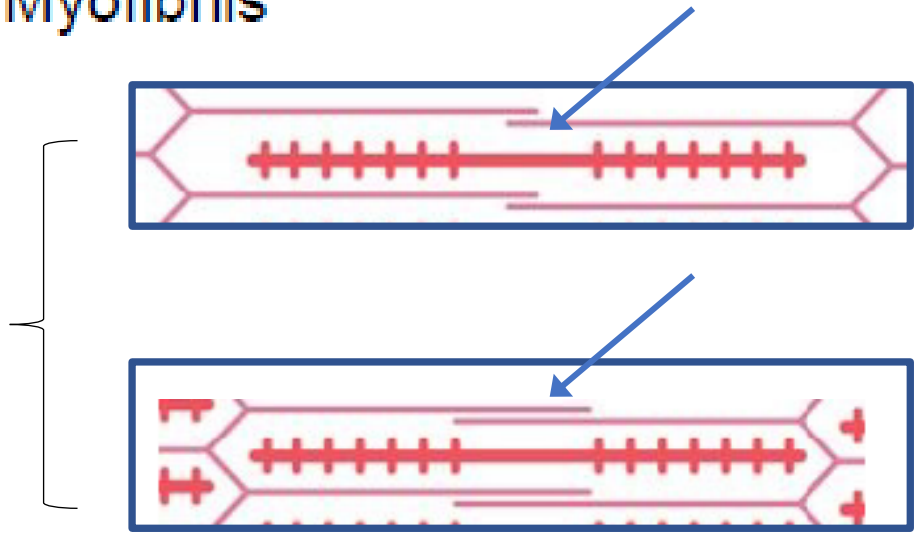
excitation-contraction coupling and relaxation



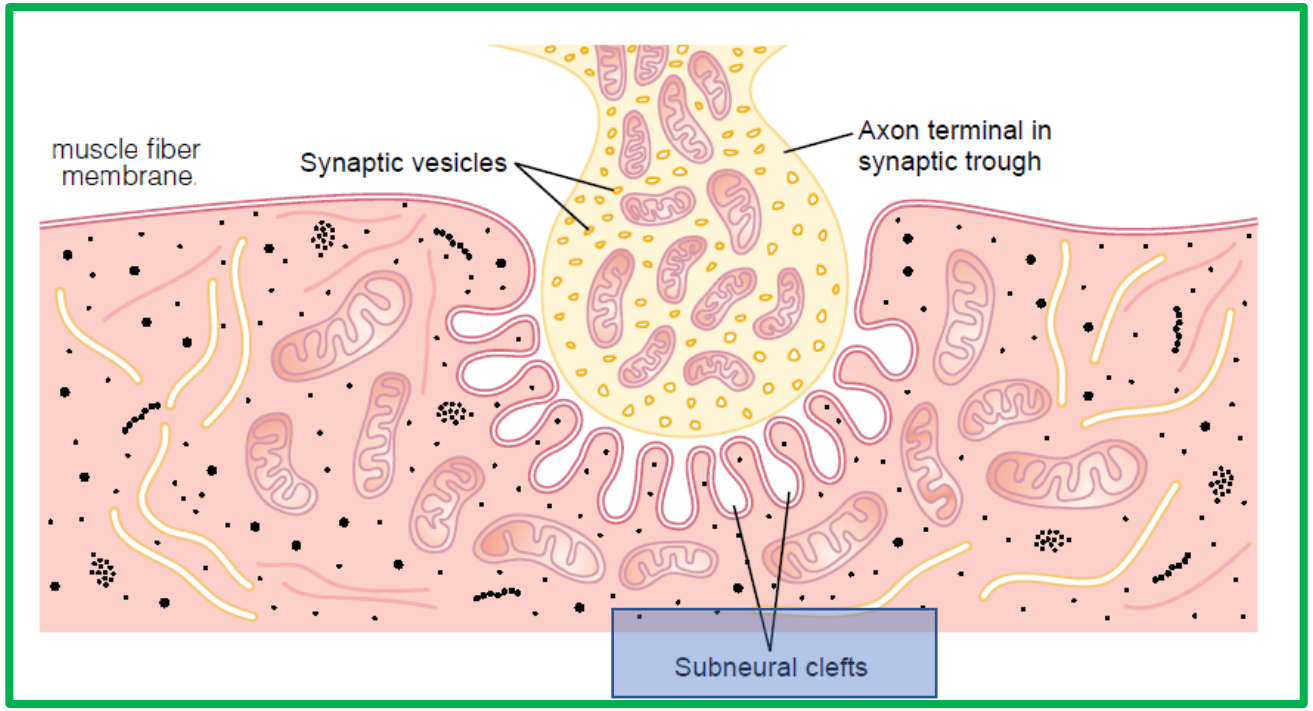
Motor End Plate



Myofibrils

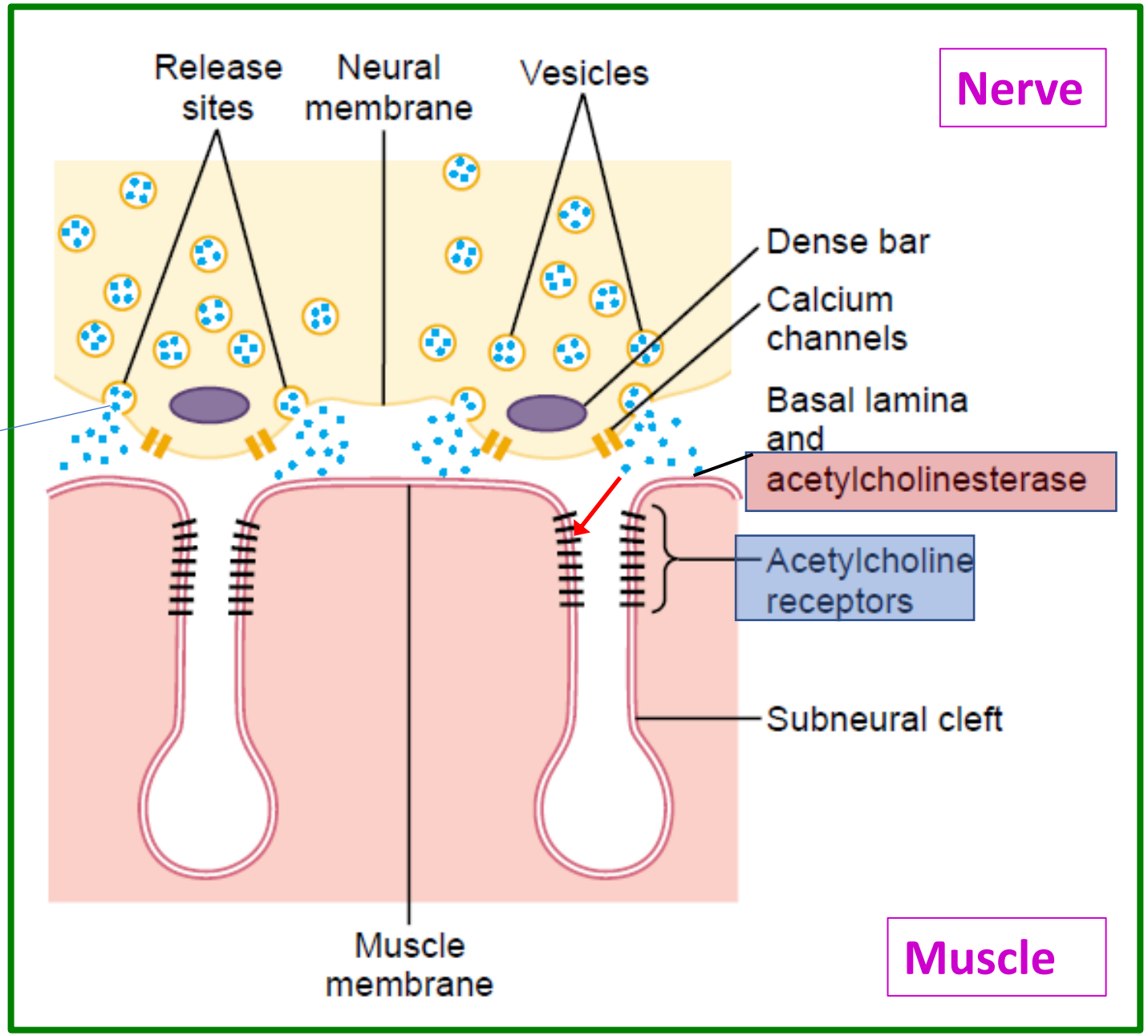


contact point between a single axon terminal and the muscle



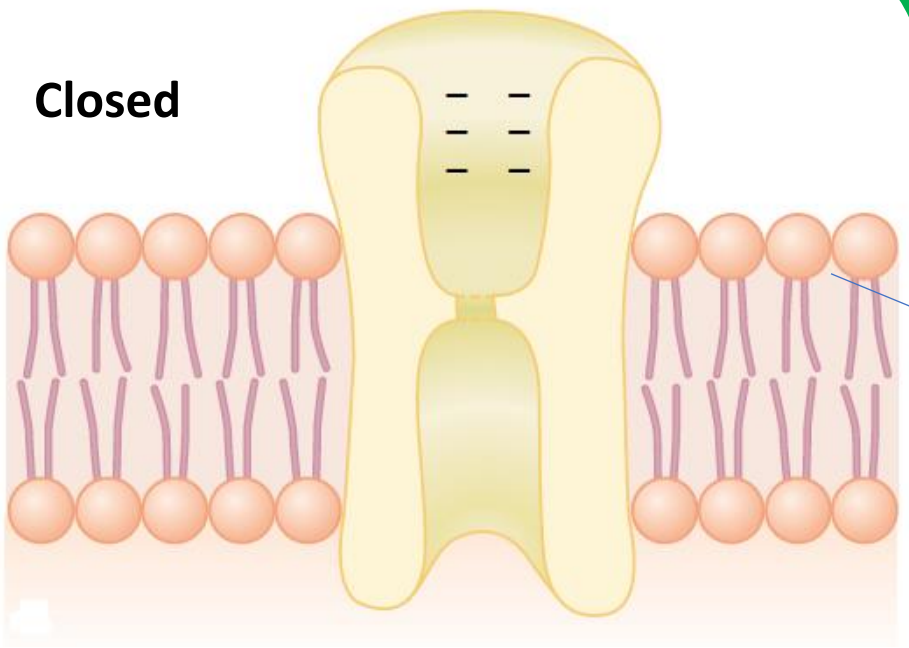
Basis of Neuromuscular Junction:

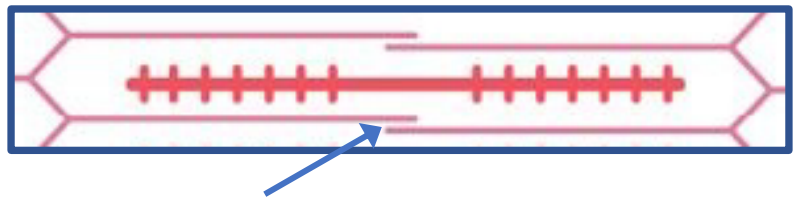
Acetylcholine from Synaptic Vesicles



Acetyl-choline Channel (Ach)

Closed

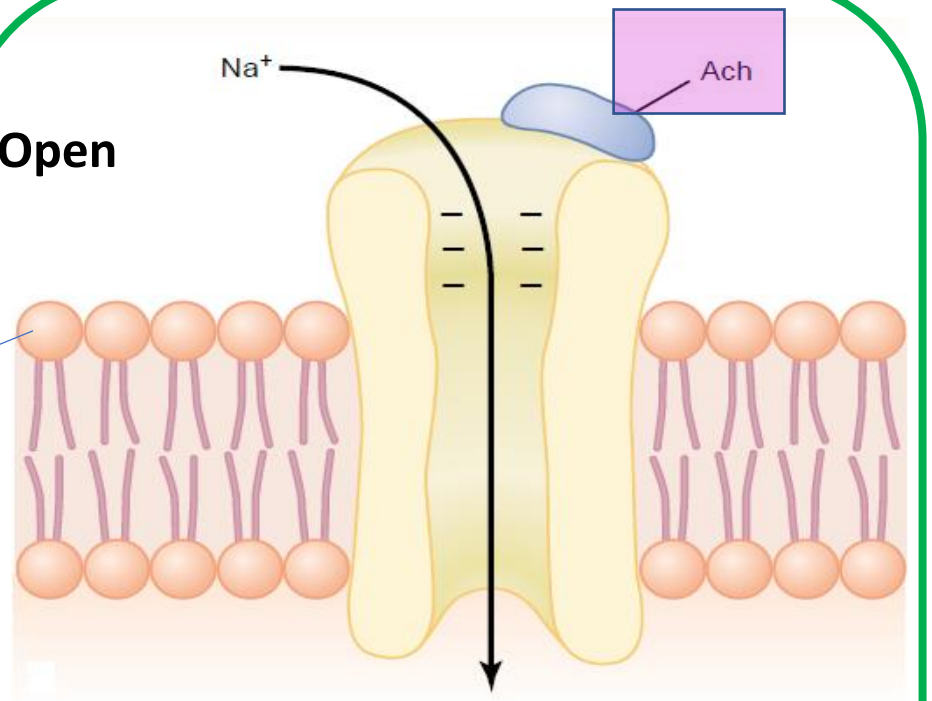


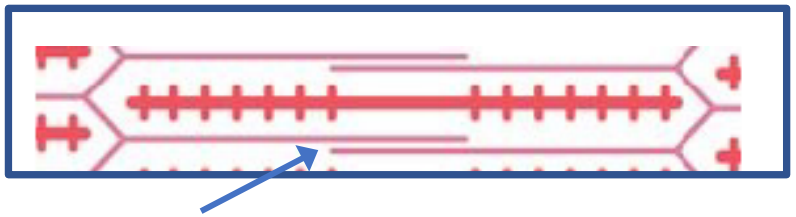


Relaxed Myofibril

Cell Membrane

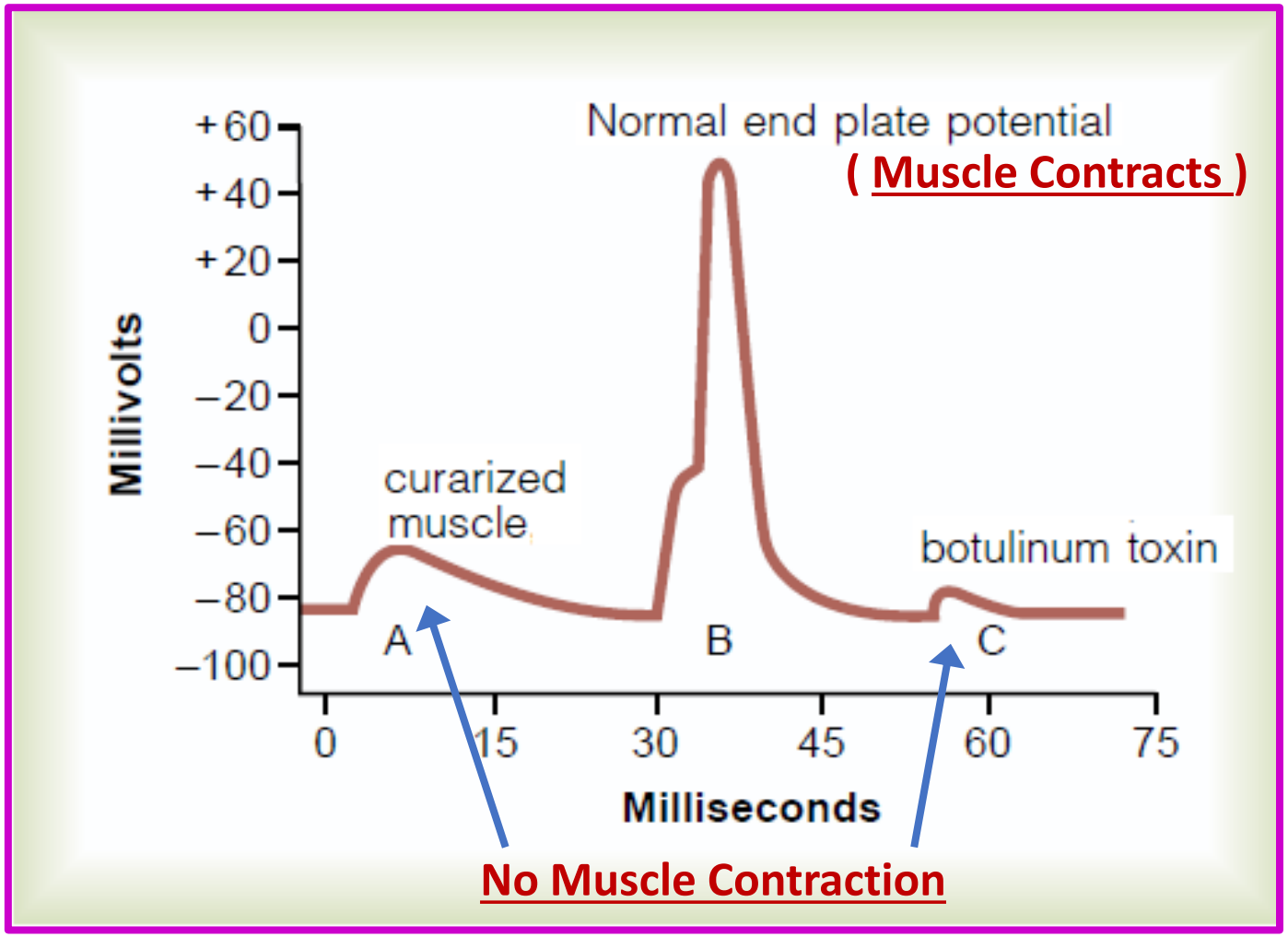
Open



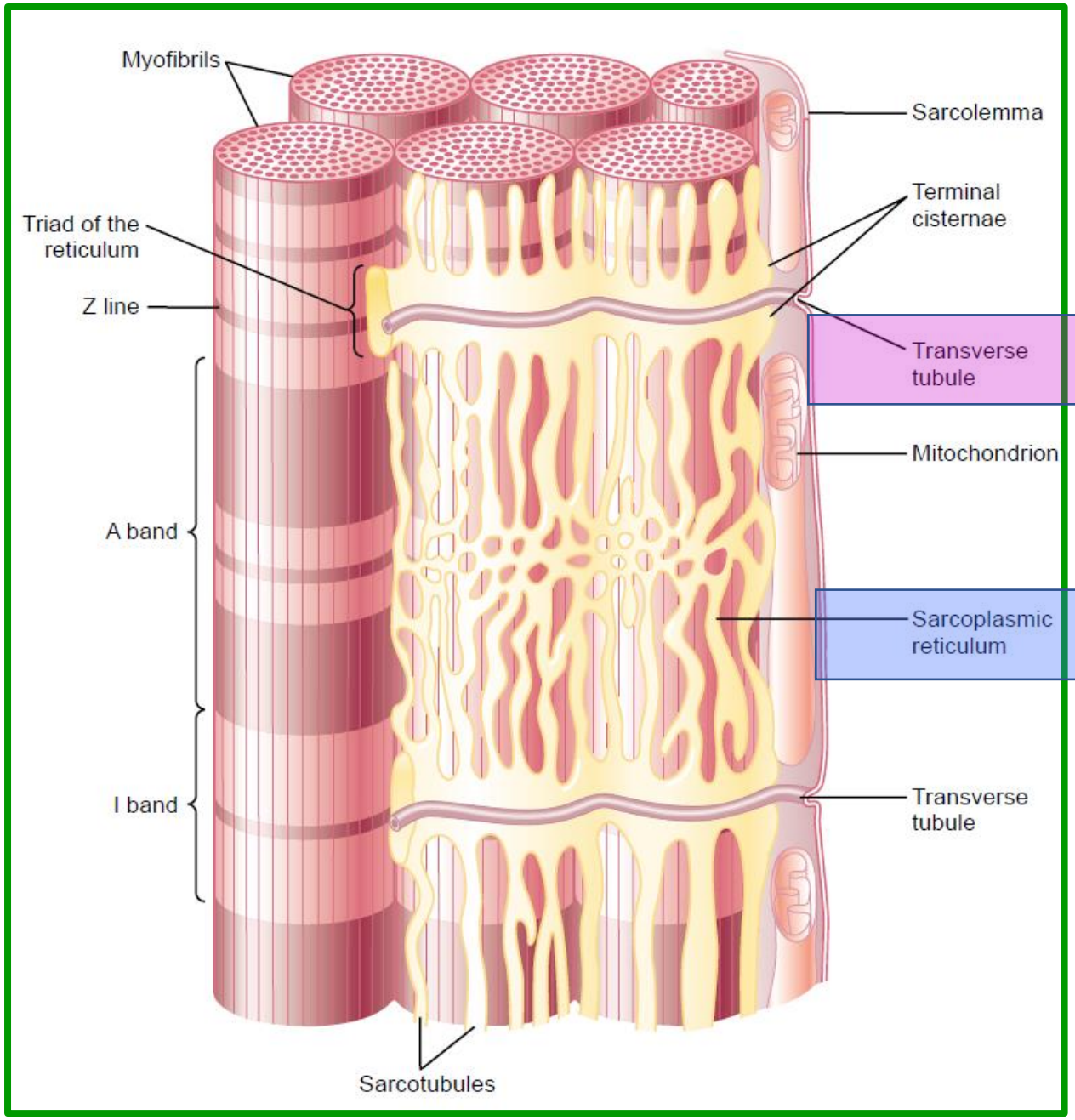


Contracted Myofibril

Only End-plate Potential having normal amplitude (+60 mV) contracts a Muscle



excitation-contraction coupling and relaxation



Transverse Tubule (Tubes of Extracellular Fluid)

&

Sarcoplasmic Reticulum Network

Enables Action Potential to Spread deep inside Muscle

Mechanisms of excitation-contraction coupling and relaxation

Periodic Electrical Stimulation

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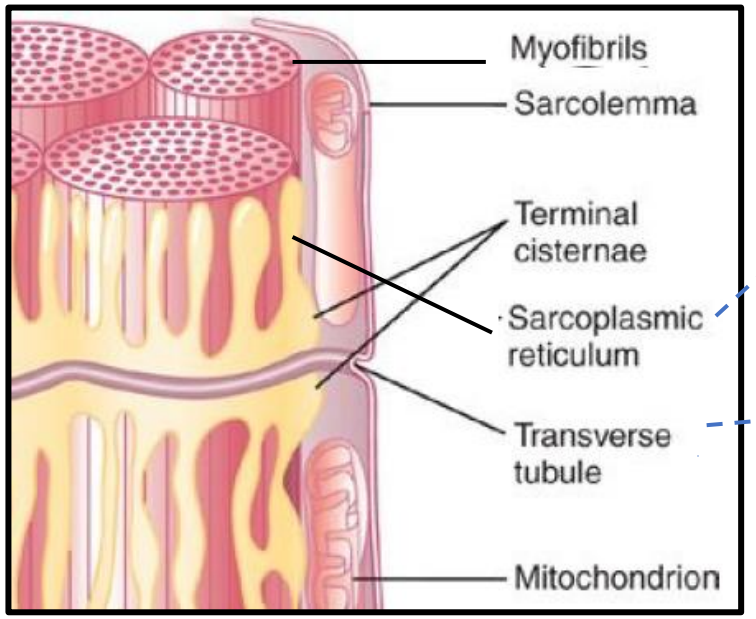
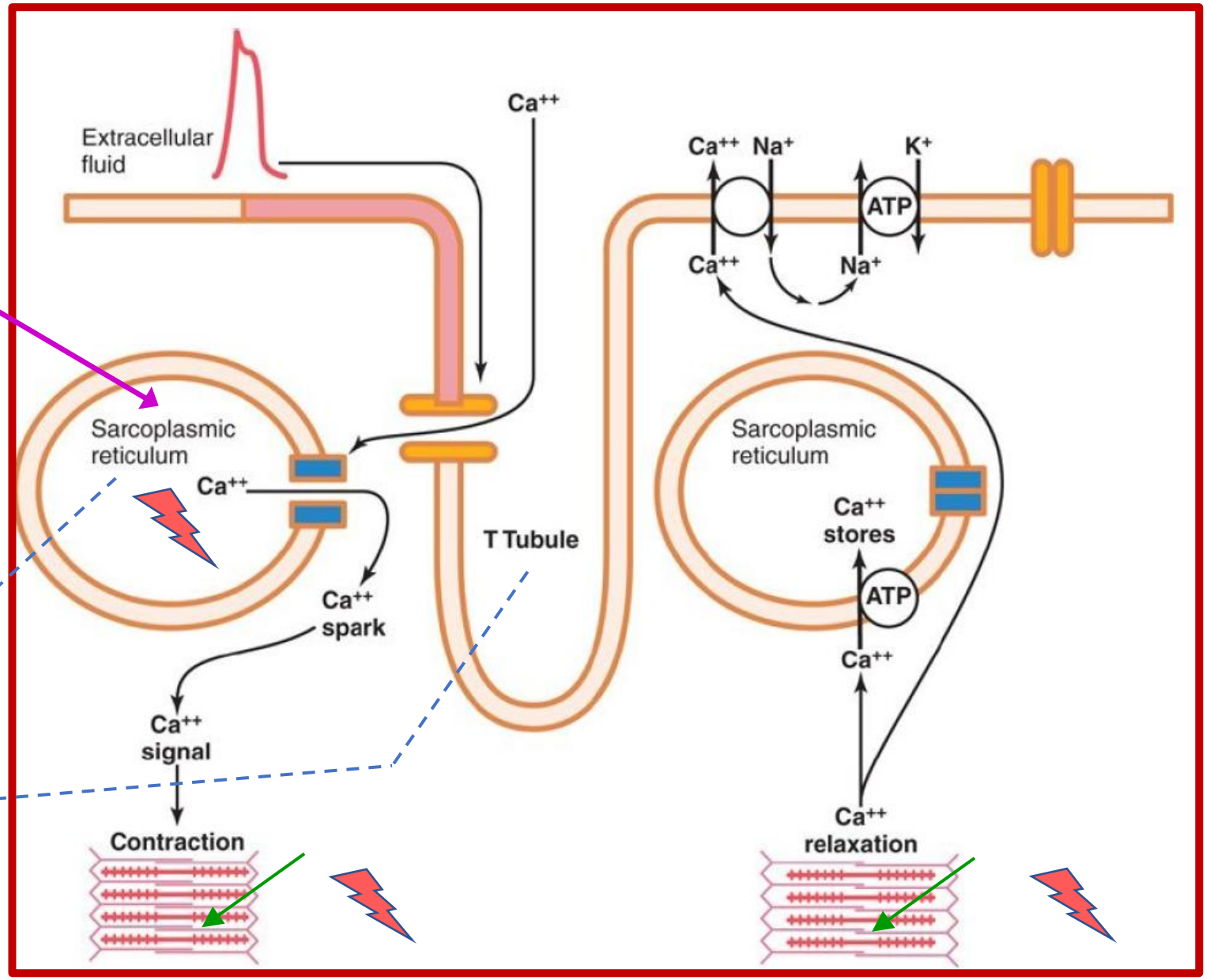
Ca ++ Release in Myofibril

↓

Periodic Muscular Contraction





“Excitation – Contraction” Coupling → Neuron - Muscle Coupling

Action Potential in Sarcolemma membrane lining outside

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Ca^{++} Release in Sarcoplasmic Reticulum Network inside

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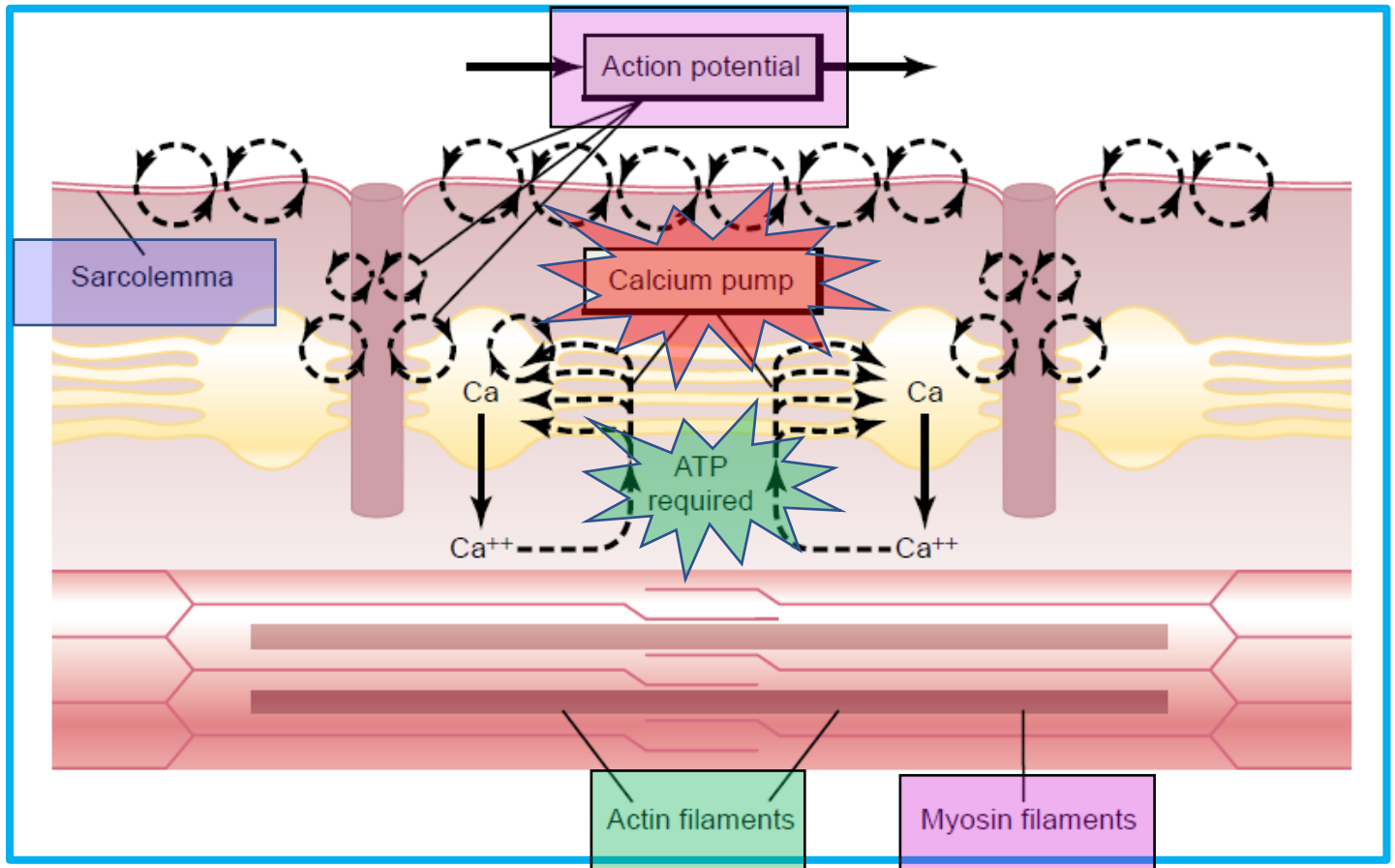
Ca^{++} Pump: Re-uptake & Recycling of ions



Comparison Between Action Potentials of Muscle Vis-a-Vis Nerve

1. Resting membrane potential: about –80 to –90 millivolts in skeletal fibers—the same as in large myelinated nerve fibers.

2. Duration of action potential: 1 to 5 milliseconds in skeletal muscle—about five times as long as in large myelinated nerves.

3. Velocity of conduction: 3 to 5 m/sec—about 1/13 the velocity of conduction in the large myelinated nerve fibers that excite skeletal muscle.