



Muscle tissue

Practical part

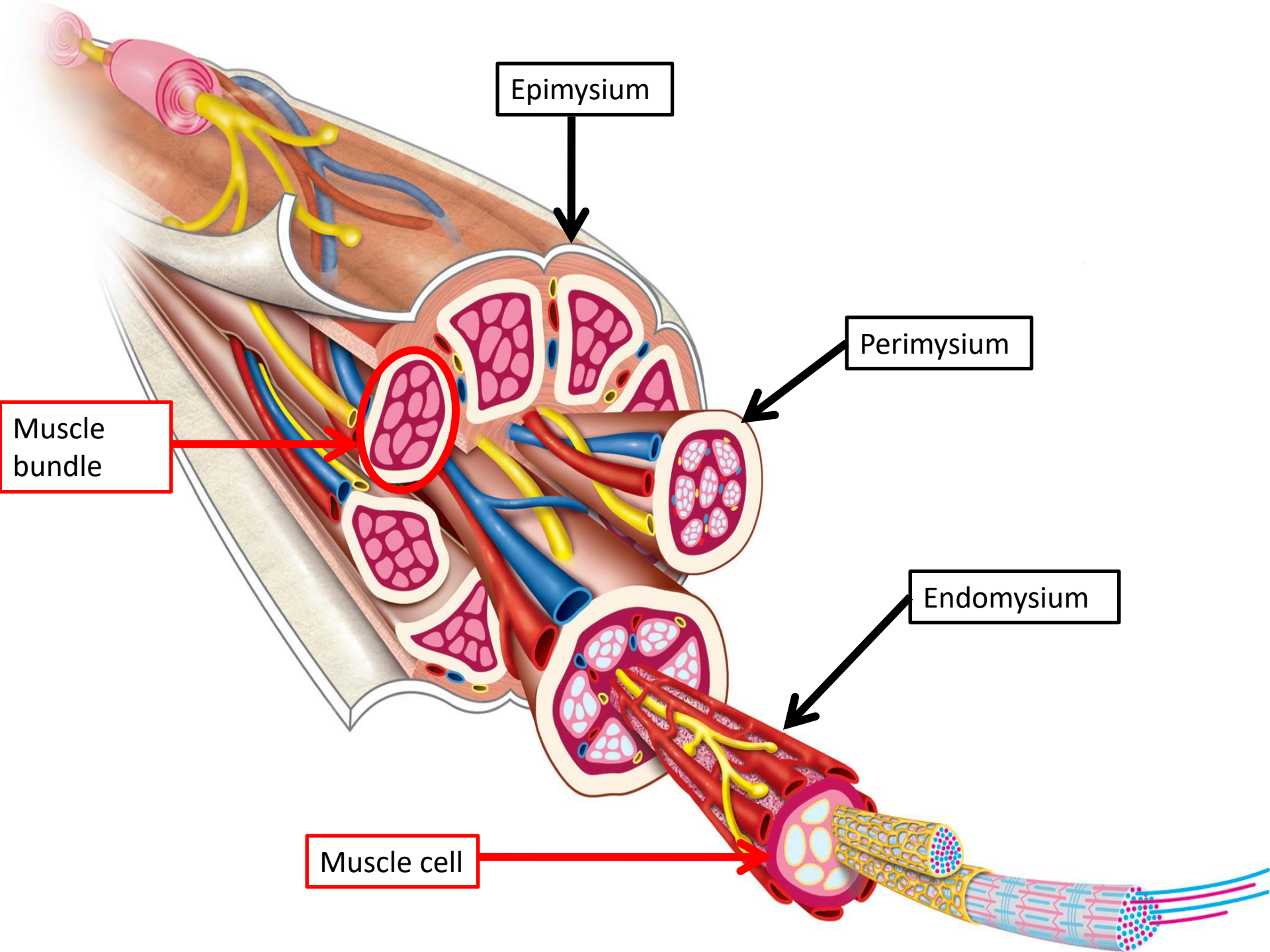
Dr. Heba Kalbounieh

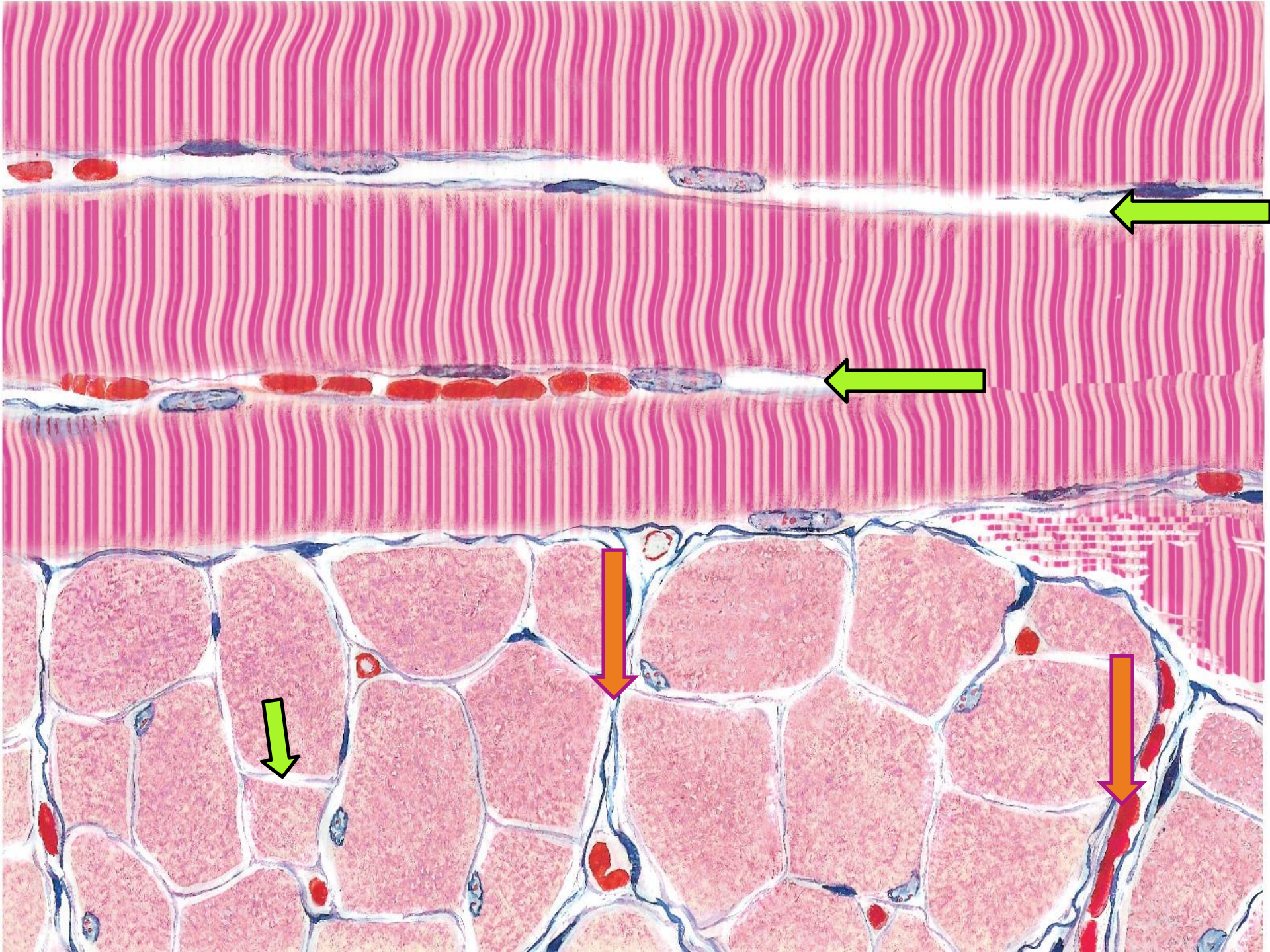
Assistant Professor of Anatomy and Histology

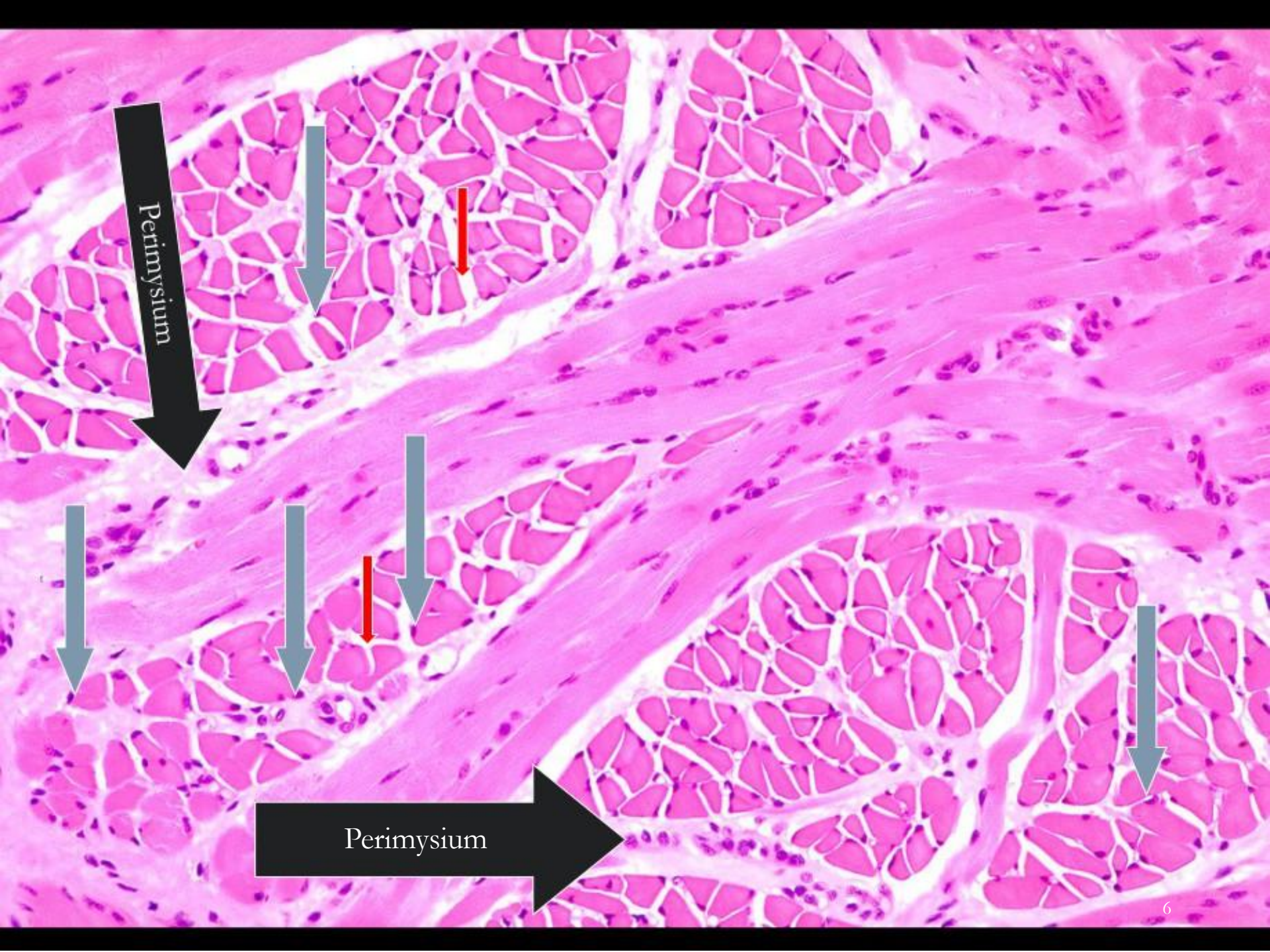
Comparison of the 3 types of muscles

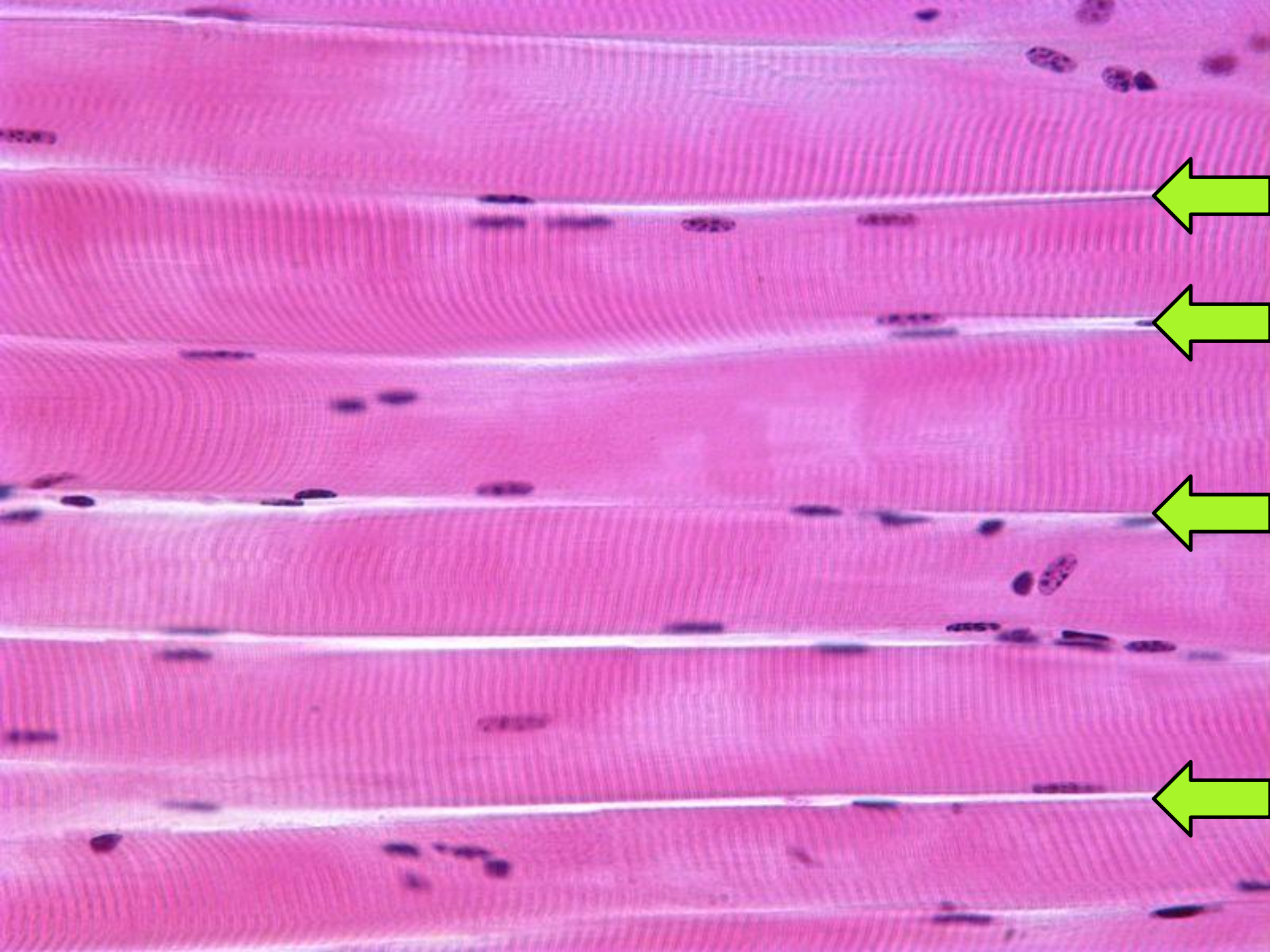
	Skeletal Muscle	Cardiac Muscle	Smooth Muscle
Sarcomere	Yes	Yes	No
Nuclei	Multinucleated, peripherally located	1 or 2 centrally located	One, centrally located
Sarcoplasmic Reticulum	Well developed with terminal cisterna	Poorly defined, some small terminals	Some sER (not involved in calcium storage)
T Tubule	Yes: involved in triad formation	Yes: involved in diad formation	No
Cell Junctions	No	Intercalated disks	Nexus (gap junctions)
Contraction	Voluntary “all or none”	Involuntary: rhythmic and spontaneous	Involuntary: slow and forceful
Calcium Binding	Troponin C	Troponin C	Calmodulin
Regeneration	Limited, via satellite cells	No-very poor	Yes, via mitosis
Nerve Fibres	Somatic motor	Autonomic	Autonomic
Connective Tissue	Epimysium; perimysium and endomysium	Connective tissue sheaths and endomysium	Connective tissue sheaths and endomysium
Distinctive Features	Long, cylindrical, many peripheral nuclei	Branched cells, intercalated disks, central nucleus	Fusiform cells, no striations, central nucleus

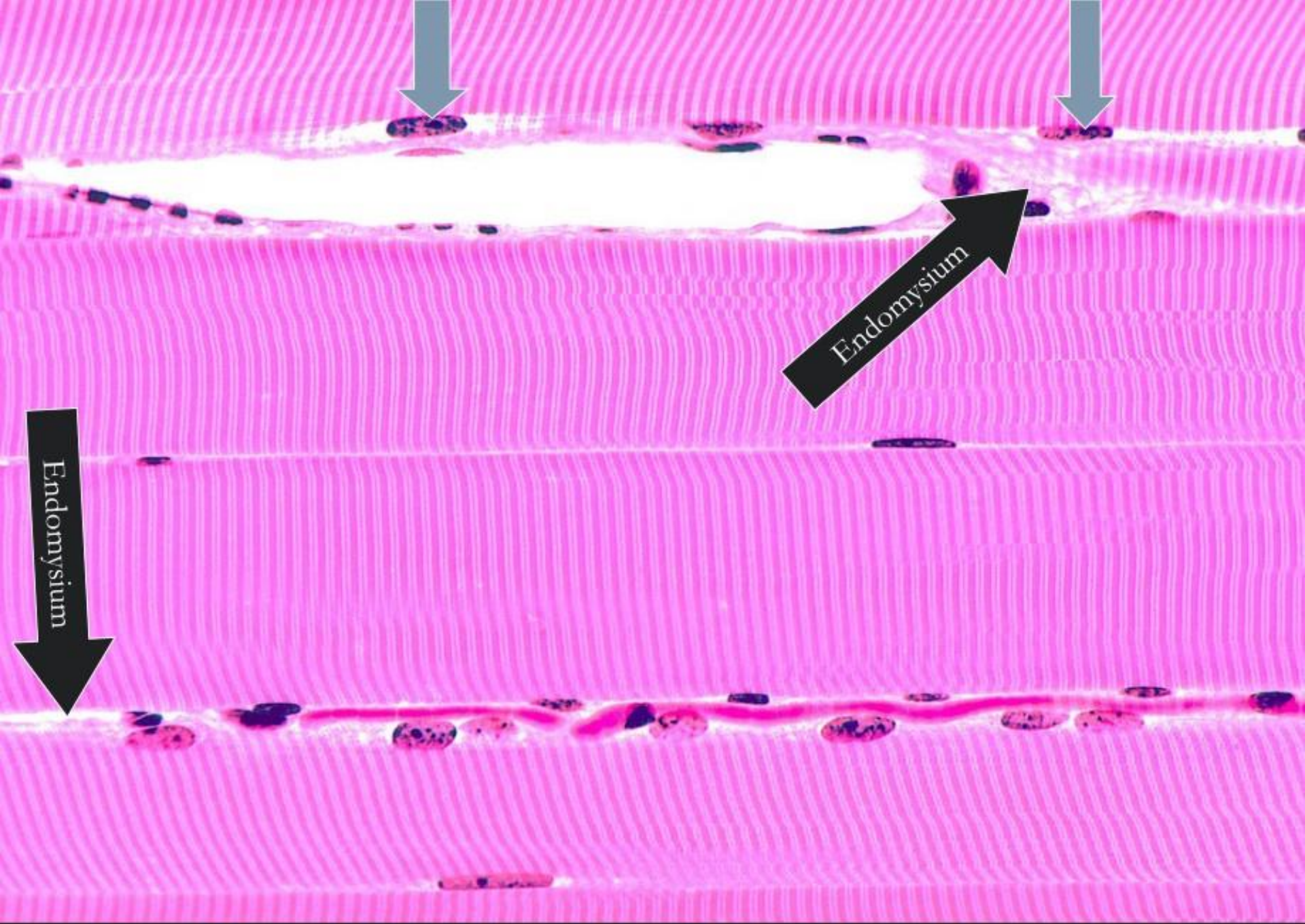
Skeletal muscle

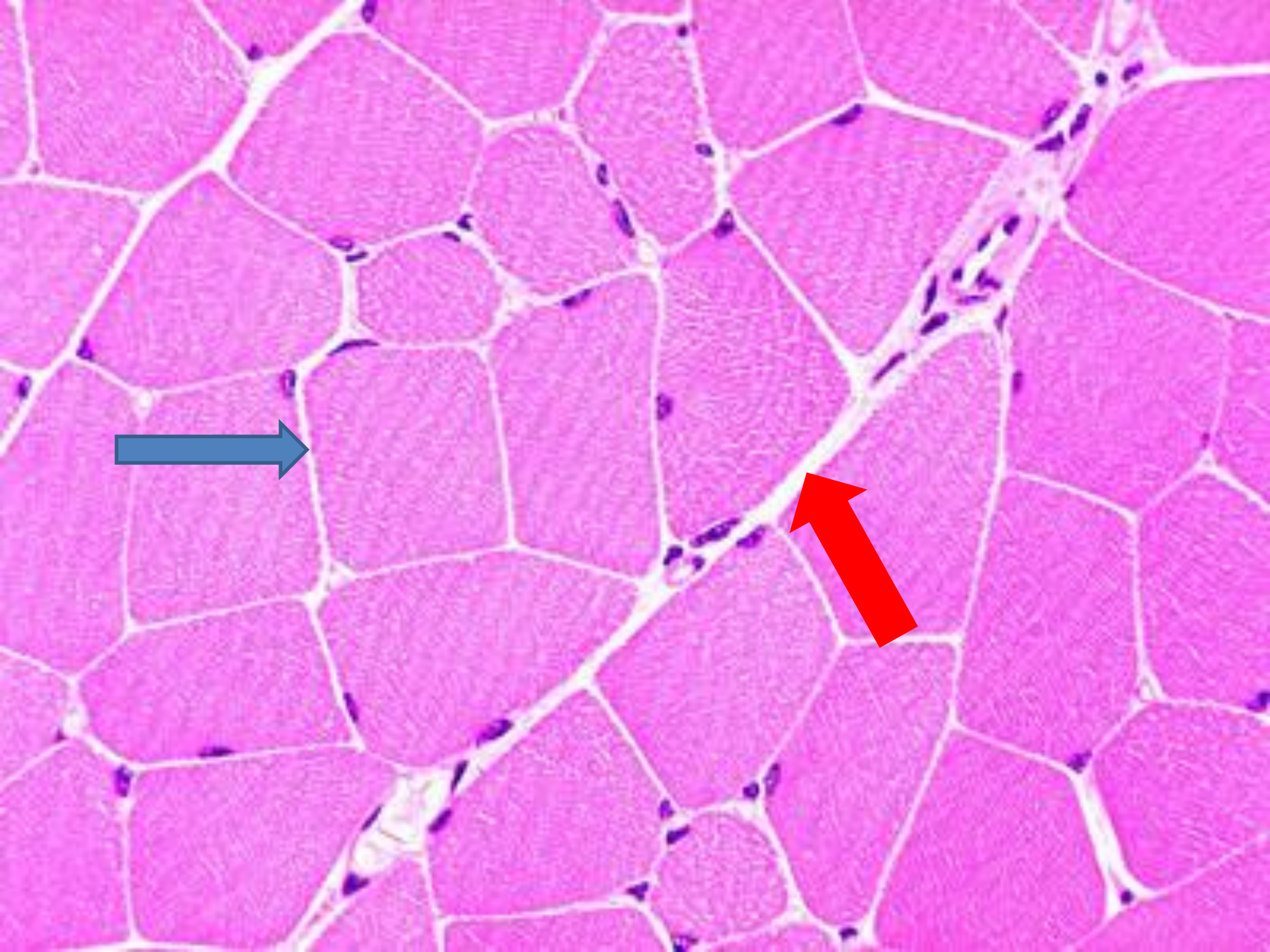


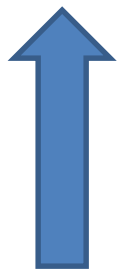
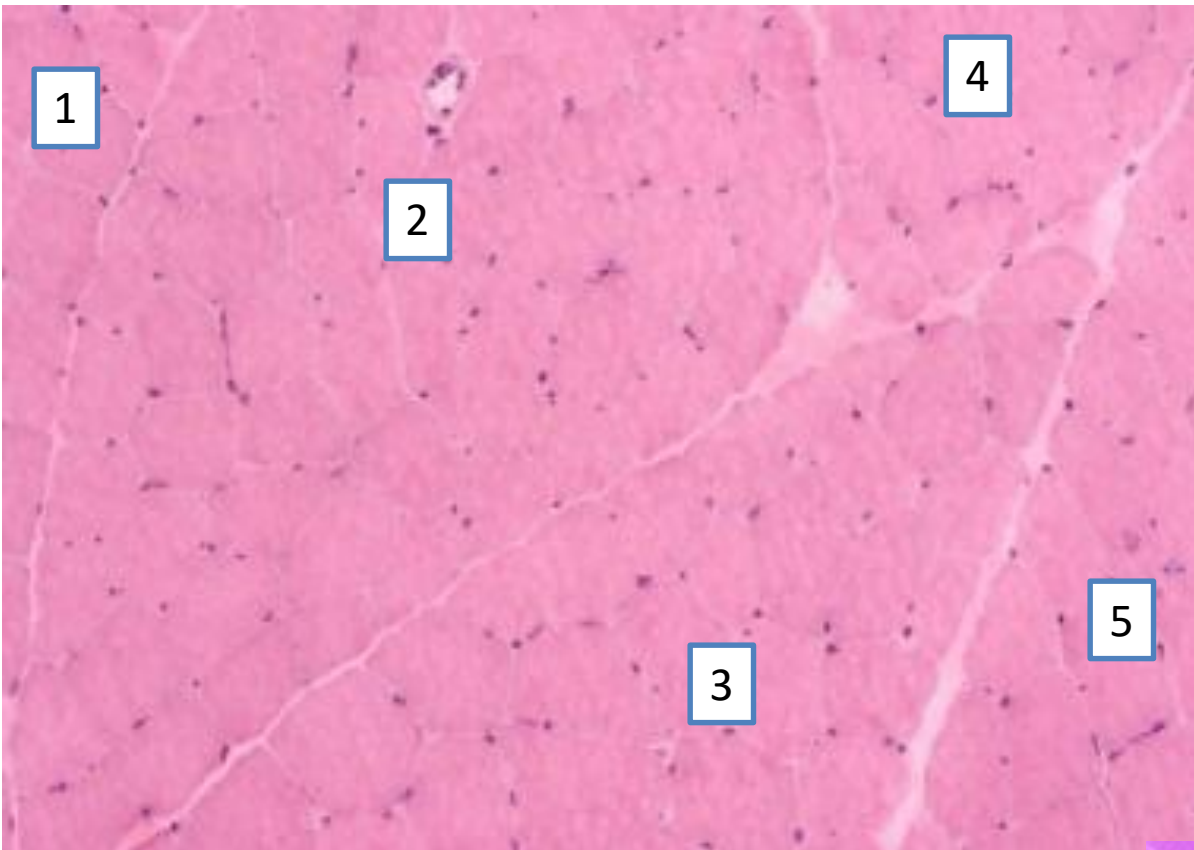




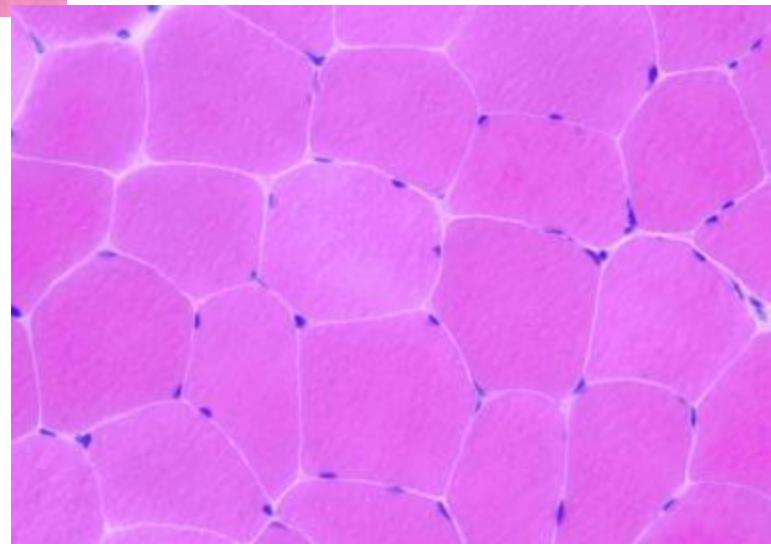


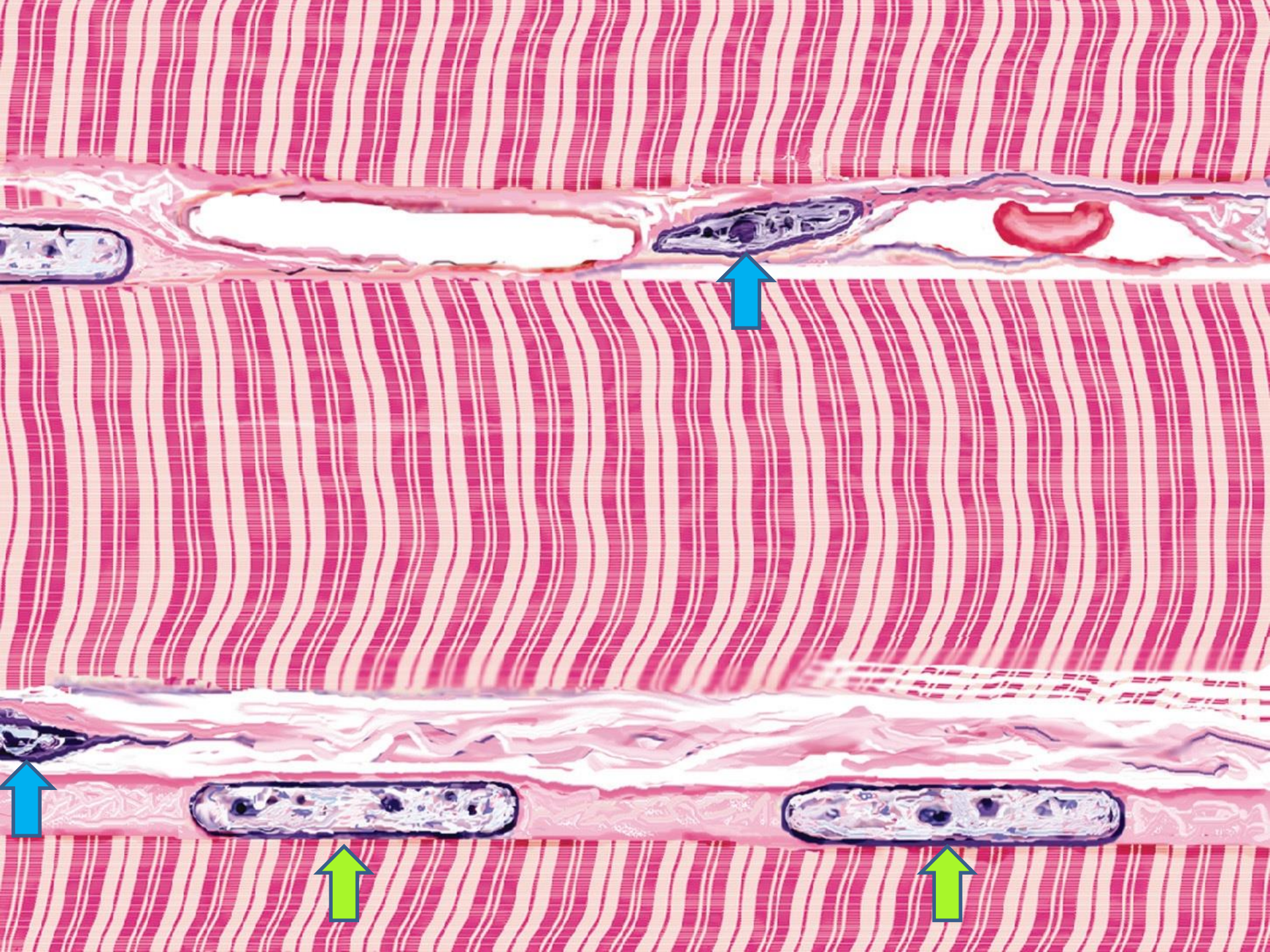


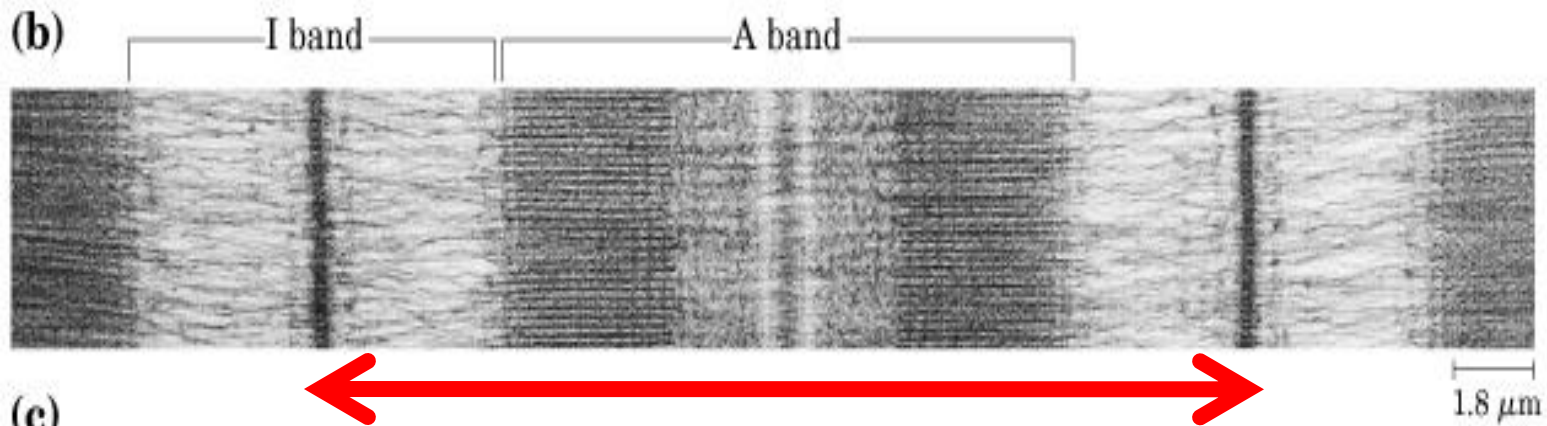




How many fascicles in this section??

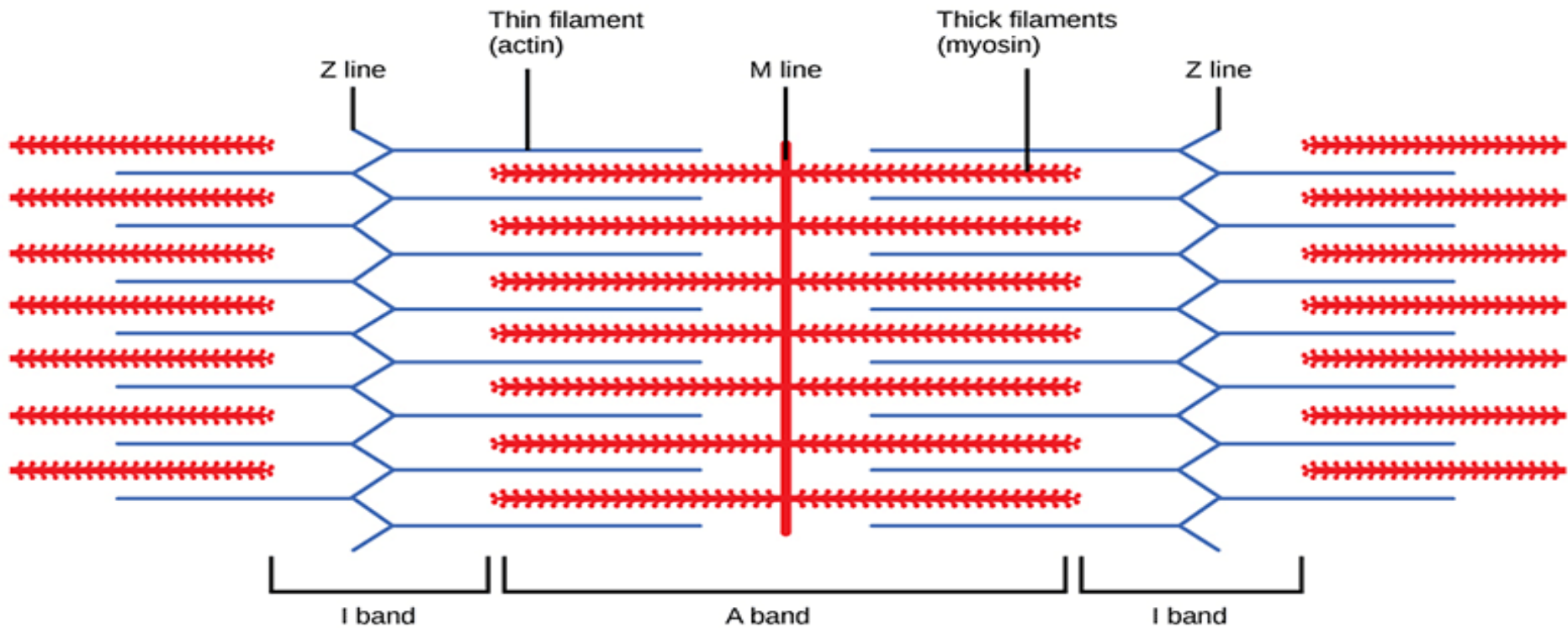


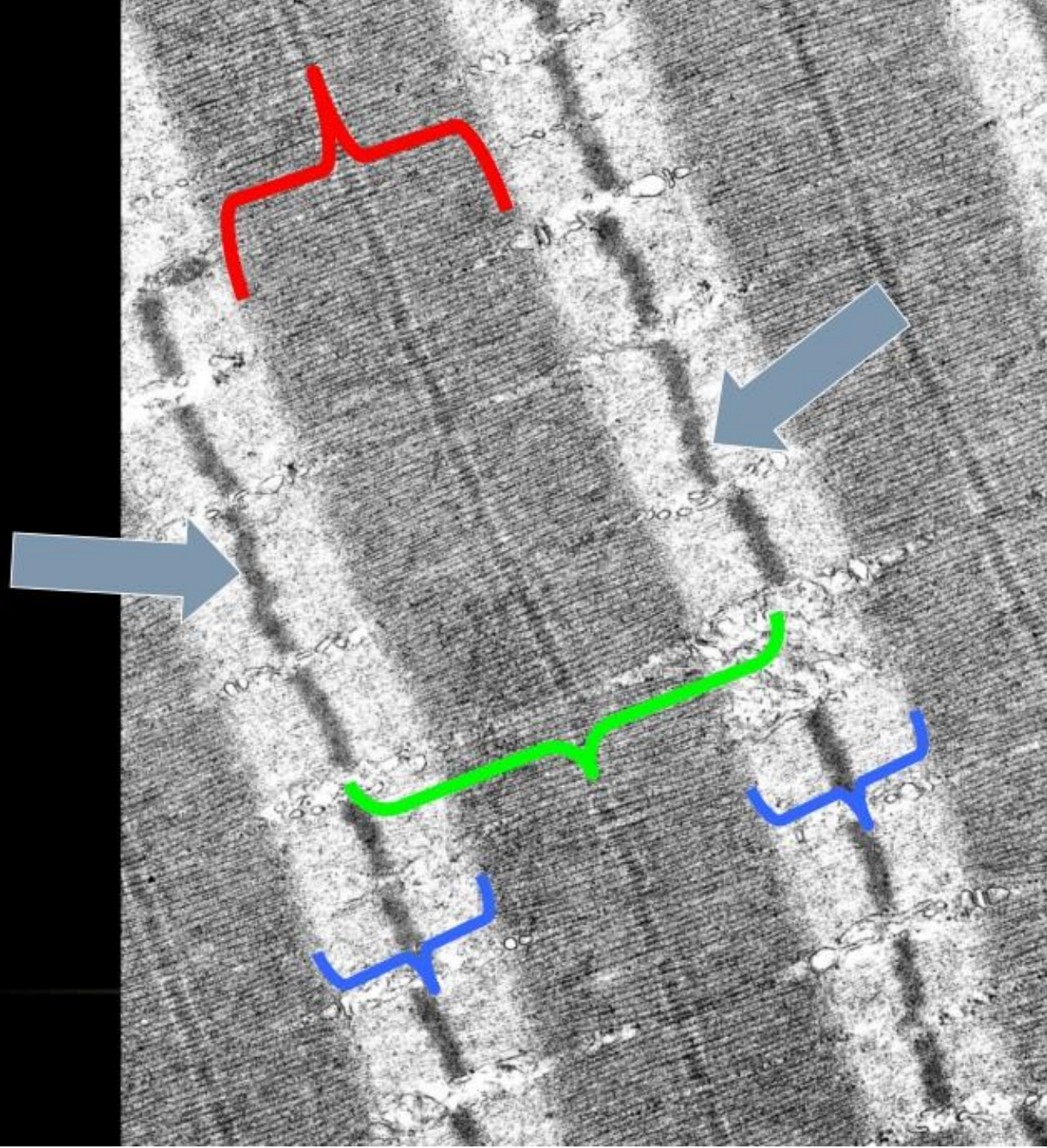


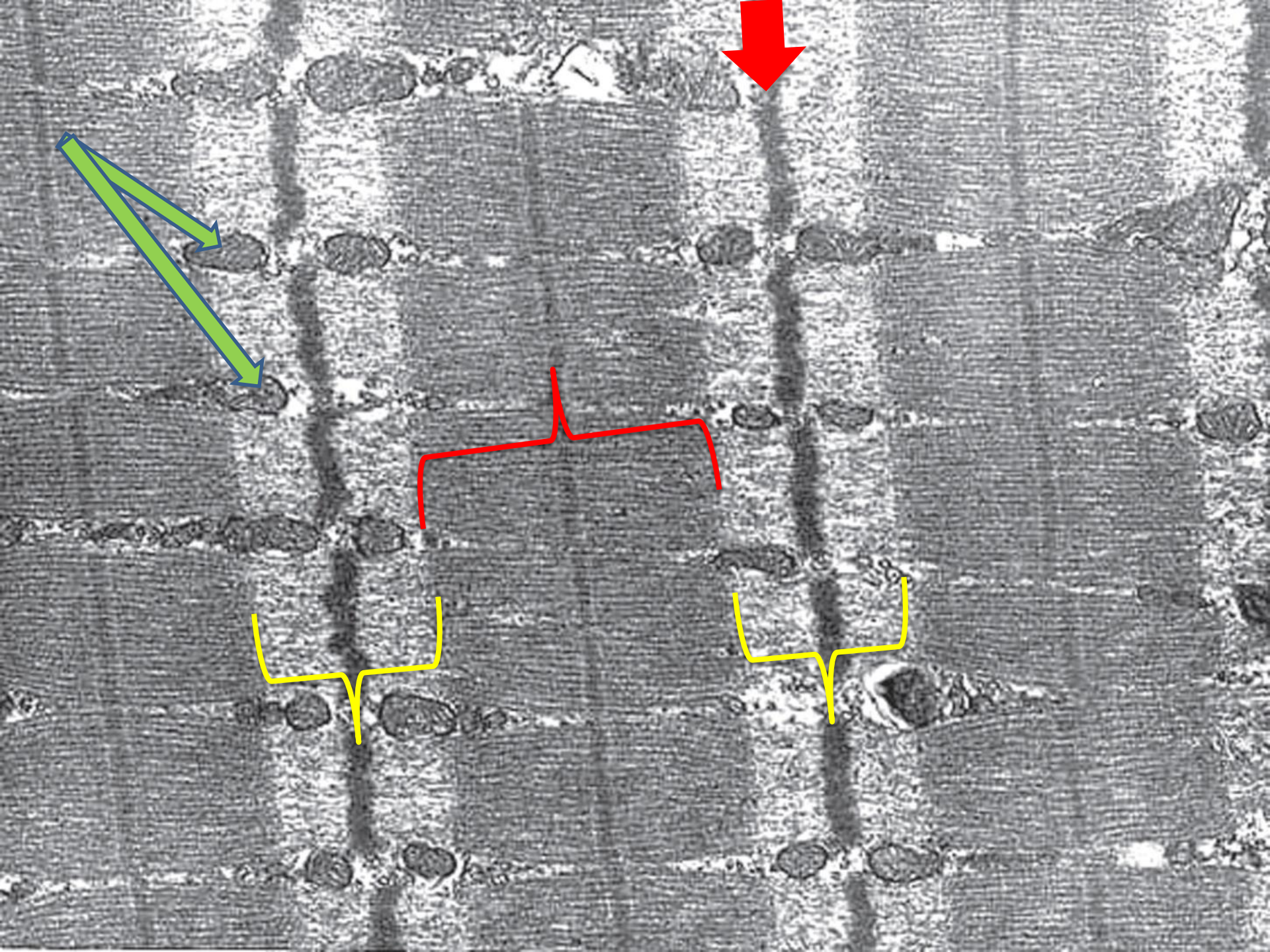


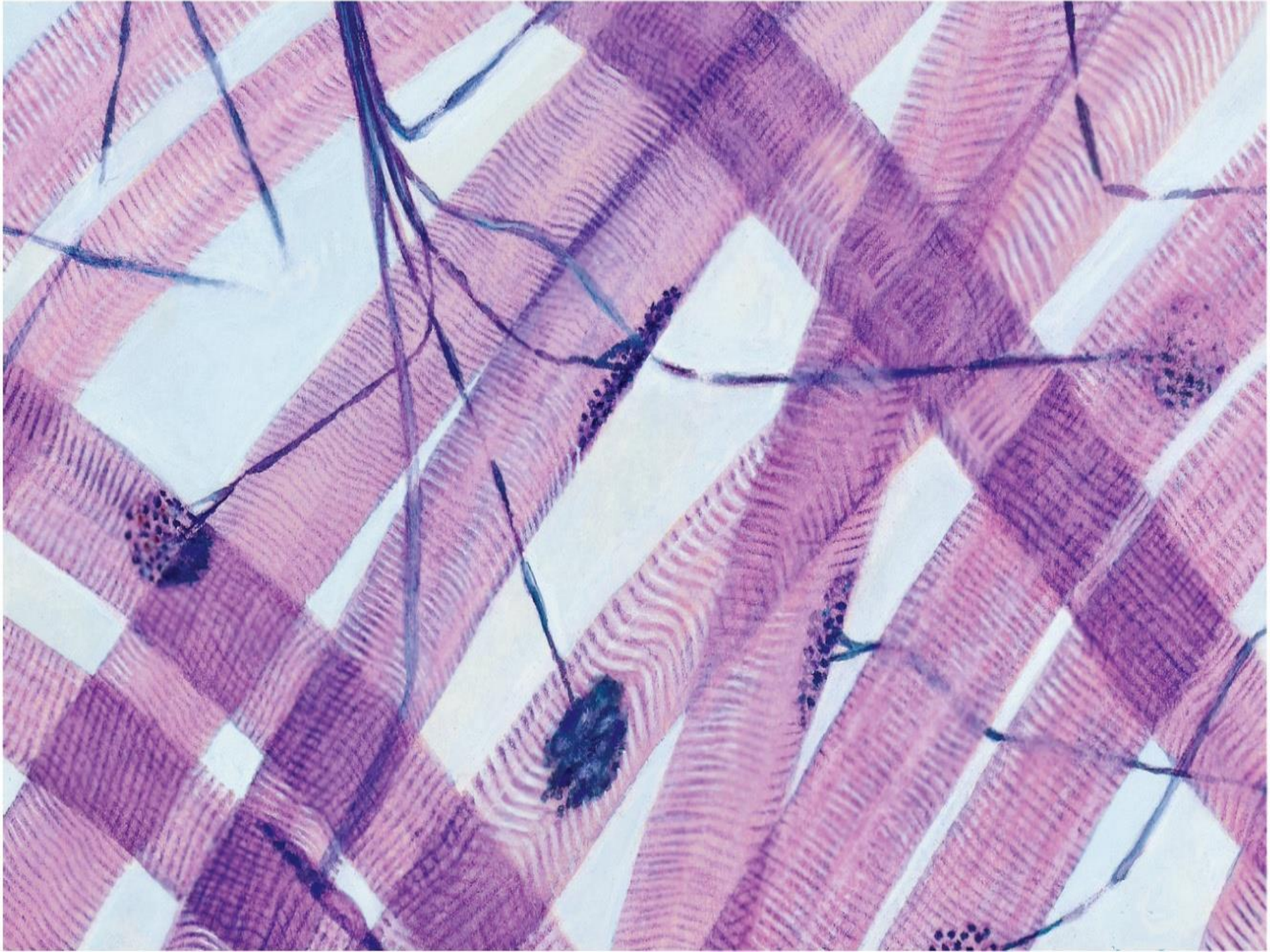
(c)

Sarcomere

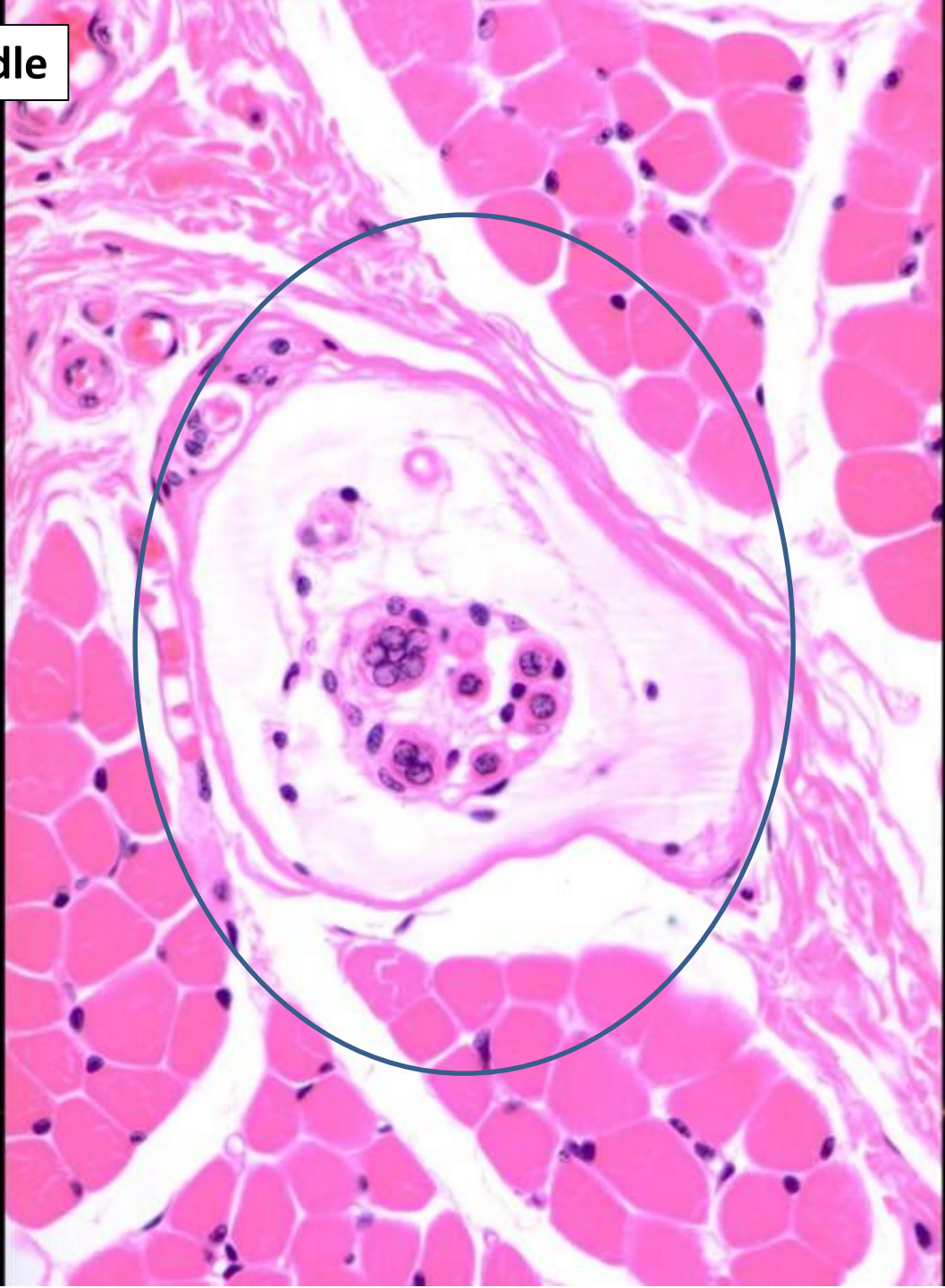


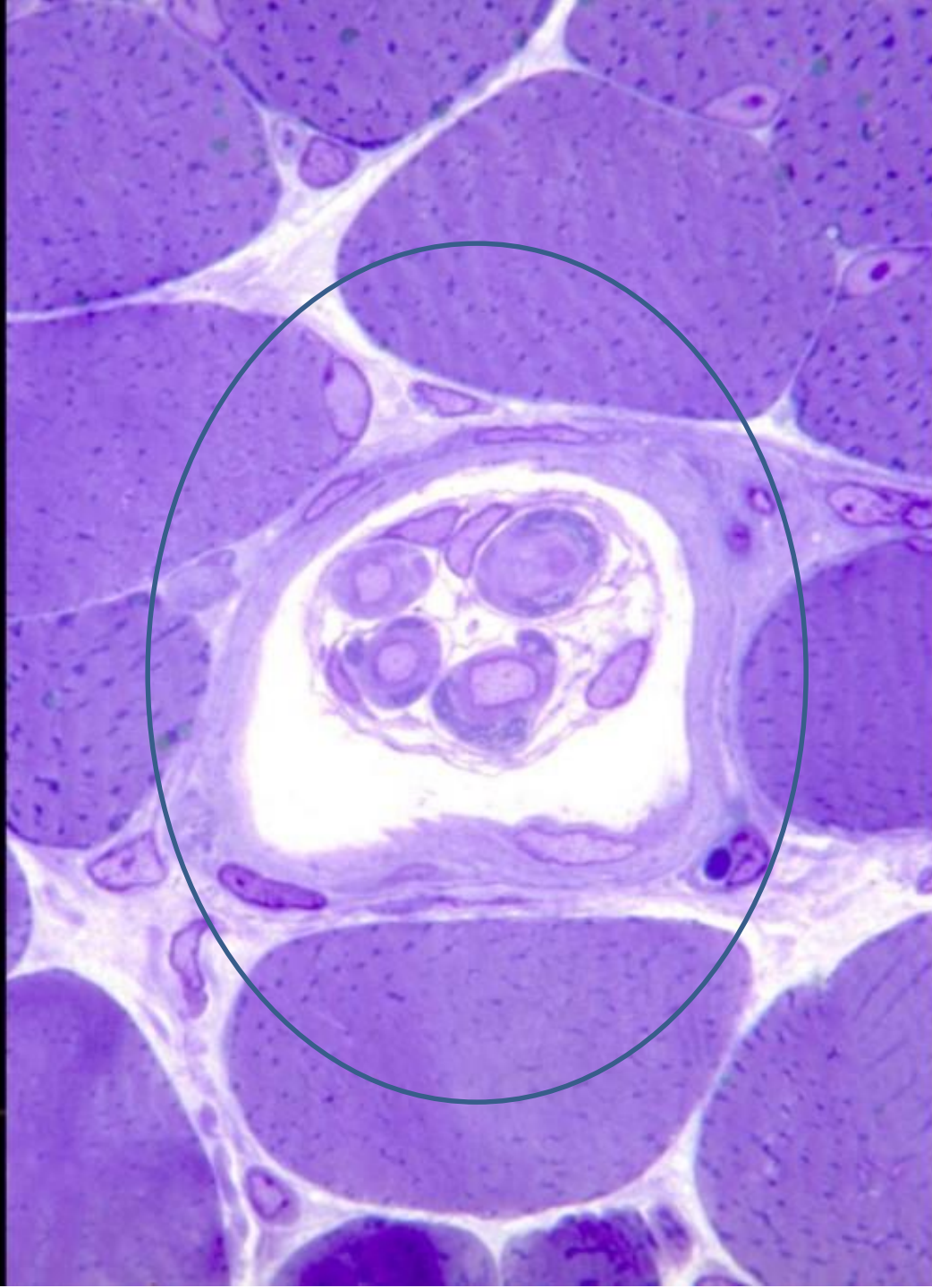




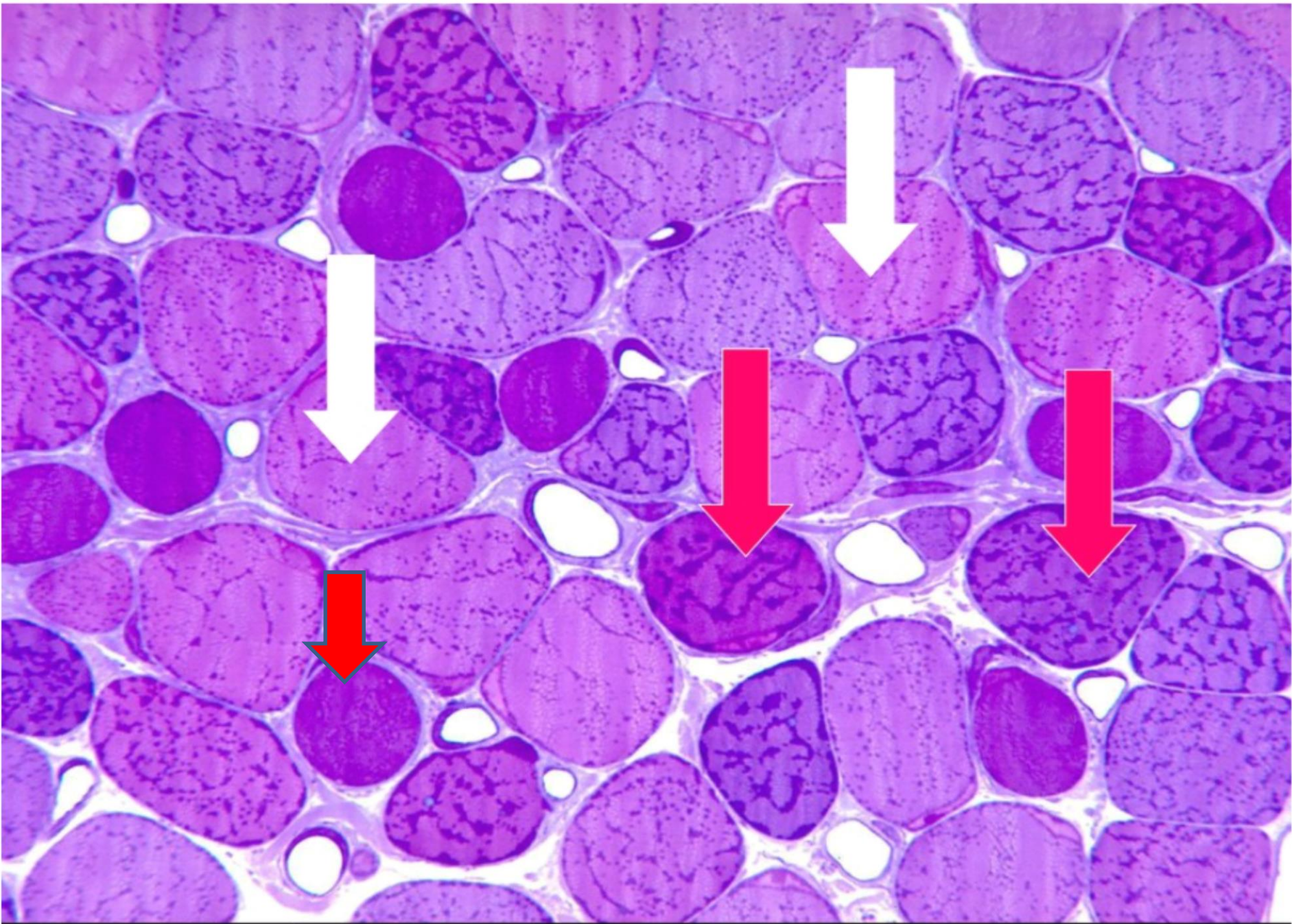


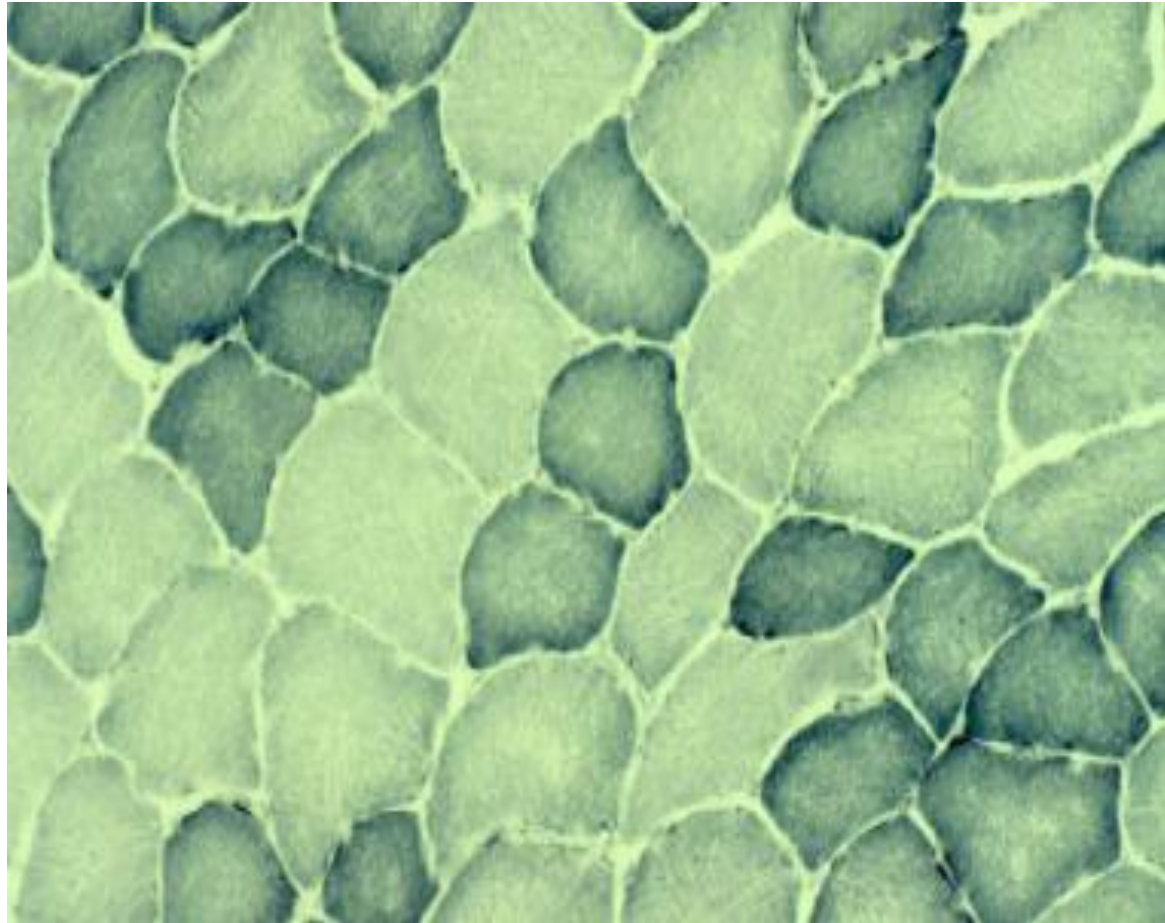
Muscle spindle



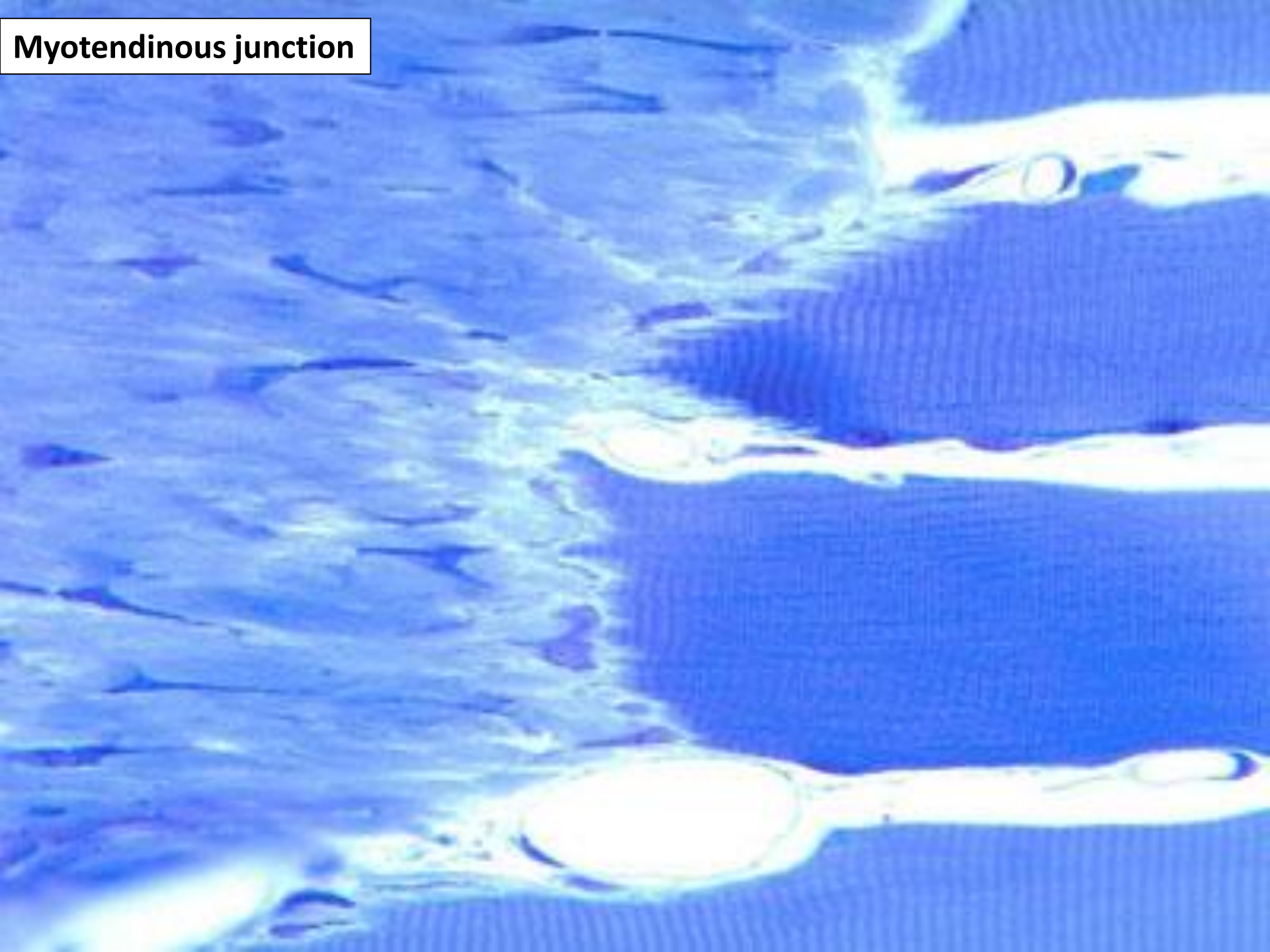


Characteristics	Type I	Type IIa	Type IIb
Vascularization	Rich	Rich	Poorer
Innervation	Small nerve fibres	Intermediate	Larger nerve fibres
Fibre Diameter	Smaller	Intermediate	Larger
Contraction	Slow, repetitive, weak (soleus, muscles of the back)	Fast (leg muscles)	Fast, strong (extra-ocular muscles)
Fatiguability	Difficult	Intermediate	Easy
Sarcoplasmic reticulum	Not extensive	Intermediate	Extensive
Mitochondria	Rich	Rich	Few
Myoglobin	Rich	Rich	Poor
Glycogen content	Low	Intermediate	High
ATPase activity	Low	High	High
Major source of ATP	Oxidative phosphorylation	Oxidative phosphorylation	Anaeorbic glycolysis



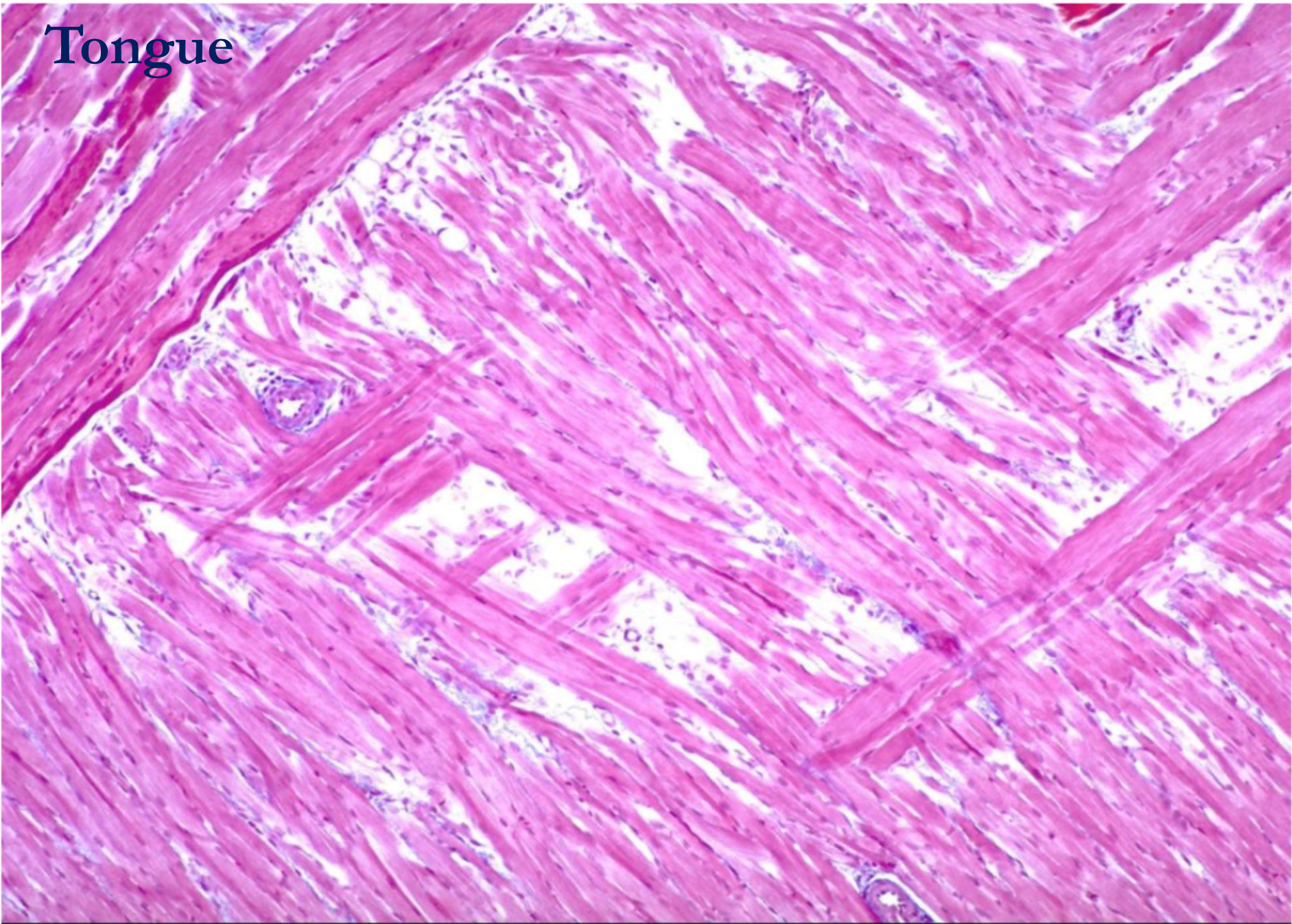


Myotendinous junction

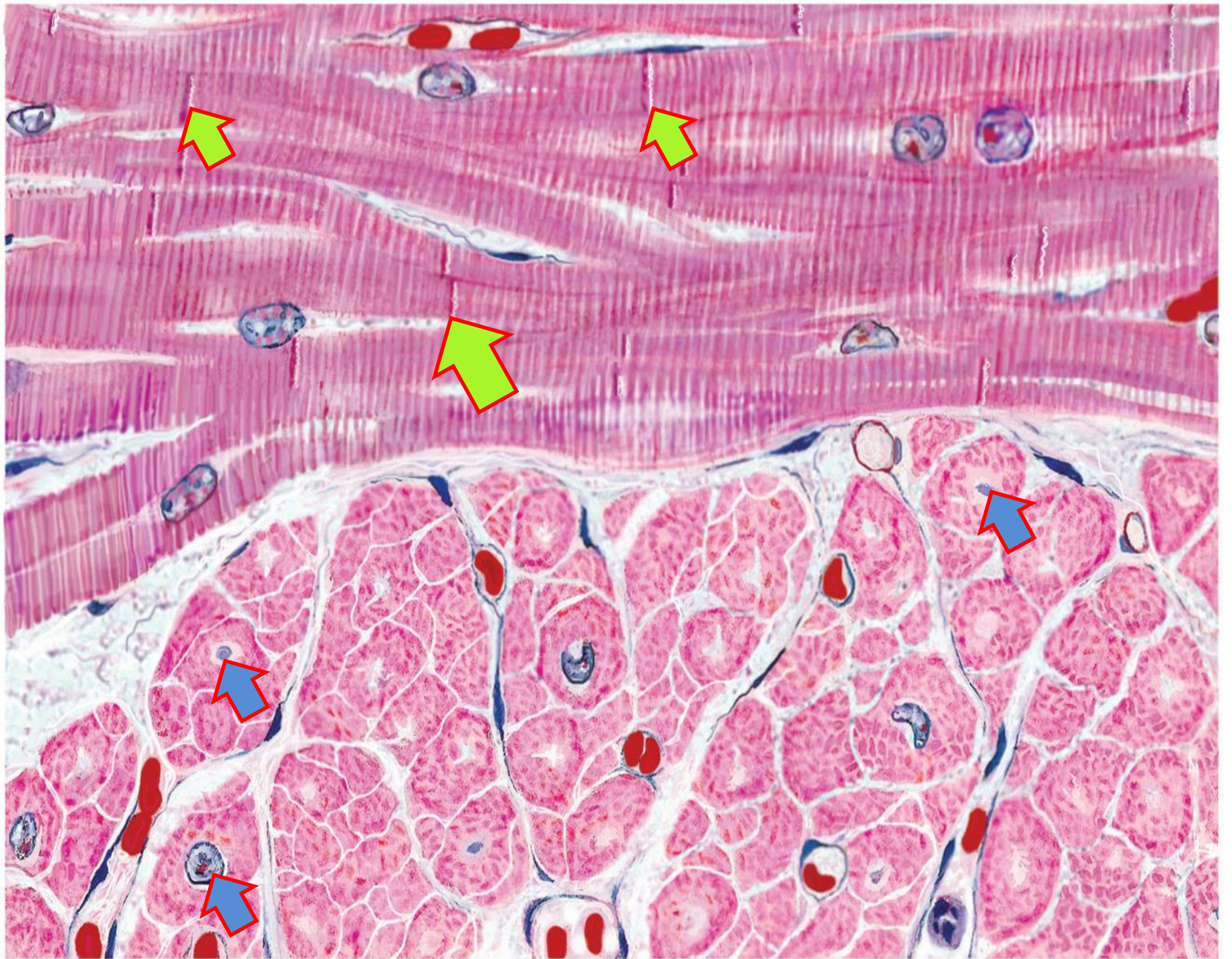


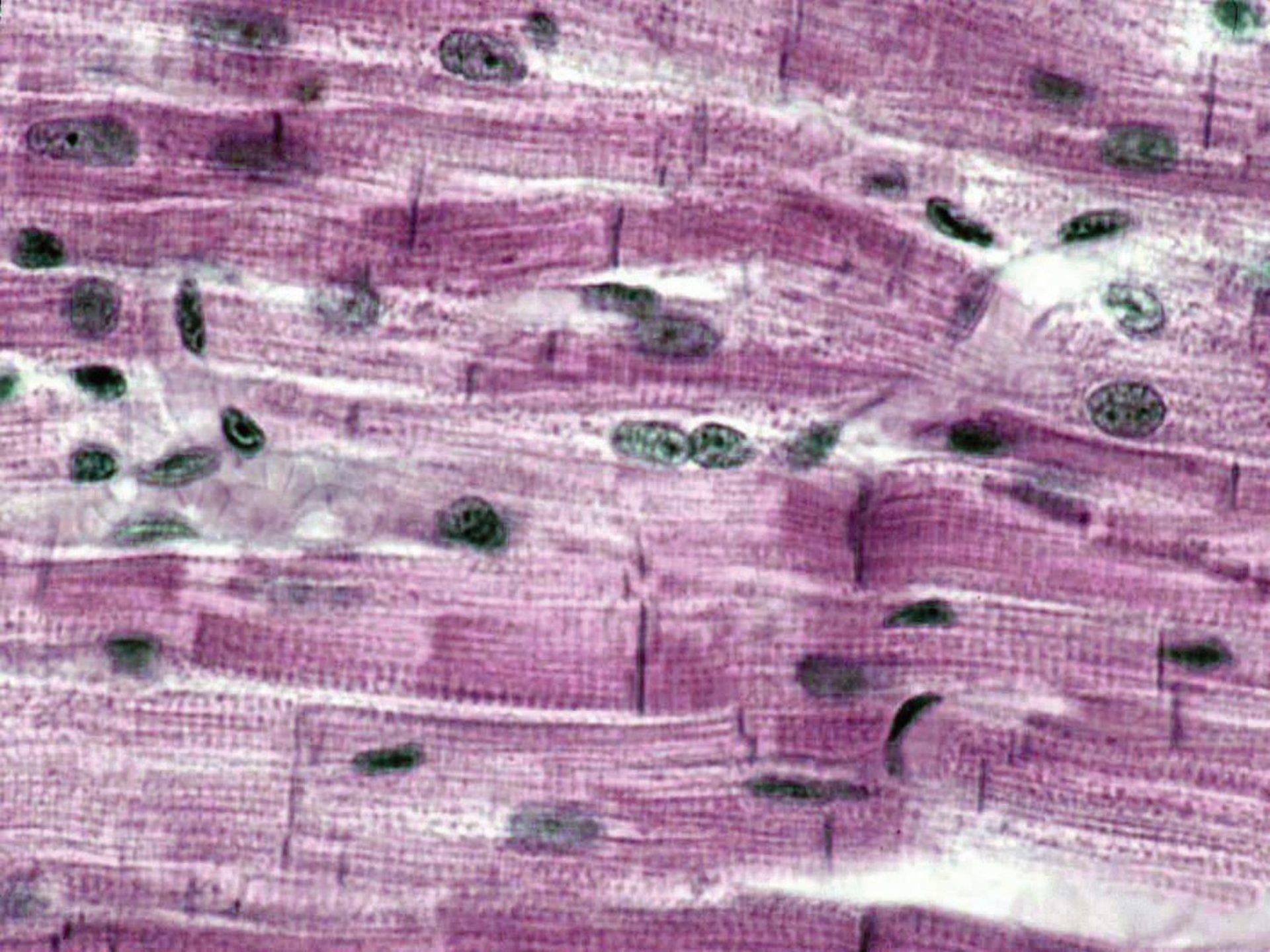


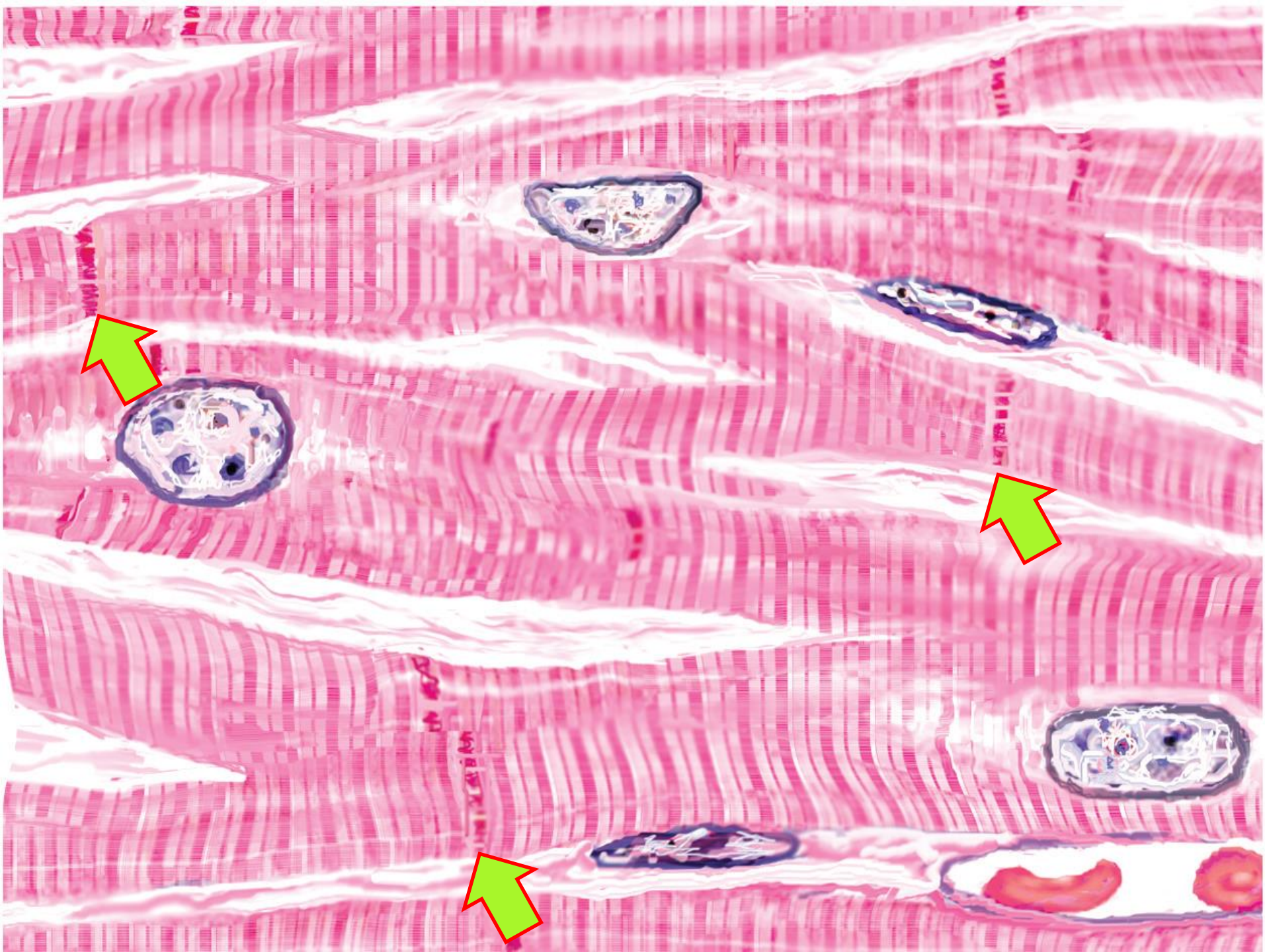
Tongue

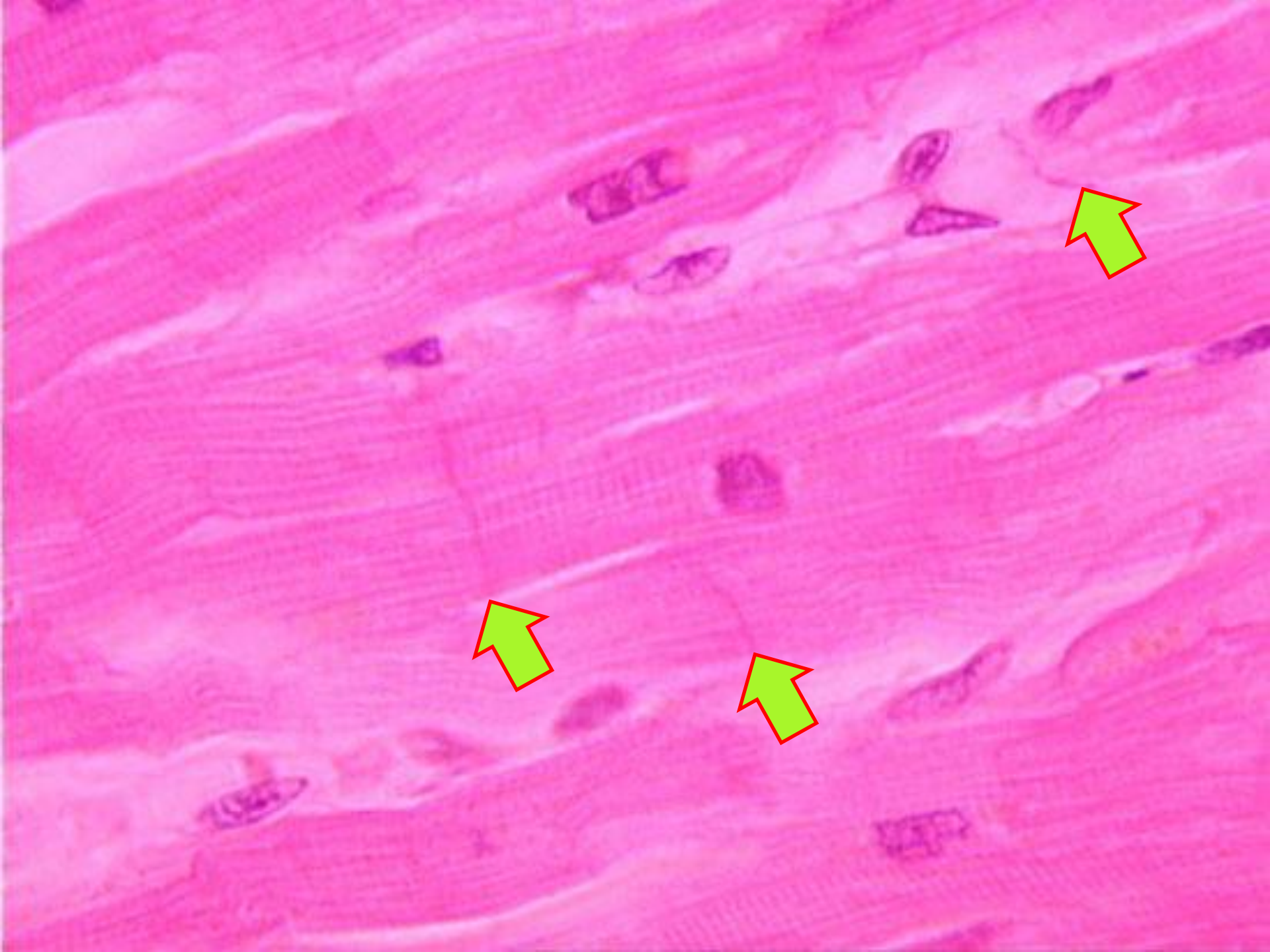


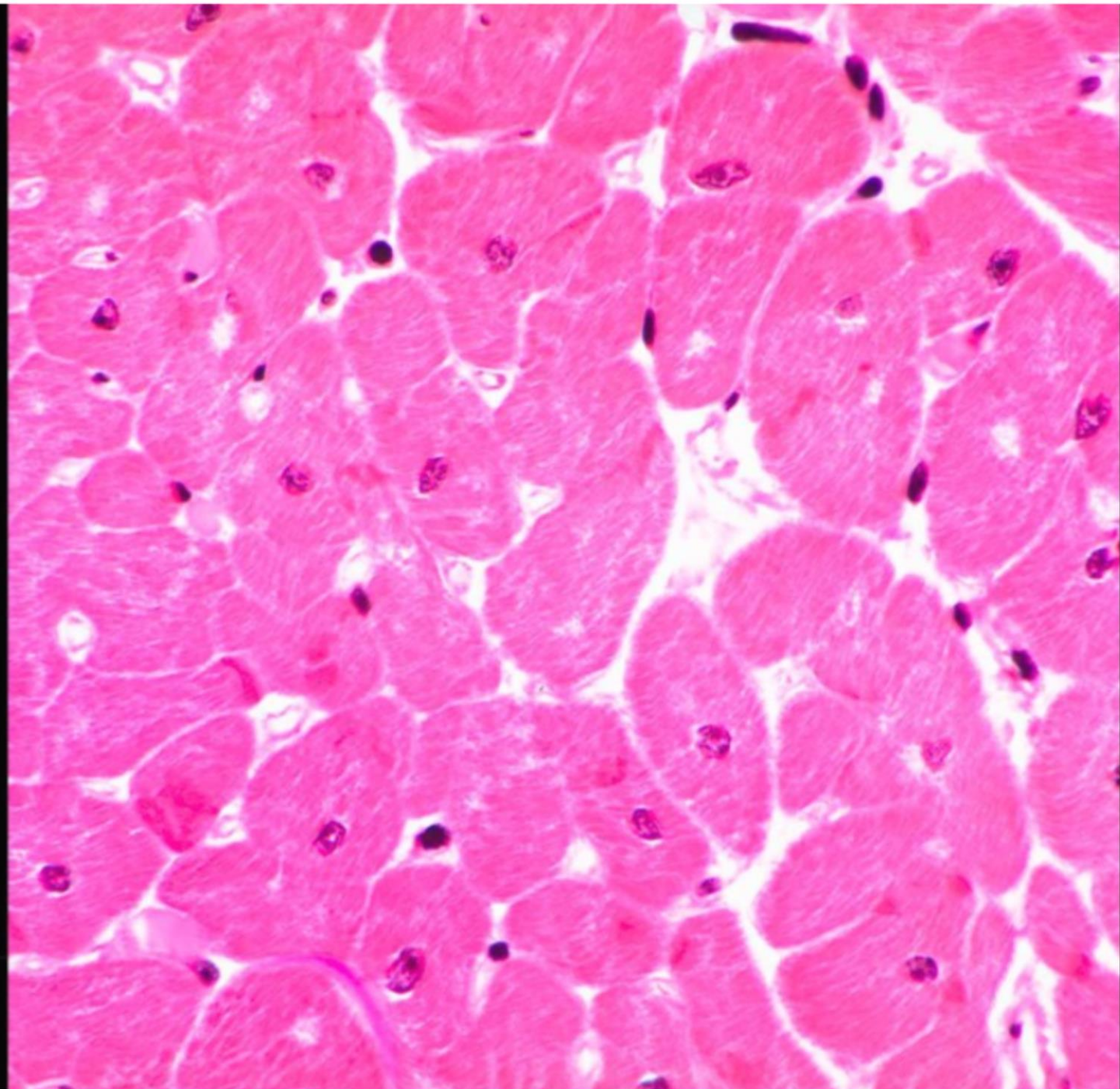
Cardiac muscle

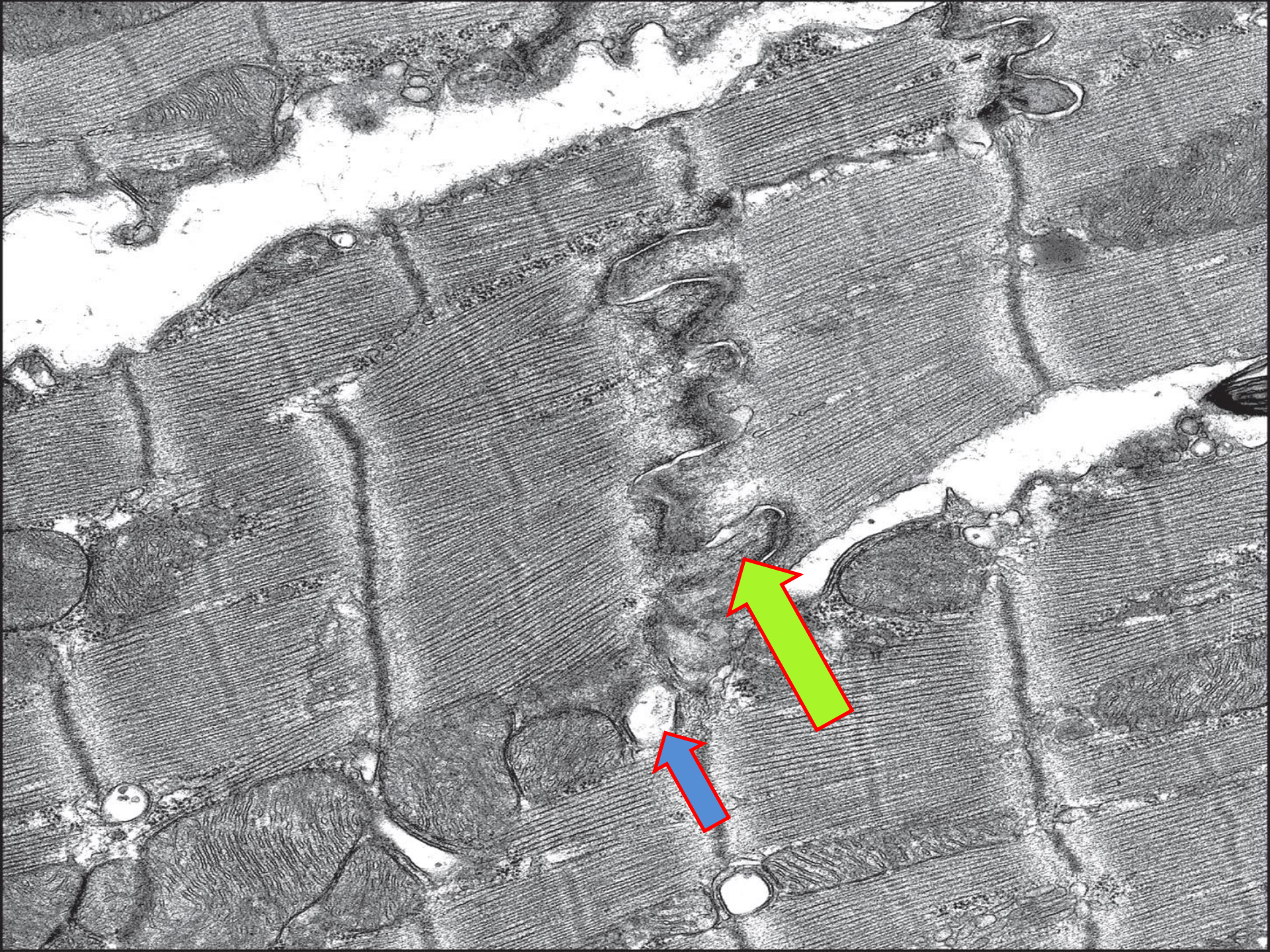


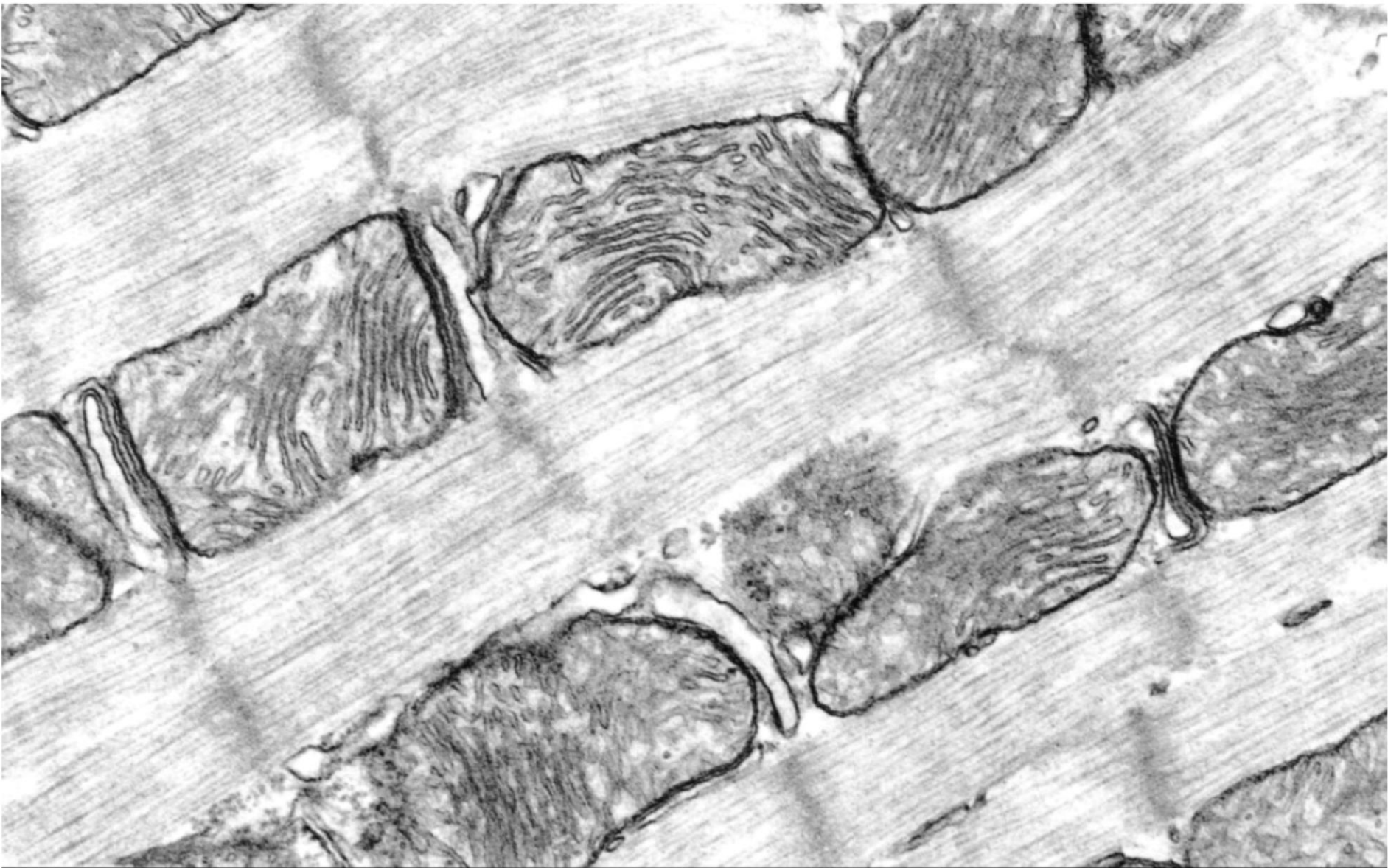


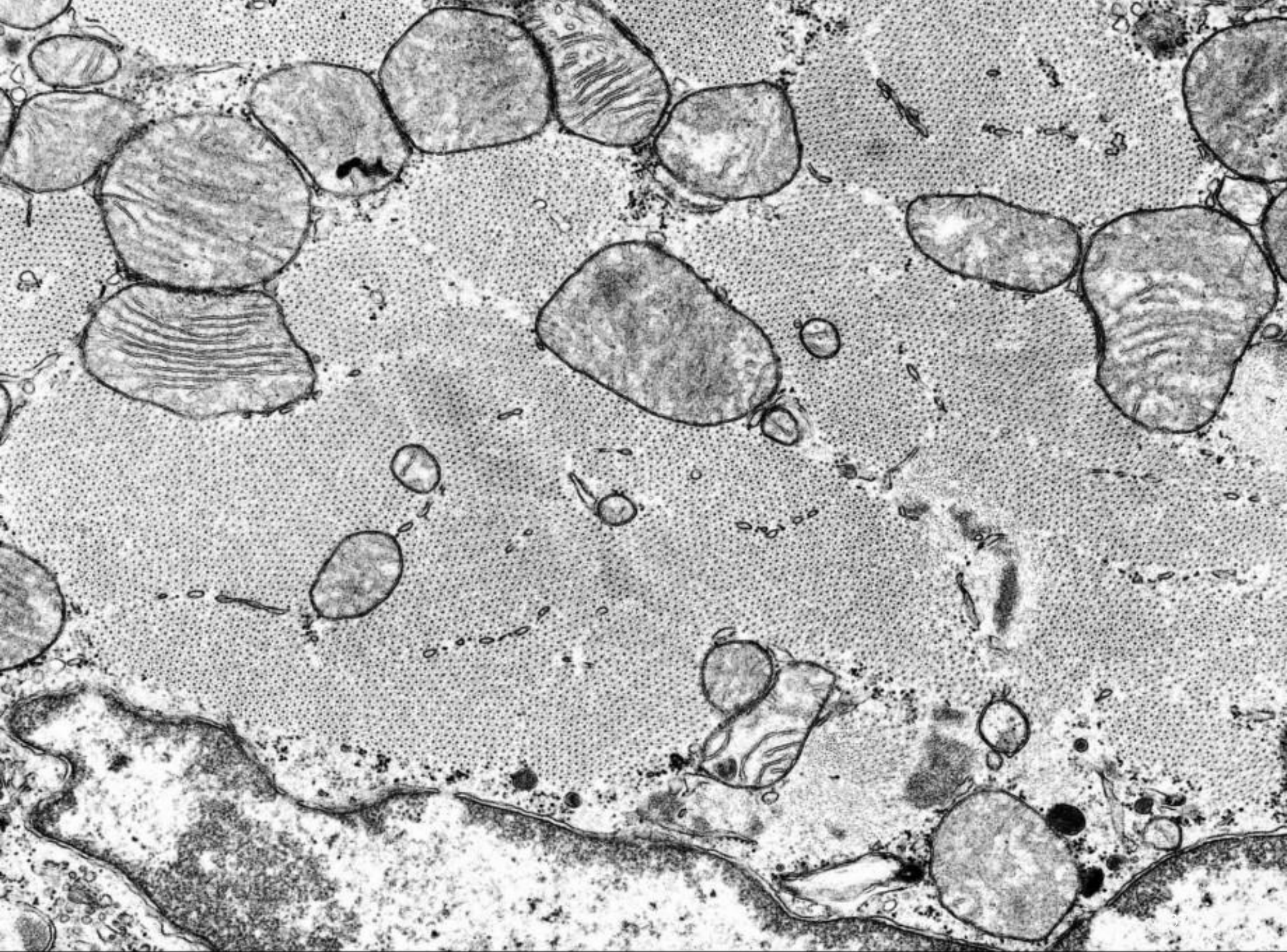












Smooth muscle

