BIOL 2401 Unit 3 Lab
Introduction to Muscle Tissue
Study Guide

Use this study guide to review the human muscle tissues for Lab Exam 3

Information in this study guide corresponds to the "Introduction to Muscle Tissue" section on the lab-exam review

Overview of Human Muscle Tissues

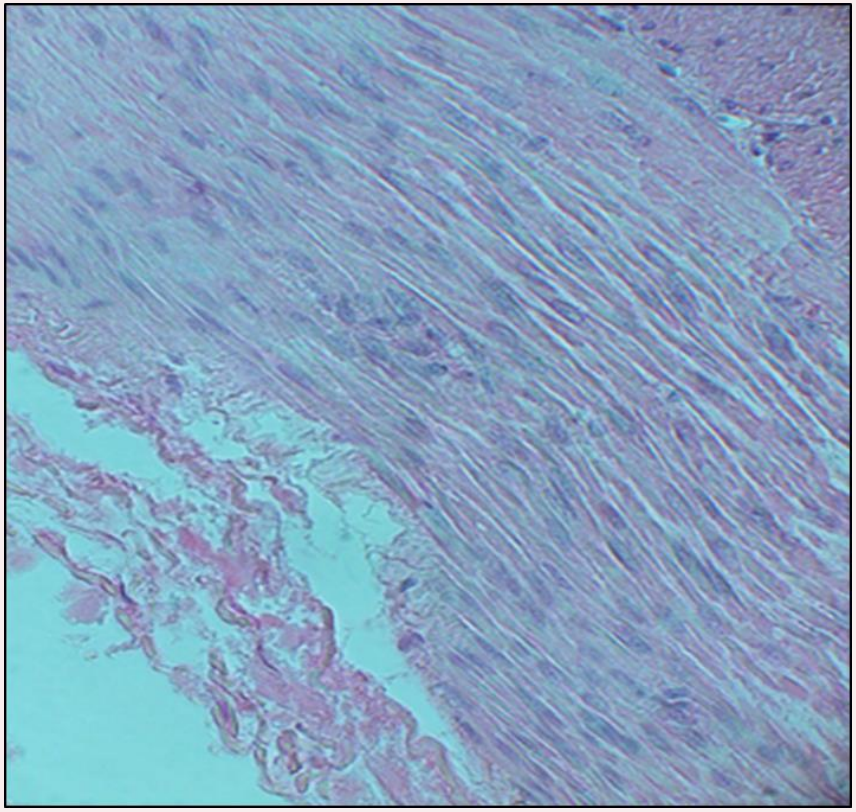
- *Muscle tissue types*
  - *Skeletal muscle tissue*
  - *Smooth muscle tissue*
  - *Cardiac muscle tissue*

- *Composed of elongated muscle cells called muscle fibers that specialize in contraction (movement)*

- *General functions include generating heat, generating force, and contracting to move body structures*

Smooth Muscle Tissue

Photomicrograph of smooth muscle tissue shown.



Involuntary (subconsciously-controlled) muscle tissue composed of non-striated muscle fibers

FUNCTIONS

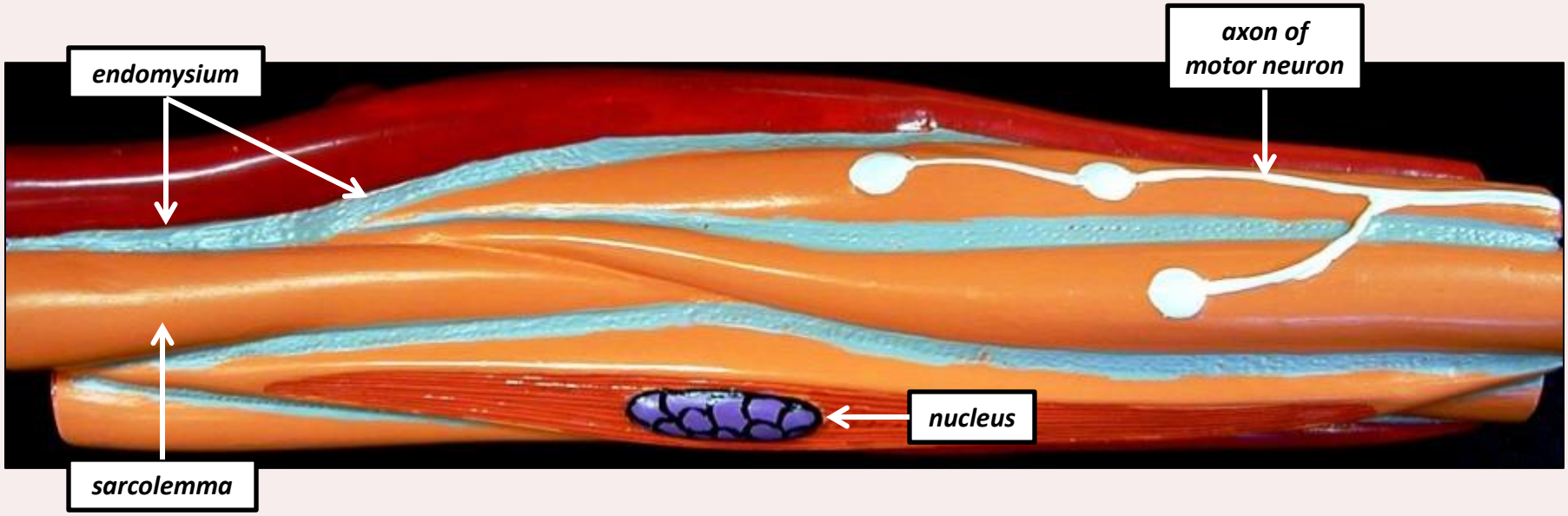
- *Contracts to move visceral organs*
- *Generates heat*
- *Generates force*

LOCATIONS

- *Blood vessels*
- *Bronchial tubes*
- *Digestive organs (i.e. esophagus, stomach, small intestine, and large intestine)*
- *Urinary bladder*
- *Uterus*
- *Male reproductive tract*

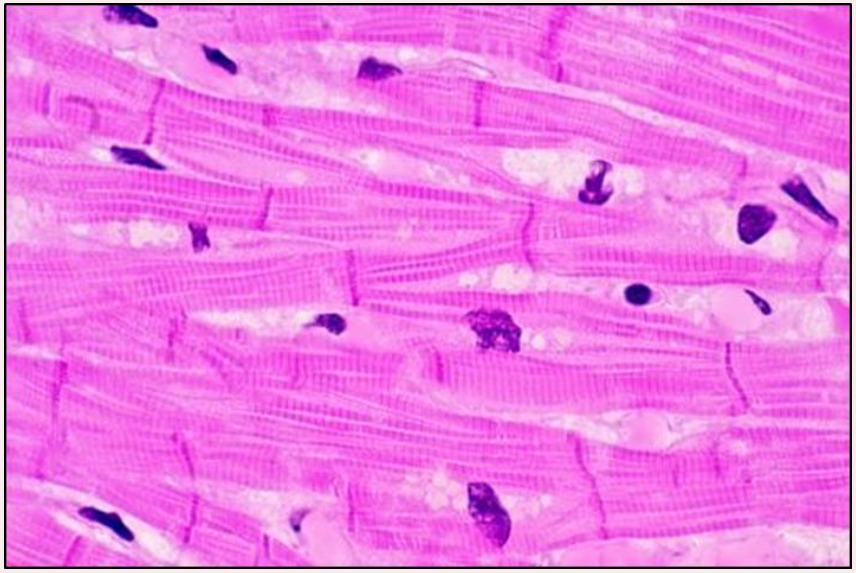
Smooth Muscle Tissue

Smooth muscle tissue model shown.



Cardiac Muscle Tissue

Photomicrograph of cardiac muscle tissue shown.



Involuntary (subconsciously-controlled) muscle tissue composed of striated muscle fibers

FUNCTIONS

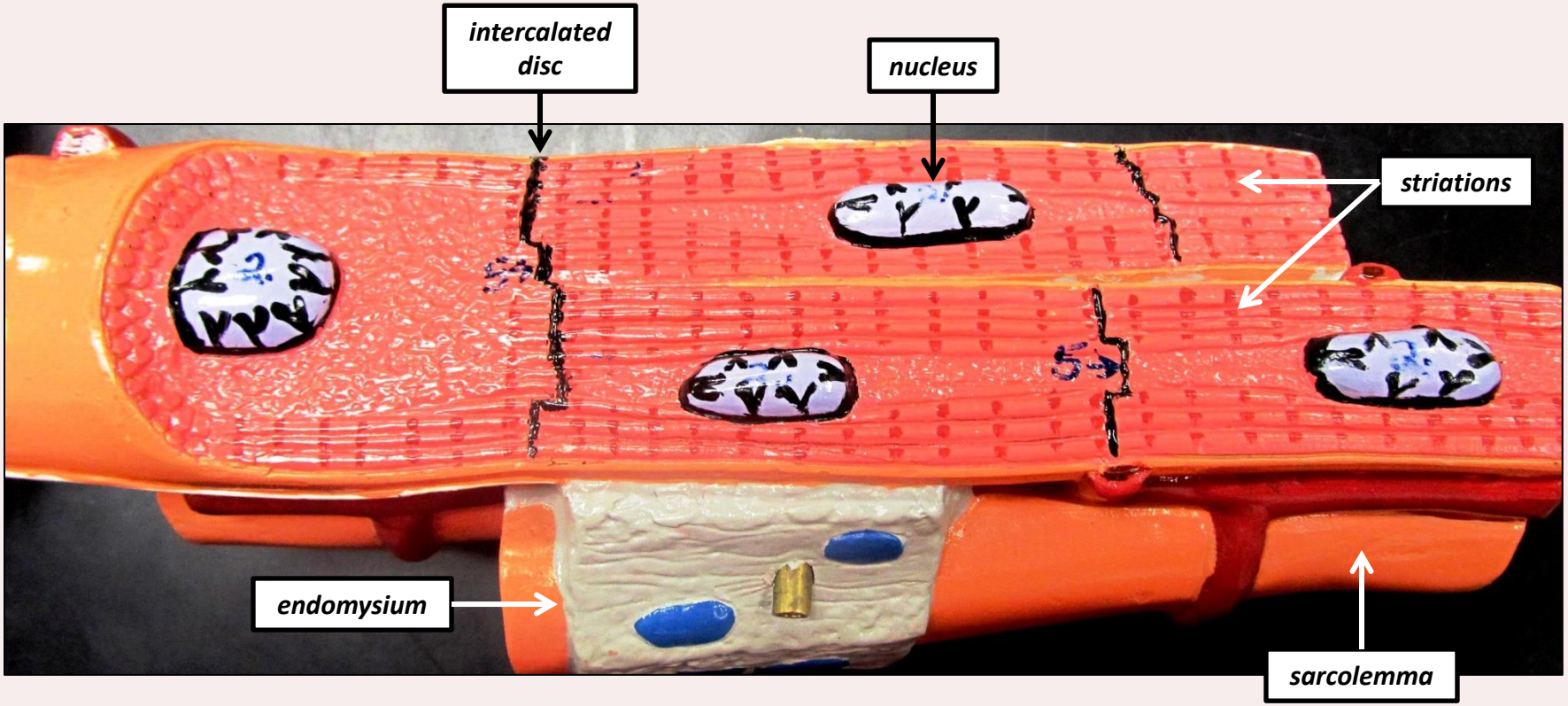
- *Contracts to allow heart to beat*
- *Generates heat*
- *Generates force*

LOCATION

- *Heart wall*

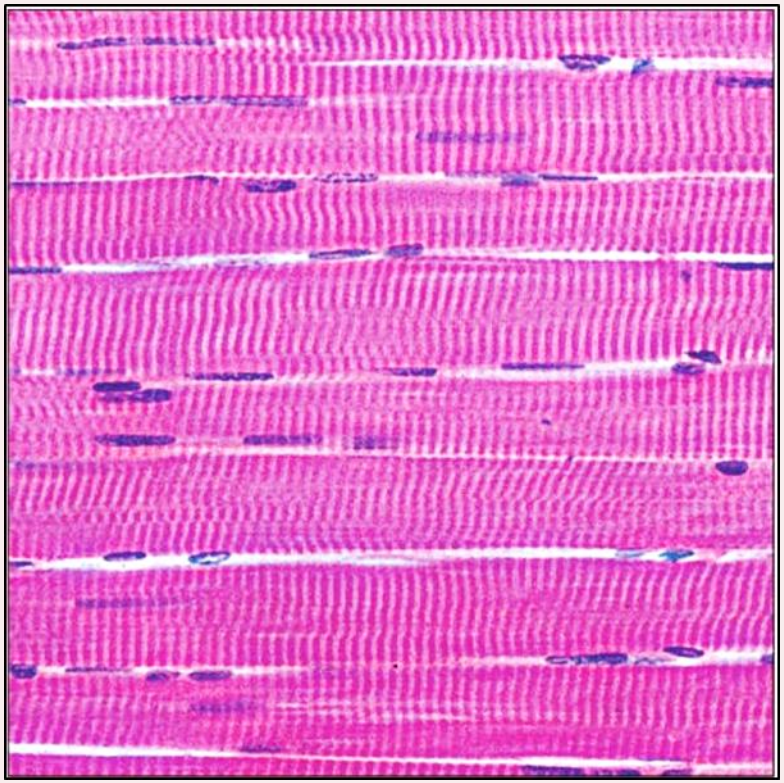
Cardiac Muscle Tissue

Frontal section of cardiac muscle tissue model shown.



Skeletal Muscle Tissue

Photomicrograph of skeletal muscle tissue shown.



Voluntary (consciously-controlled) muscle tissue composed of striated muscle fibers

FUNCTIONS

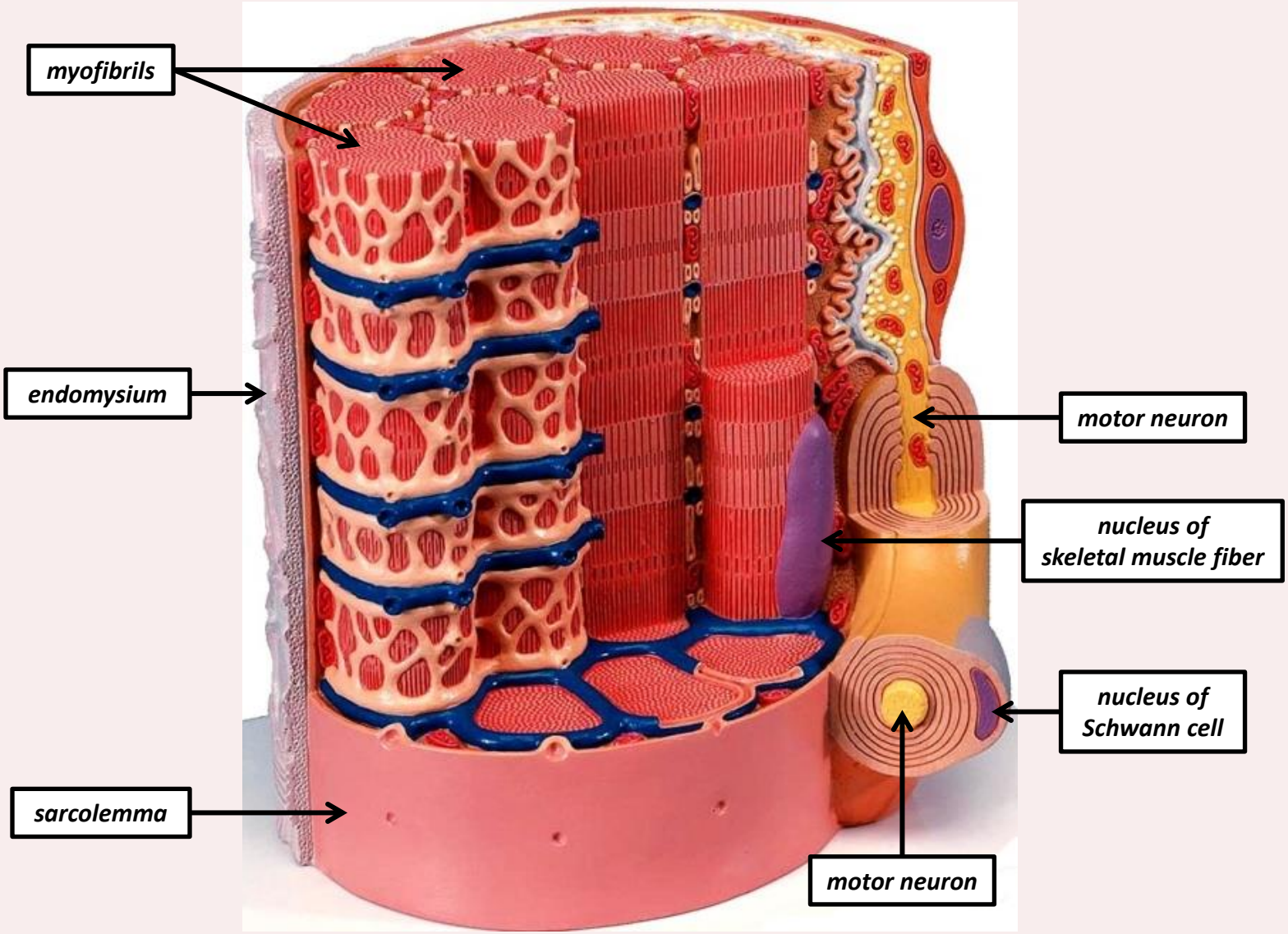
- *Contracts to move bones of the skeleton*
- *Generates heat*
- *Generates force*

LOCATION

- *Attached to bones of the skeleton*

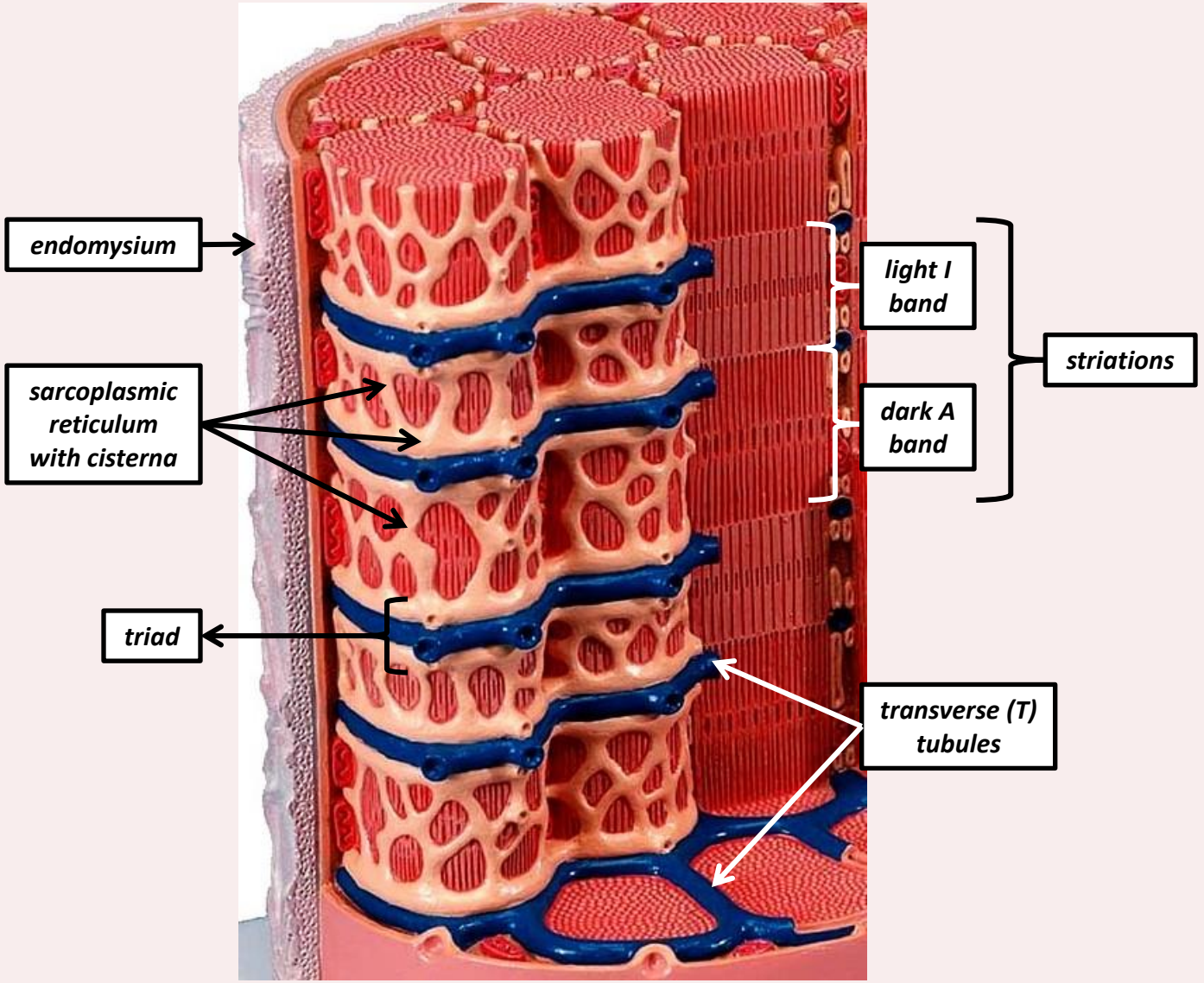
Neuromuscular Junction

Frontal section of neuromuscular junction model shown.



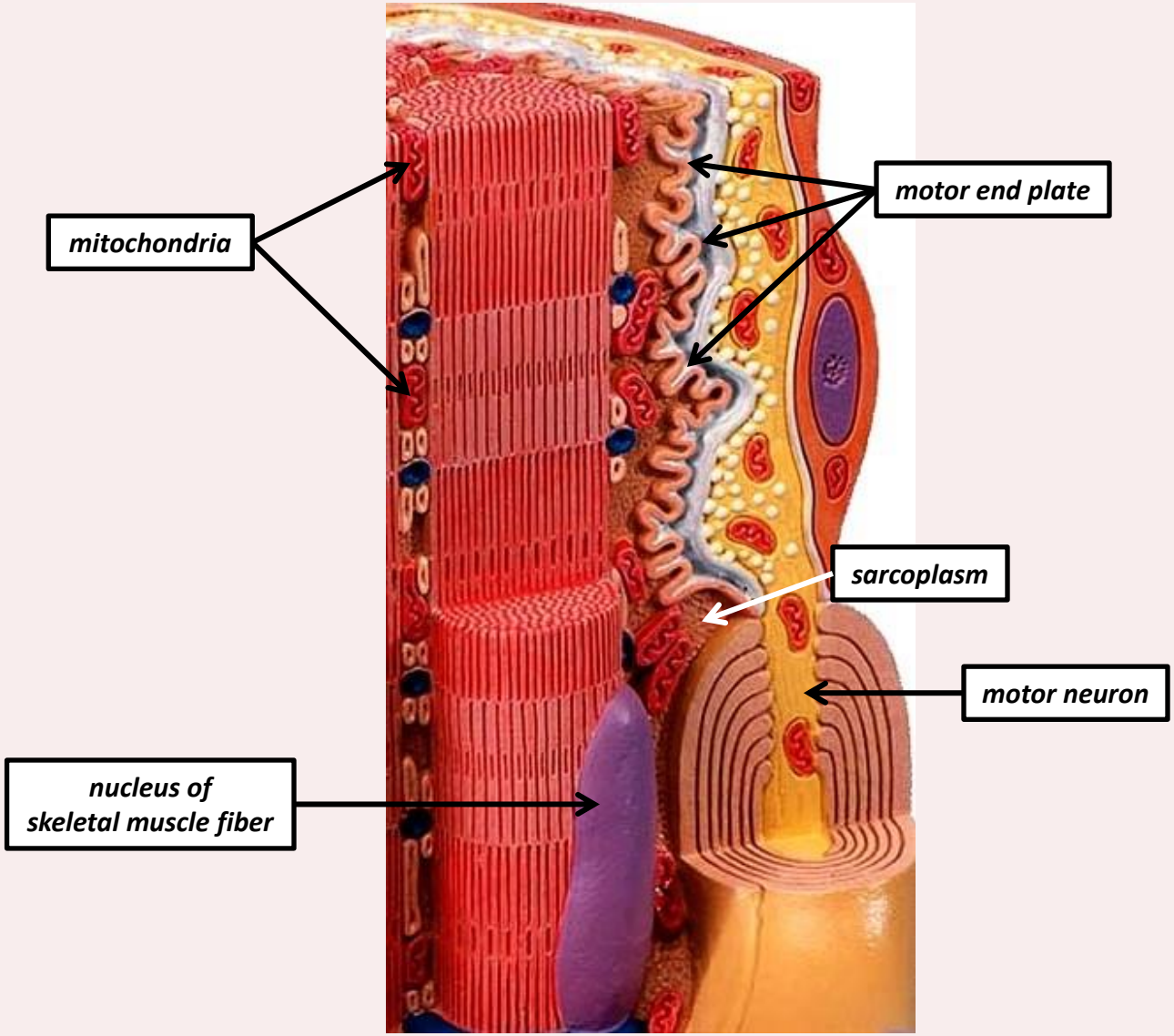
Neuromuscular Junction

Frontal section of neuromuscular junction model shown.



Neuromuscular Junction

Frontal section of neuromuscular junction model shown.



Neuromuscular Junction

Posterior view of neuromuscular junction model shown.

Structures of Skeletal Muscle Fiber Functions

- ***Endomysium*** *– covers/wraps around each individual skeletal muscle fiber*
- ***Sarcolemma*** *– transports substances into and out of skeletal muscle fiber*
- ***Sarcoplasm*** *– site of metabolic reactions in the skeletal muscle fiber*
- ***Nucleus*** *– controls protein synthesis*
- ***Mitochondria*** *– synthesize ATP*
- ***Myofibrils*** *– contraction of skeletal muscle fiber*
- ***Triad*** *– conducts nerve impulses into the skeletal muscle fiber to facilitate simultaneous contraction of the fiber*
  - ***Sarcoplasmic reticulum with cisternae*** *– regulates intracellular calcium–ion levels; stores/releases calcium ions during contraction*
  - ***Transverse (T) tubule*** *– increases surface area of the sarcolemma of the skeletal muscle fiber to facilitate contraction*