

Histology — Lecture 1

MSS

“Skeletal”
Muscle

* We Have **3** types of muscles :

Skeletal
Muscle

- Bundles of long Multinucleated cells
- Cross-~~stria~~ striations
- quick, forceful and voluntary contraction

Smooth
Muscle

- collection of fusiform cells
- no striations
- slow, involuntary contraction
- ↳ fusiform

Cardiac
Muscle

“spindle”
tapered at both ends
and wider in the middle

- intercalated discs
- cross-striations
- composed of elongated cells bound to each other at structures called intercalated discs
- involuntary, vigorous and rhythmic contraction
- thickening of sarcolemma that connects cardiac muscles together
- * vigorous: intense
- * rhythmic: a pattern of beats

Organization of skeletal muscle

epimysium

external sheath of **dense connective tissue**

Surrounds the entire muscle

Septa extend inward and carry the ^{large} supplies

perimysium

thin connective tissue

surrounds each bundle of muscle fibers which is called **fascicle**

the supplies penetrate the perimysium

endomysium

very thin layer of reticular fibers

surrounds scattered ~~fibers~~ ~~fibers~~

* Sarcoplasm contains myofibrils

Longitudinal section

will show cross-striations

How??

in a form of alternating **Dark (A) and Light (I)** bands

"polygonal" **Transverse section**

Straight sides

and Angles muscle fibers will

appear **rounded or polygonal** in shape

the dark dots in the cytoplasm represent **myofibrils**

The sarcoplasm contents

SE R
Smooth endoplasmic reticulum

Myofibrils

- Long and parallel cylindrical structure
- Formed of the contractile proteins (Microfilaments)

Sarcoplasmic Reticulum

- Highly Modified SE R
- Stores and Releases Ca^{++}
- * which is needed for contraction

Long mitochondria

- Found near the nucleus
- Form rows between myofibrils

A small golgi

- with 1 nuclear pole

Glycogen and few lipid droplets

Myoglobin pigment

- oxygen-binding protein
- Responsible for the red-brown color
- Related to oxygen supply for muscle

○ **Sarcomere** ⁽¹⁾ the part between 2 Z-lines and is the functional ⁽²⁾ unit of the muscle fibers each one ⁽³⁾ contains 1 (A) band + 2 halves of (I) Band on both sides of (A) band

Within the sarcomere

We have the A and I pattern which is mainly due to the regular arrangement of thick and thin myosin and F-Actin.

A band: contains myosin and actin myofibrils.
The A band has a ^{*} pale central region called **H zone** and consist of myosin only.
this H zone is bisected by **dark M line**
• the site of attachment of myosin myofibrils.

I band: contains Actin only which is attached to **Z line**.

*** Myosin**: A large complex with 2 identical heavy chains and 2 pairs of light chains (4 chains).

*** Myosin Heavy** & thin, rod-like chains
motor proteins, twisted together forming "Myosin tails"