

MUSCLE PHYSIOLOGY

11/12/81, 7 Nov 05, 12Nov08, 16Nov09
S&M: p. 188, Martini 6th: 301-307, 7th: 294-299, 8th: 299-315

Electron microscopic anatomy: 297

Around each fiber **sarcolemma** cell membrane of muscle cell (lemma: husk).
T-tubules transverse tubules around myofibril, from sarcolemma into interior,
sarcoplasmic reticulum membranous network within cell, hold Ca^{++}

PHYSIOLOGY:

Acetylcholine (P 305) released at neuromuscular junction triggers change in permeability, passes over sarcolemma, into cell via T tubules

Sarcoplasmic reticulum (reticular **enlargements** along T-tubules) release Ca^{++}

Ca^{++} stimulates contraction

Components of **sarcomere**:

G-actin	globular actin subunits
F actin	fibrous actin subunits
troponin	regulator, blocks myosin heads from linking with G actin, Ca inactivates
myosin	

p308: (See video: http://www.youtube.com/watch?v=Nriei1rzhc&feature=player_embedded)

- 1) ATP charges clubs on myosin heads ,but is prevented from attaching to actin due to tropomyosin blocking
- 2) When troponin binds Ca^{++} , it draws into fiber, allows binding of G actin to myosin head.
- 3) Bound ATP is split upon linkage of myosin with actin, cross bridge flexes, pulling actin and holding in rigor complex.
- 4) When another ATP is bonded to the myosin club, the rigor complex dissolved.
- 5) The cycle repeats resulting in the thin filament (actin) being pulled along the thick filament (myosin).
- 6) When Ca^{++} is pumped back into sarcoplasmic membrane, muscle relaxes.

ATP come mostly from aerobic respiration, also from glycolysis, anaerobic, producing lactic acid.

Muscle can store energy as creatine PO_4 also source of energy for super exertion
oxygen partially stored in muscle in myoglobin, makes meat dark (light, reverse)

Muscle cells: fibers respond all or nothing, latent period, contract, relax

single neuron causes group of fibers to contract at same time, called a **motor unit**.

muscles controlling	fine movements	many motor units
	coarse movement	few fibers per unit

asynchronous discharge allows for smooth response

rate of volley of discharge controls strength of pull by wave summation