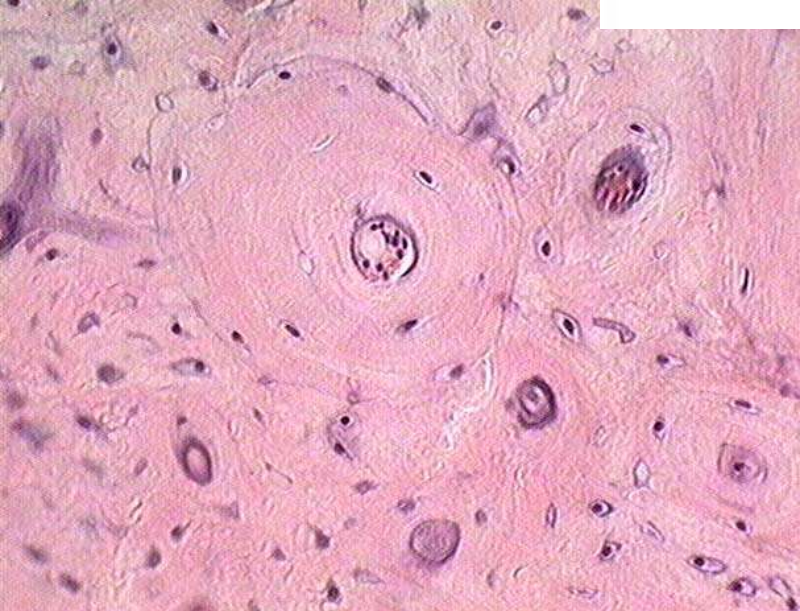
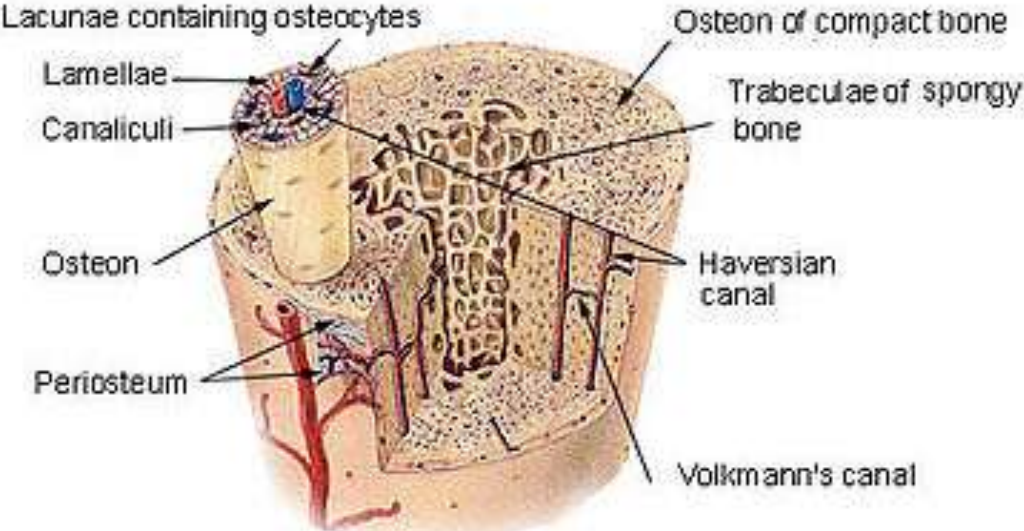


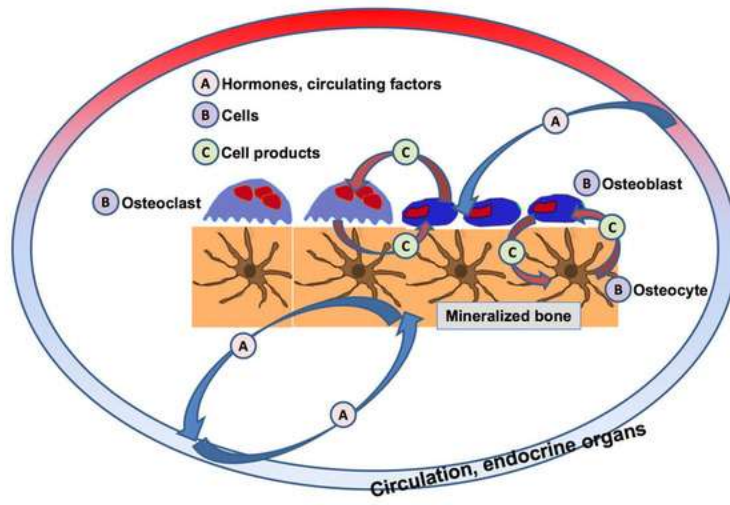


- Chapter 49 ~ *Sensory and Motor Mechanisms*

# Osteon

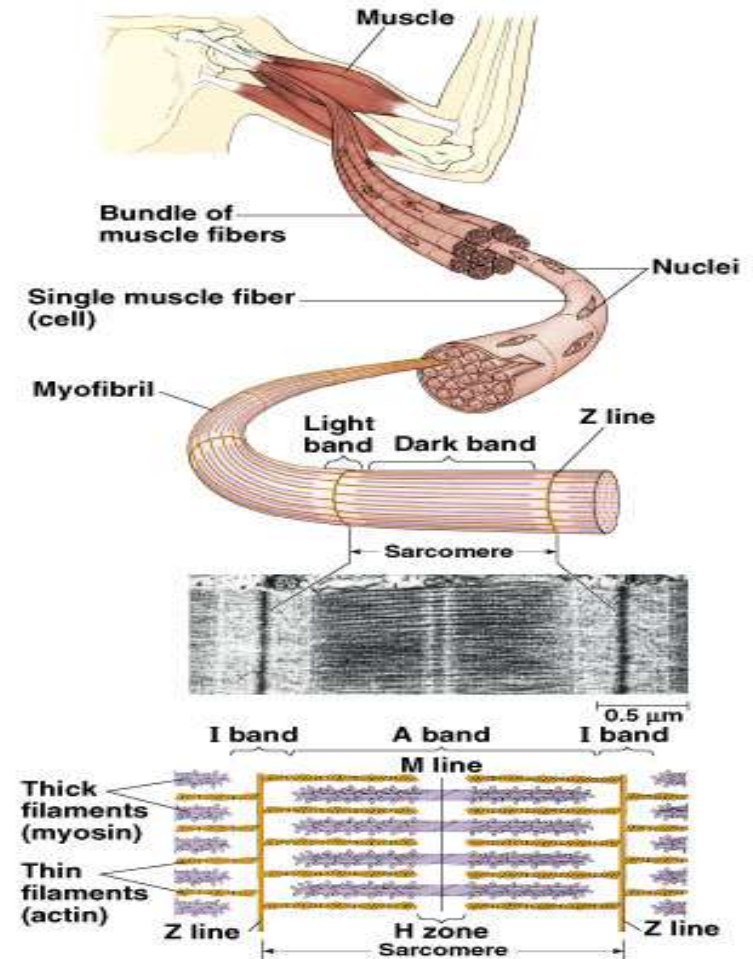
## Compact Bone & Spongy (Cancellous Bone)





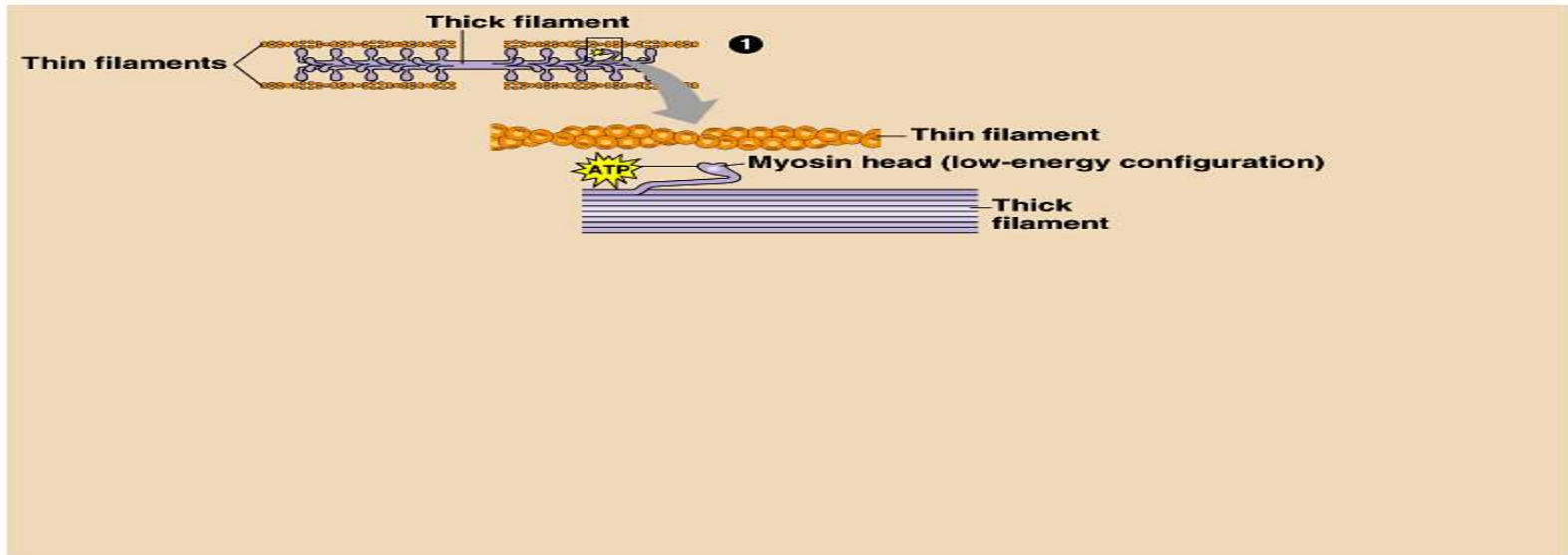
# Vertebrate Skeletal Muscle

- Contract/relax: antagonistic pairs w/skeleton
- Muscles: bundle of....
- Muscle fibers: single cell w/ many nuclei consisting of....
- Myofibrils: longitudinal bundles composed of....
- Myofilaments:
  - Thin~ 2 strands of actin protein and a regulatory protein
  - Thick~ myosin protein
- Sarcomere: repeating unit of muscle tissue, composed of....
- Z lines~sarcomere border
- I band~only actin protein
- A band~actin & myosin protein overlap
- H zone~central sarcomere; only myosin



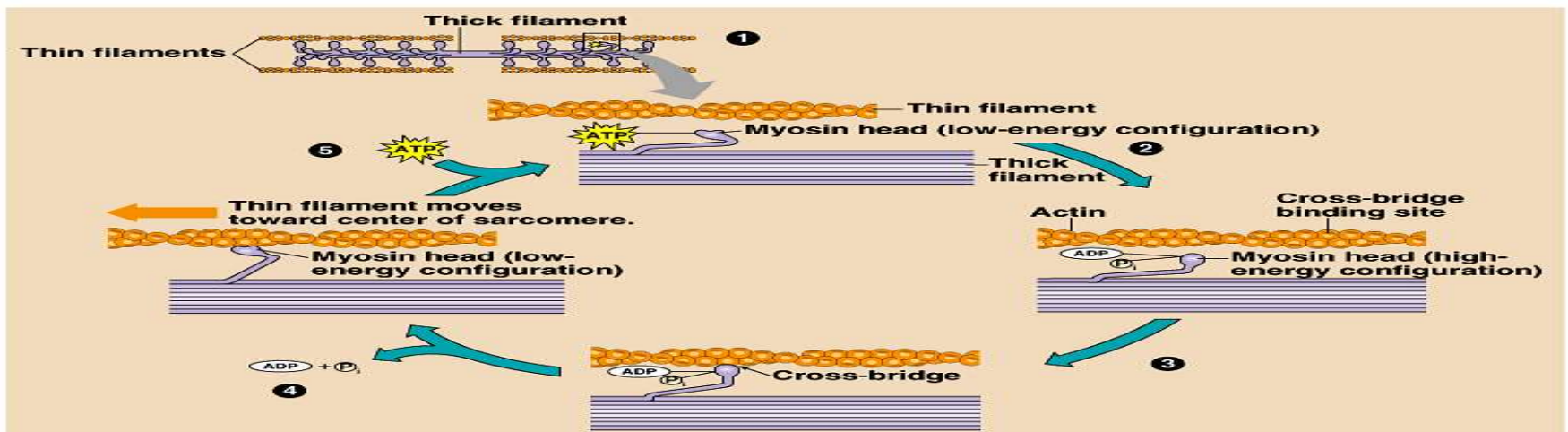
# Sliding-filament model

- Theory of muscle contraction
- Sarcomere length reduced
- Z line length becomes shorter
- Actin and myosin slide past each other (overlap increases)



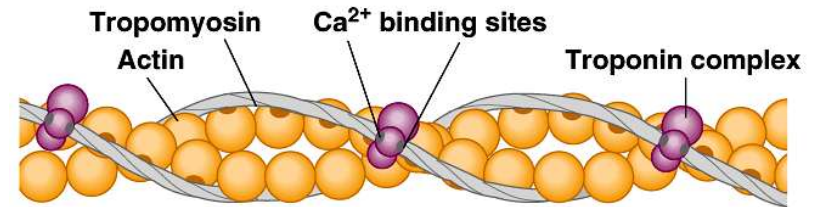
# Actin-myosin interaction

- 1- Myosin head hydrolyzes ATP to ADP and inorganic phosphate (Pi); termed the “high energy configuration”
- 2- Myosin head binds to actin; termed a “cross bridge”
- 3- Releasing ADP and (Pi), myosin relaxes sliding actin; “low energy configuration”
- 4- Binding of new ATP releases myosin head
- Creatine phosphate~ supplier of phosphate to ADP

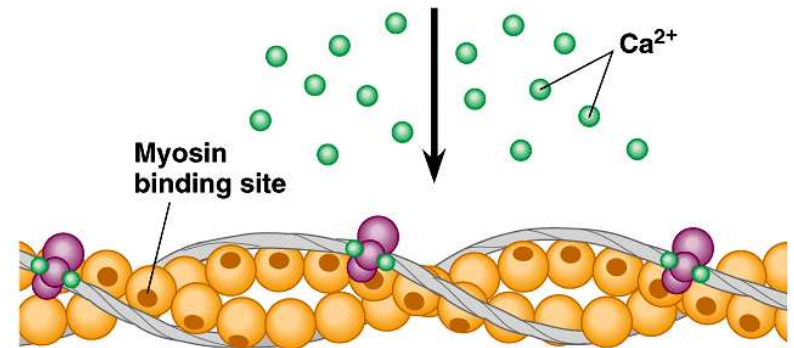


# Muscle contraction regulation, I

- Relaxation: tropomyosin blocks myosin binding sites on actin
- Contraction: calcium binds to troponin complex; tropomyosin changes shape, exposing myosin binding sites



(a) Myosin binding sites blocked; muscle cannot contract

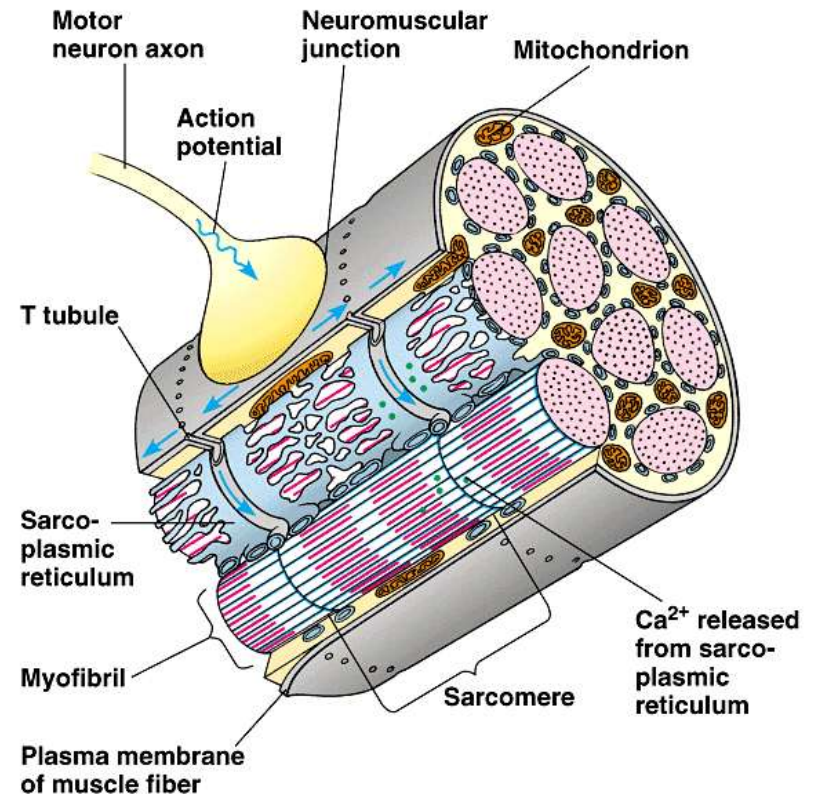


(b) Myosin binding sites exposed; muscle can contract

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# Muscle contraction regulation, II

- Calcium ( $\text{Ca}^{+}$ )~ concentration regulated by the....
- Sarcoplasmic reticulum~ a specialized endoplasmic reticulum
- Stimulated by action potential in a motor neuron
- T (transverse) tubules~ travel channels in plasma membrane for action potential
- $\text{Ca}^{+}$  then binds to troponin





# Muscle Types

