Motor mechanisms II

Review questions

**Binding of ATP to myosin head causes:**
- a) actin filament to slide
- b) Myosin head to detach from actin filament
- C) Myosin head to cock

![Diagram of ATP binding to myosin head](image)

**What will happen when ADP and P_i dissociate from myosin head?**
- A) head will detach from actin filament
- B) head will retract and pull actin filament
- C) head will bind ADP again

![Diagram of ADP and P_i dissociation](image)

**Ca^{++} induces muscle contraction by:**
- A) Causing actin monomers to assemble into a filament
- B) making ATP available to bind to myosin head
- C) allowing myosin head to bind to actin filament

![Diagram of Ca^{++} interaction](image)
Muscle fiber types are the result of different types (isoforms) of myosin

- Type I - slow fibers (aerobic)
- Type II - fast fibers (anaerobic)
  - Type IIx - very fast
  - Type IIa - intermediate between IIx and I
  - Types present in other vertebrates, not humans e.g., IIb in rats and other small mammals

- Quadriceps muscle stained for ATPase activity. Dark = type II fast; light = type I slow.

- Type I slow twitch
  - Slow contraction time (100 msec)
  - Myoglobin (red)
  - Continuous use
  - More capillaries
  - Small size
  - Low glycogen
  - High fat
  - More mitochondria

- Type I fast twitch
  - Fast contraction (50 msec)
  - No myoglobin (white)
  - Brief use
  - Few capillaries
  - Larger size
  - High glycogen
  - Low fat
  - Few mitochondria
Characteristics of other muscle types:

- Cardiac muscle - found only in the heart, striated, gap junctions allow direct electrical signaling between cells
- Smooth muscle - involuntary muscle, meshwork of actin and myosin, can contract more (greater shortening), but with less tension.

Muscle cell types schematic:
1) skeletal
2) cardiac
3) smooth

Skeletal muscle

Cardiac muscle

Smooth muscle

http://www.youtube.com/watch?v=Cd8AwJYkDY&feature=related
http://www.youtube.com/watch?v=b1WD56s4Ww&feature=related