Overview of Muscle Contraction

For all these tissue types, there will be a general trend:

we will do this in more detail in later section:

Muscle cell

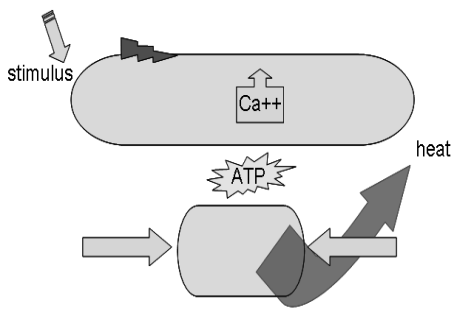
Muscle Types

- NOTE: (not in book)

For all these tissue types, there will be a general trend:

we will do this in more detail in later section:

A stimulus causes an AP, which causes an increase in Ca++ in the cell, which will cause contraction. ATP will be used to contract, and heat will be generated

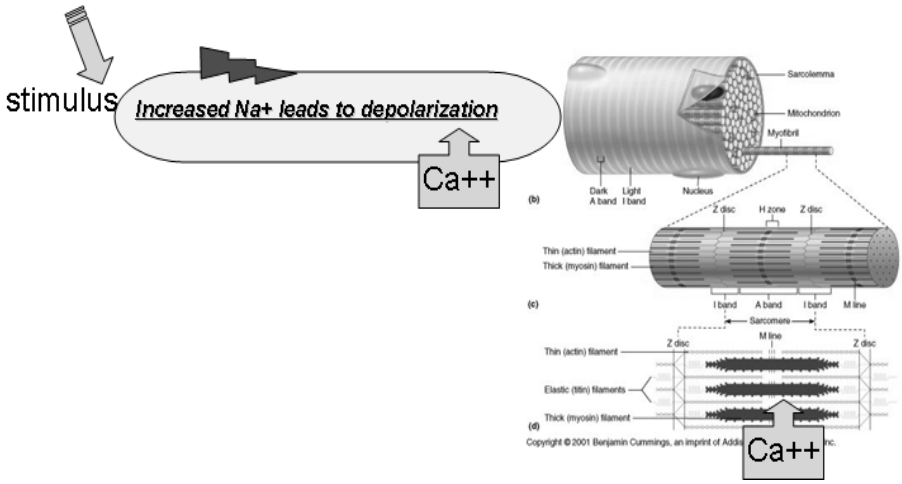


A little more detailed:

*If we increase Na+ permeability of the sarcolemma, we'll have an AP run down the sarcolemma.

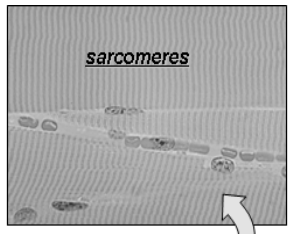
*This will inevitably increase [Ca++] within the cell's cytoplasm (called the sarcoplasm).

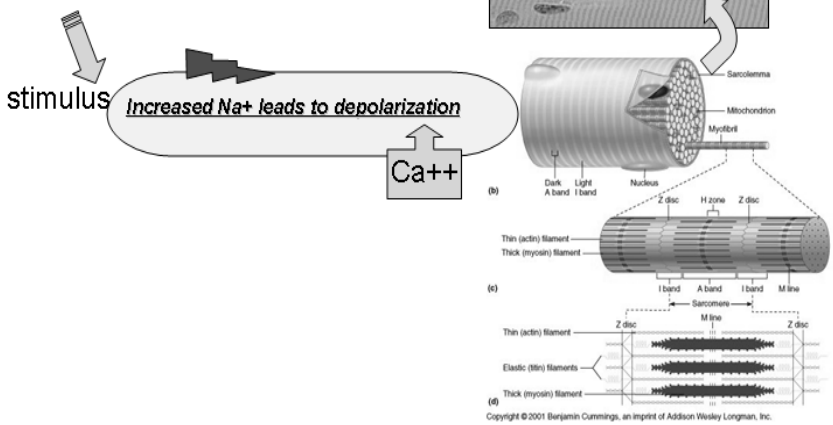
(more…)



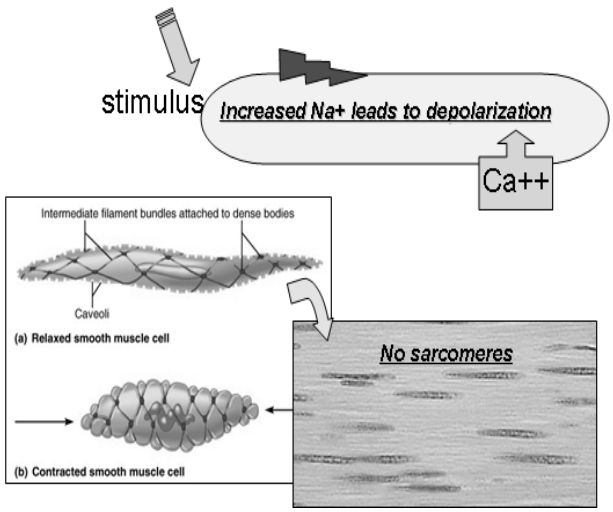
Difference between muscle tissue types:

HOW are the myofilaments arranged
* 2 have structures called "sarcomeres"…these are "striated" (see later)





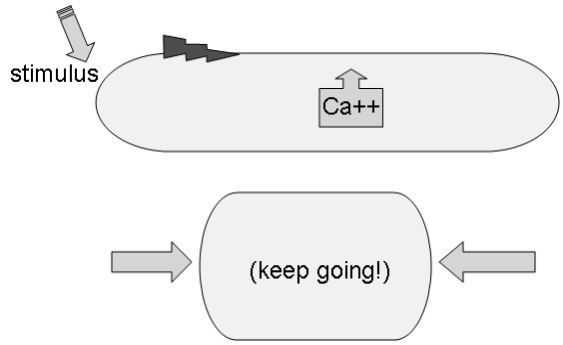
* 1 does not



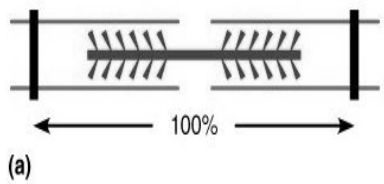
How calcium causes contraction: The Power Stroke

Recall:

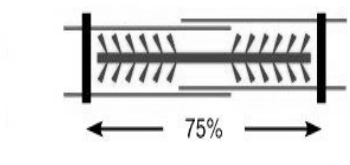
i. A stimulus causes an AP, which causes an increase in Ca++ in the cell, which will cause contraction. …….



ii. If Ca++ is present, binding sites on thin are revealed, and the cross bridges are formed between the thin & thick myofilaments



Then, they do "the power stroke":

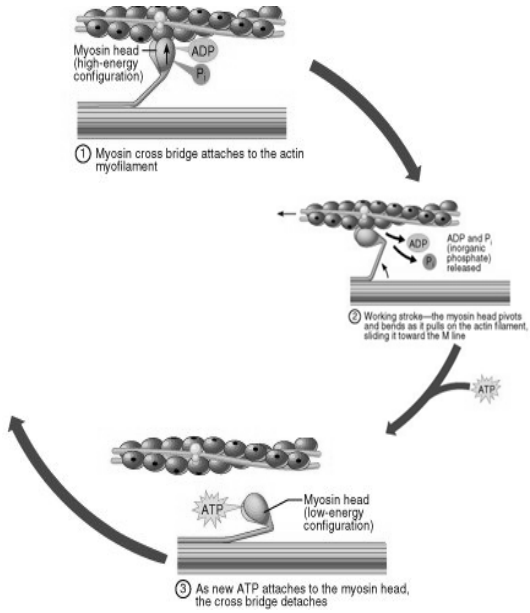


iii. These cross bridges do the "Power Stroke":

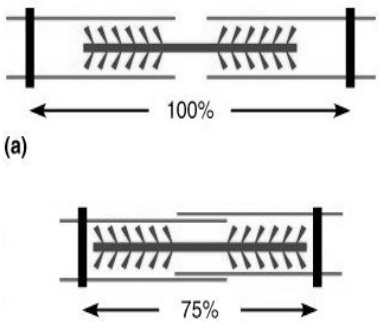
*1. Cross bridges bond to a thin filament

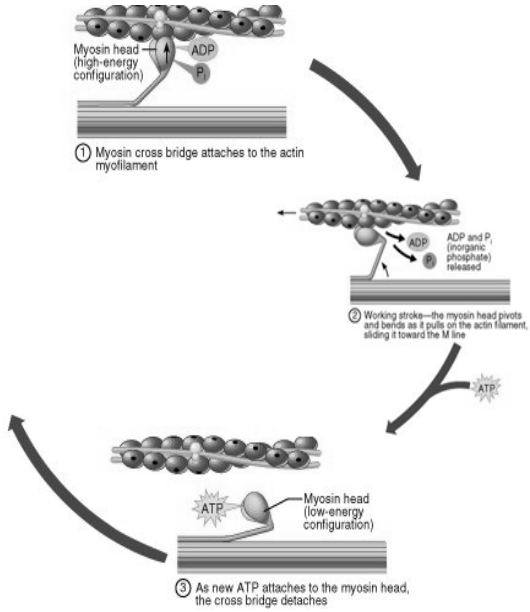
*2. "cocking" the head back, sliding the thin past the thick

*3. letting go of the thin filament, grabbing it again, etc.....sliding the thin past the thick and moving the z-lines towards the middle and shortening the sarcomere.



iv. This continues as long as Ca++ is present, which continues as long as there is stimulation by an AP on the sarcolemma.





The Sarcoplasmic Reticulum is responsible for releasing Ca++ into the cell.

It will do so if it is stimulated electrically: