

muscle physiology lecture 6

muscle fiber type

alpha motor neurons - thick myelinated axons - allows conduction velocity to be fast (35-65 m/s)

people have ranges of conduction velocity - comes down to the size of the motor nerve

I slow twitch - oxidative, red (blood in it) energy efficient

IIA fast twitch - glycolytic, white, explosive, stronger power

IIB fast twitch (in general humans don't have IIB)

different sports use different muscle fibers in order to perform

all muscle fibers in a motor unit are the same type (for the most part)

I → Ic → IIc → IIac → Ila → IIax → IIx

classifying a muscle fiber type - uses myosin heavy chain (head & tail of myosin)

myosin light chain - 2 per head, bind heavy chains in neck to the tail

myosin heavy chain is main way to classify, but other things are looked @ too, such as

myosin-ATPase activity (matters for shortening velocity), concentration of reticula

quality of muscle matters a lot

when you change muscle fiber types it still has remnants of what it used to be

the proportion of type II is higher in superficial vs. in deep.

long distance running - endurance - more type I

fast sprints - short bursts of energy - more type II

the differences in structure and function of skeletal muscles is due to the variety of myosin isoforms.

- the latest count reveals there are 35 different groups of myosin families

- in the myosin IIs found in humans, there are 11 different sarcomeric myosin isoforms, 1 smooth muscle isoforms, and 3 non-muscle isoforms

- different myosin classes are due to changes in the length & shape of the lever arm
 - this causes the size & direction of movement to change

3 major isoforms of MHC in human muscles

- MHC I (slow myosin)

- MHC IIA

- MHC IIX / MHC IIB

- ↑ subtypes of these create more diversity