Kinesiology exam review 3 Sections of multiple choice, Calculators allowed

- 65 Standard multiple choice
- 25 Fill in Blank Multiple Choice
- 10 Multiple Choice Calculations

Skeletal Muscle Mechanics

- Each Myofibril is made up of rod-like proteins (contractile proteins)
- Action potentials travel along the muscle and travel down the t-tubule, this excites the sarco-plasmic reticulum that releases calcium, so calcium can freely flow in the muscle fibre
- Inside the muscle is the myofibrils with thick and thin filaments

Sarcomere

- The functional unit of a muscle fibre showing the overlapping of thick and thin filaments
- The sarcomere contracts when the muscle contracts (shortens), and relaxes

Sliding Filament Mechanism (cross bridge)

- Sarcomeres contract when myosin filaments reach out and grab actin, it will then let go, reach out and grab the next actin head, 3-D mechanism, not 2D
- The binding sites on actin are blocked by tropomyosin (threadlike brown molecule). The binding sites are covered by tropomyosin when you are resting, in order for the binding sites to be uncovered, you need calcium to combine with the troponin to be able to bind to actin.

Cross Bridge Activity

- ATP comes along and binds to myosin head
- Myosin ATPase cuts off the the last P to make ADP
- All the energy that was in that bond is now ready for a power stroke
- It cannot do the power stroke yet because tropomyosin is blocking the binding sites on actin
- Once calcium comes along from the sarcoplasmic reticulum, the power stroke can be performed

Relaxation

- All the calcium that is released gets sucked back into the sarcoplasmic reticulum, and tropomyosin goes and covers actin
- This is called calcium re-uptake
- The axon nerve will stop releasing acetocholyne, the left over acetocholyne is is broken down by acetocholynesterase

Changes in Z line-Through (contraction)

- When the muscle contracts the z line comes together
- The A band (Thick and thin filaments) stays the same (width stays the same)
- The H- Zone (only thick filaments) gets more and more narrow and can actually disappear
- The I-Band is the lightest (only thin filaments) becomes much narrower

Electrical Activity of the Heart

- The heart is a very special muscle, is the only muscle that does not need a nerve to beat
- This is possible because of 1% of special cells that are in the heart (SA Node/Right Atrium) (pacemaker potential)- no resting potential- autorhythmic
- The other 99% of cells in the heart cannot contract unless they are told to do so
- When the potential starts for the Autorhythmic pacemaker cells, it starts at -60 potential, it then surges passed the threshold potential (-40) to 0. It then repolarizes back down to -40
- Action potentials occur because of a constant influx of sodium, and a partial efflux of potassium. Potassium only rushes out when the inside of the cell is negatively charged.
- Once threshold is reached, voltage gated channels calcium channels(t-type) open for a short time. This leads to brief influx of calcium and threshold is reached
- Once -40 is reached, the L-Type channels are opened and a big surge of calcium rushes into the cell moving the potential to a maximum of 0.

Excitation of the Atria

Starting at the SA node, the action potential travels

1. From the Right atrium to the left atrium through gap junctions (Interatrial pathways)
2. From the SA node to the AV node via the intermodal pathway

The Cardiac Cycle(Electrocardiagram)

- ECG- P wave represents the depolarization of the atria
- Ventricular Volumes- A slow accumulation of blood increases into the ventricles (left).
- Heart Sounds- Lub Dub

Ejection Fraction

- The proportion of the blood pumped out of the left ventricle at any given beat
- Reveals how much of the blood entering the ventricle is ejected during systole

EF (%)= (SV/LVEDV)x100

Cardiac Output

- The amount of blood pumped per minute
- Measured in ml/min or L/min
- Cardiac output (Q) calculated by:
  Q= SV x HR

Classifying Muscle Fibres

1. Contractile (twitch) properties

a) Slow Twitch
b) Fast Twitch

2. Metabolic Properties

A) Oxidative
B) Oxidative/Glycolytic
C) Glycolytic

Slow Twitch (Type 1)

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