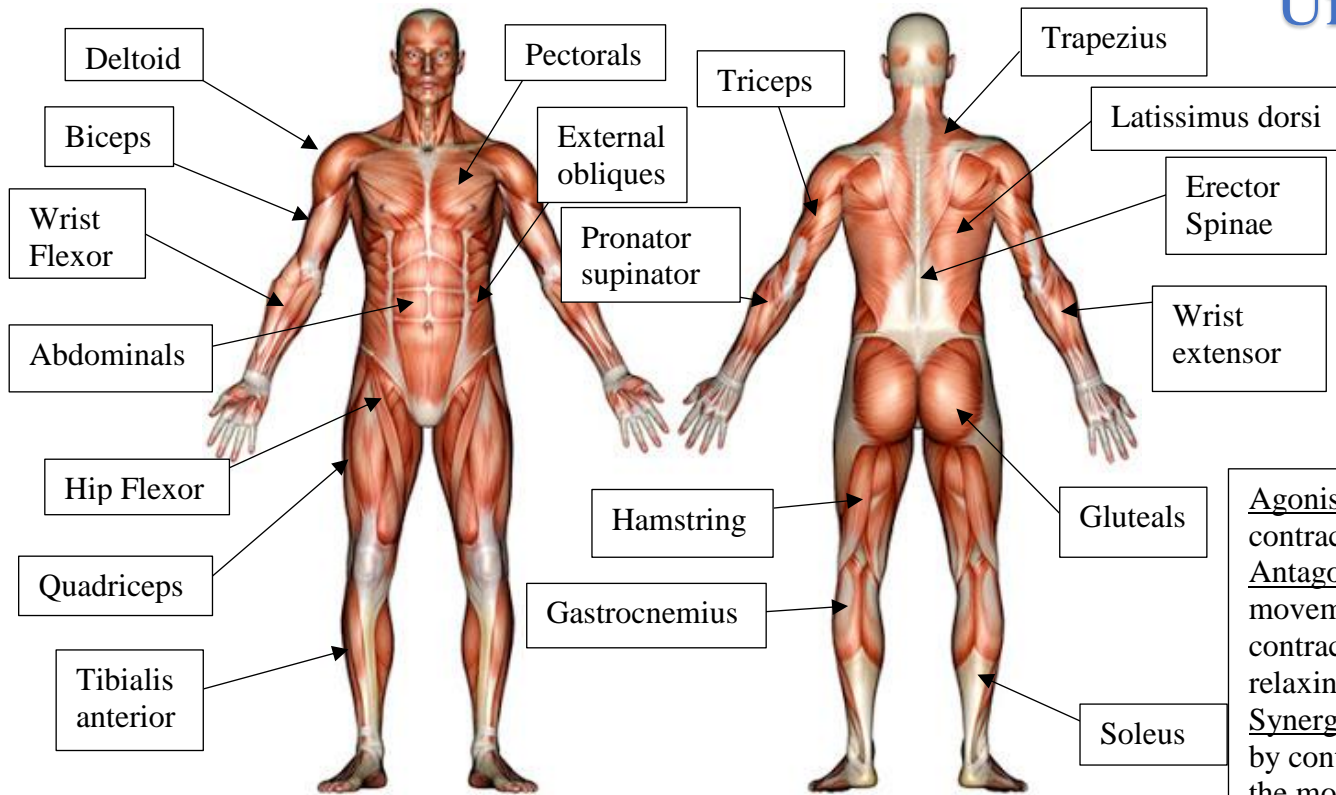


Unit 1: LOB: Muscular System



Cardiac	Smooth	Skeletal
Striated	spindle shaped cells	Striated
Generates own impulse (myogenic)	Controlled by the ANS (involuntary)	Voluntary control
Contracts to pump blood around body	Long, slow contractions	Contracts to perform movement
Does not fatigue	Does not fatigue	Can fatigue
Heart	Digestive system + Blood vessels	Attached via tendons to bones

Origin = bone that stays still Insertion = moving bone

Agonist- (prime movers) contracts to perform action
Antagonist relaxes to allow movement. Example- Biceps contracting and triceps relaxing.
Synergist- Helps the agonist by contracting and helping the movement.
Fixator- Prevents unwanted movement by stabilising the joint of where the origin is attached.

Muscle fibre types
Slow twitch- Type i- great blood supply and has more mitochondria & Myoglobin, red in colour, doesn't fatigue, small fibres. Good for ENDURANCE.
Fast twitch-
Type iia- Fast twitch, large number of myoglobin and mitochondria to generate ATP Aerobically and anaerobically. Resistant to fatigue
Type iib (iix)- Fatigues quickly. low Myoglobin & Mitochondria, high intensity for short bursts – strong contraction strength, good for sprinters.

Short term responses (acute)	Long term adaptations (chronic)
Increased blood supply	Hypertrophy – increase in muscle size and strength
Increase temperature	Increase tendon strength
Micro fibre muscle tears – repair with protein and rest	Increase mitochondria (size and number) – more aerobic energy
Increase production of lactate	Increased myoglobin – more O2 carried
Increase pliability	Increased glycogen – more energy
Delayed onset of muscle soreness (DOMS) – caused by intense/resistance exercise	Use of Fat stores – more energy
	Increased tolerance to lactate

Concentric- Muscle shortens when under tension (contracting) – con = short
Eccentric- Muscle lengthens when under tension (contracting) – Eeeeeee - longer
Isometric- Muscle does not change in length when under tension
 During a biceps curl, a concentric contraction happens at the biceps brachii muscle when lifting up, when lowering the weight, the muscle is doing an eccentric contraction as it is getting longer as it works. An isometric contraction would be any strenuous exercise which does not involve movement, maintaining the position = handstand

Additional factors:

Age: Muscle mass decreases with age beginning at aged 50, this is referred to as sarcopenia, muscles will then become weaker, opposite of hypertrophy (atrophy).

Cramps are involuntary muscle contractions and usually occurs due to dehydration. To help prevent this stay hydrated and perform stretches

All or none law - For a muscle fibre (motor unit) to contract = the action potential must exceed the threshold potential. The motor unit can only contract or relax.

The nervous system recruits however many motor units are needed for the contraction to take place; heavier weights mean that more Motor units (fibres) will contract and work. Each fibre can either contract or not contract, there is no in between, this is the all or none law. The greater the electronic impulses, the greater the tension in the muscle.