PHARM.D • YEAR 1

Human Anatomy & Physiology

CHAPTER 16

Sports Physiology

PPT CHAPTER COVER



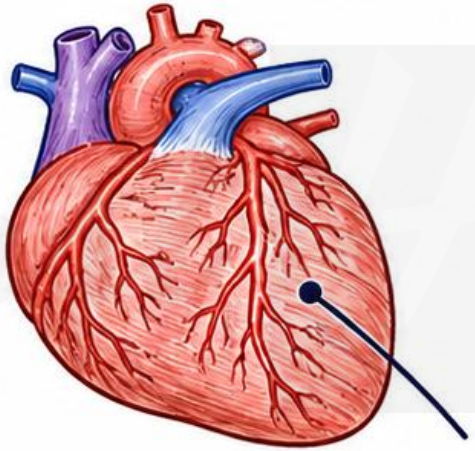
MUSCLE TYPES IN EXERCISE

SKELETAL MUSCLE



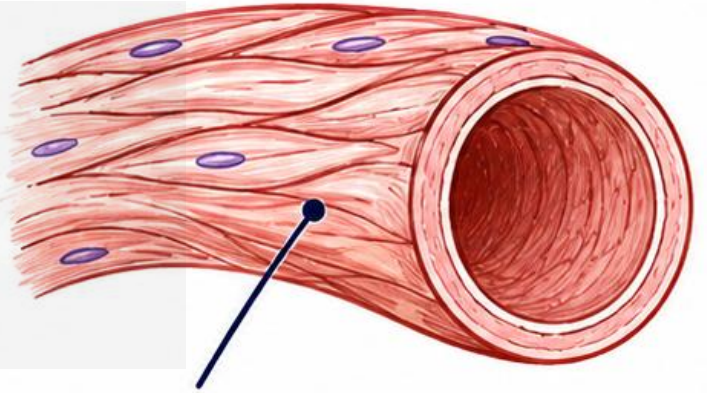
- Produces voluntary movement and posture.

CARDIAC MUSCLE



- Raises blood flow to active tissues.

SMOOTH MUSCLE

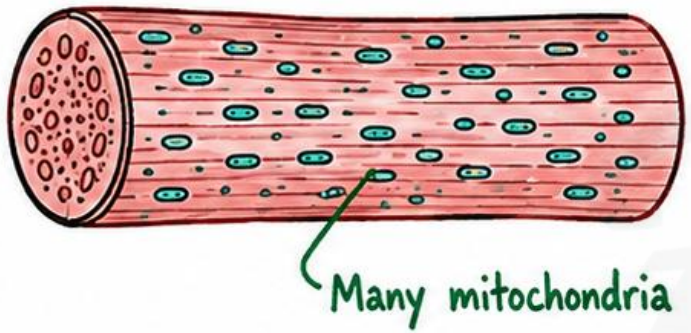


- Regulates airway and vessel diameter.

Sports physiology focuses chiefly on skeletal muscle, while all three support exercise.

Type I, Type IIa and Type IIx Fibres

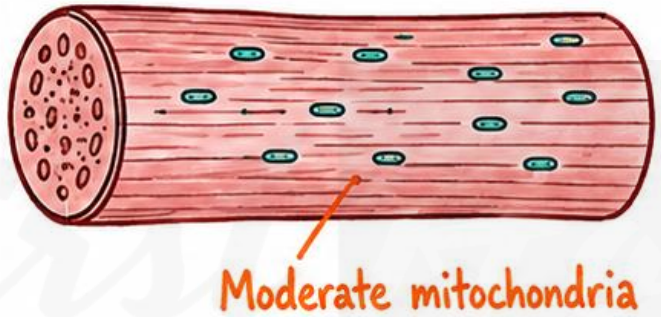
Type I Fibres



- Contract slowly
- Resist fatigue
- Rely mainly on oxidative metabolism

Metabolism: Oxidative

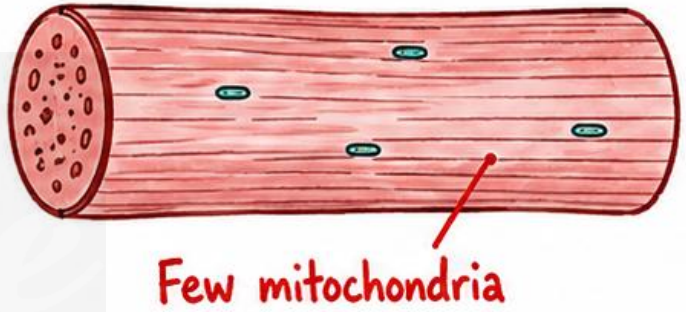
Type IIa Fibres



- Contract faster
- Intermediate fatigue resistance
- Mixed metabolism

Metabolism: Mixed

Type IIx Fibres



- Develop high power rapidly
- Fatigue quickly
- Rely strongly on anaerobic pathways

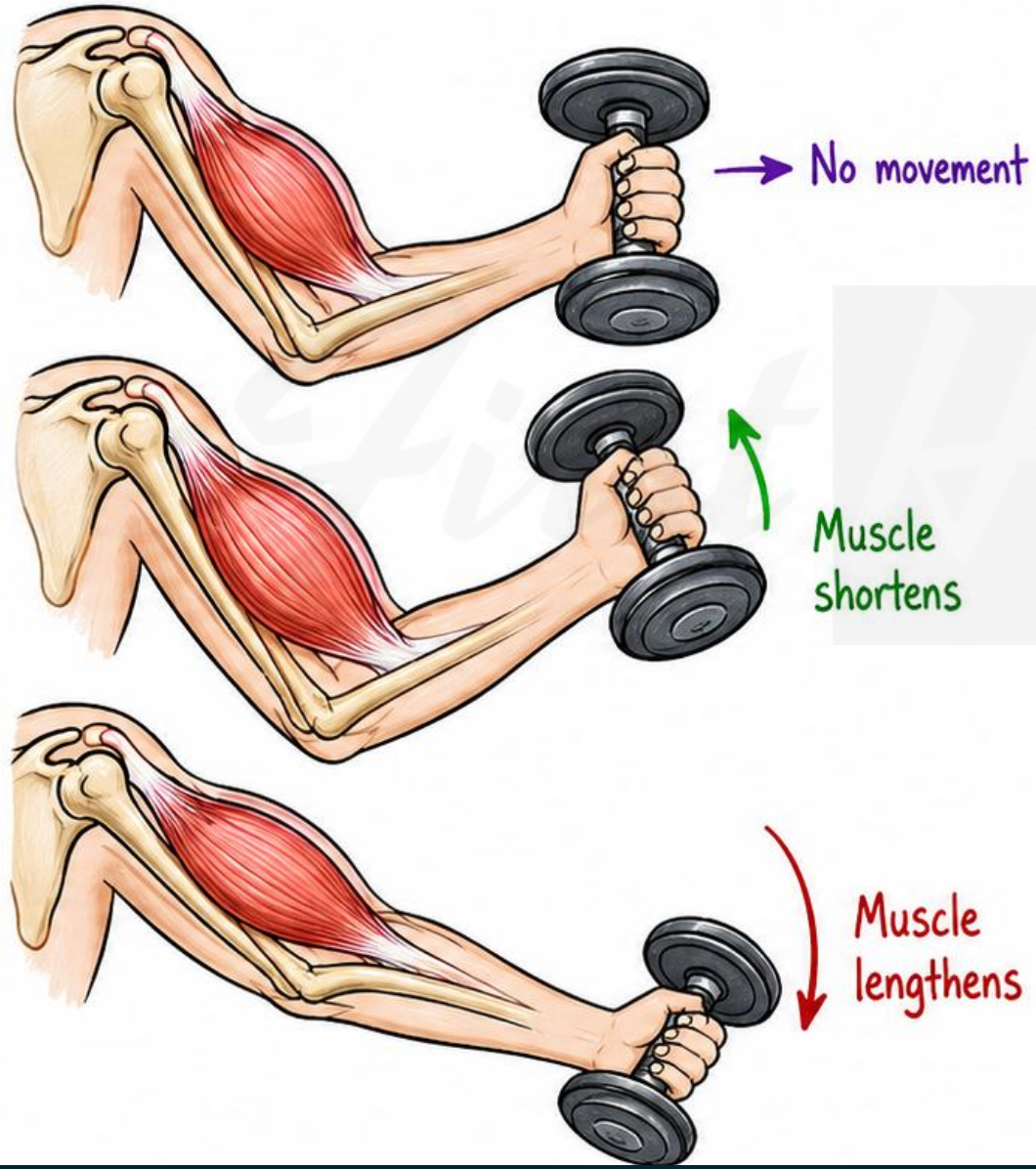
Metabolism: Anaerobic

Muscle Contraction During Exercise

Isometric Contraction

Concentric Contraction

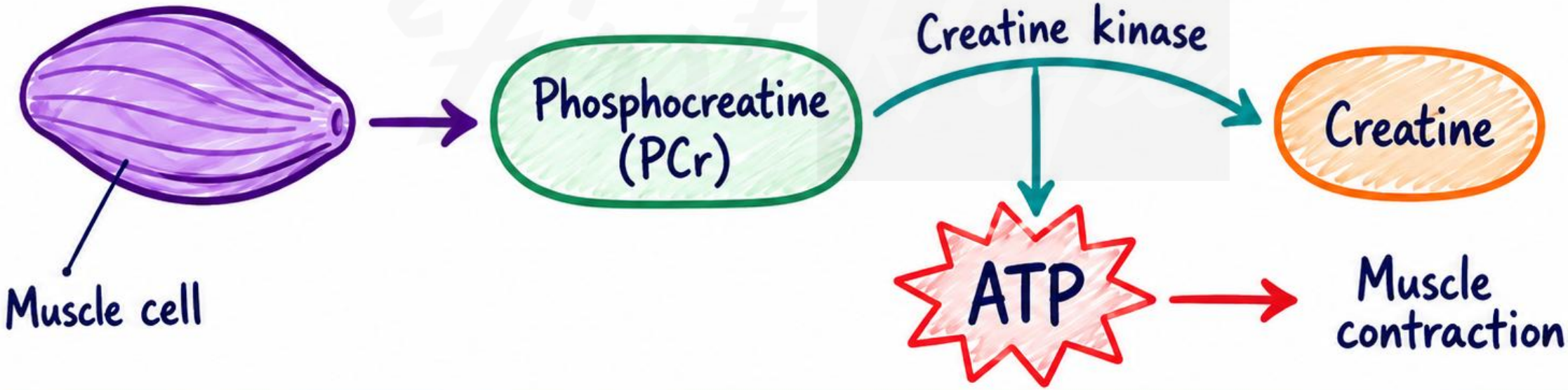
Eccentric Contraction



- **Isometric Contraction**: develops tension without changing muscle length.
- **Concentric Contraction**: shortens the active muscle while producing force.
- **Eccentric Contraction**: produces force while the muscle lengthens under load.

ATP-PCr ENERGY SYSTEM

- Muscles need ATP (Adenosine Triphosphate) to contract.
- The ATP-PCr system rapidly resynthesizes ATP from phosphocreatine.
- Provides immediate, short-term energy for very high-intensity efforts.



Delivers immediate ATP for powerful, short-duration muscle work.

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