

# Muscles and Movement (11.2)

Outline the following terms (11.2.1)

**Bones:** Act as levers and force magnifiers

**Ligament:** Connect bones together

**Muscles:** Provide the force for movement

**Tendon:** Connect muscles to bones

**Nerves:** Stimulate muscular contraction

Compare hip and knee joints (11.2.4)

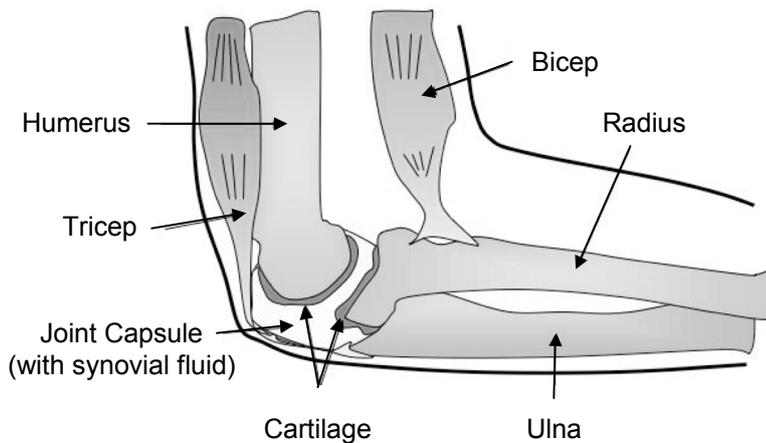
**Hip Joint:**

- Ball and socket joint between pelvis and femur
- Multi-axial movement (flex, extend, abduct, adduct)

**Knee Joint:**

- Hinge joint between femur and tibia
- Capable of movement in one axis (flex, extend)

Identify the structures and functions of a human elbow joint (11.2.2 / 11.2.3)



**Humerus:** Anchors muscle (origin)

**Radius / Ulna:** Forearm levers (muscle insertion)

**Bicep:** Bends arm (flexion)

**Tricep:** Straightens arm (extension)

**Cartilage:** Shock absorbance

**Synovial Fluid:** Source of nutrition and lubrication

**Joint Capsule:** Seals joint space, limits movement

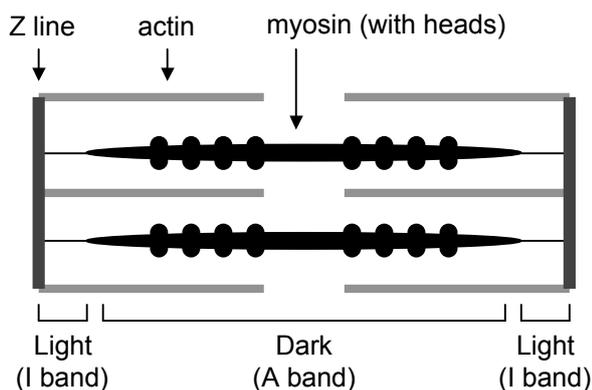
Describe the structure of striated muscle fibres (11.2.5)

- Muscle fibres are formed by the fusion of muscle cells, making them multi-nucleated
- The surrounding membrane is called the sarcolemma
- Muscle fibres contain a lot of mitochondria (ATP is needed for muscle contraction)
- The sarcoplasmic reticulum is a specialised ER network that contains calcium ions
- Muscle fibres contain striated myofibrils made of light and dark bands

- Actin myofilaments create the light striation pattern

- Actin and myosin myofilaments overlap to create the dark striation pattern

Draw a sarcomere and explain muscle contraction (11.2.6 - 11.2.8)



**Muscle Contraction**

- In response to a nervous signal,  $\text{Ca}^{2+}$  is released from the sarcoplasmic reticulum
- Calcium uncovers binding sites on actin for the myosin hooks creating actin-myosin cross bridges
- ATP hydrolysis cause myosin hooks to slide along to the next actin binding site
- This makes the myofibril shorter (contraction)

**Relax**



**Contract**

