

(An example)

Triceps origins are

- long head - margin of glenoid cavity
- lateral head - posterior humerus;
- medial head - distal radial groove on posterior humerus

- Triceps insertion
 - olecranon process of ulna

Types of muscle action

flexing knee
Flexion - closes a joint
 (ex: bicep flexes arm)

• **Extension** - opens a joint
 (ex: tricep extends arm)

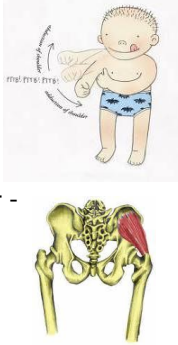
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extending knee

The block contains two illustrations. The top one shows two people sitting on chairs, one flexing their knee. The bottom one shows two people sitting on chairs, one extending their knee. A vertical anatomical diagram of a leg muscle is also present.

Types of muscle action

- **Adduction** - draw towards body
(ex: Latissimus dorsi "Lats" adducts humerus)
- **Abduction** - moves from body
(ex: Gluteus minimus abducts femur - origin at illium)

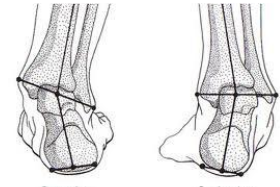
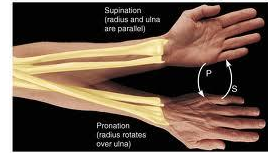


Types of muscle action

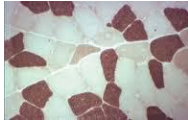
Pronation



Supination



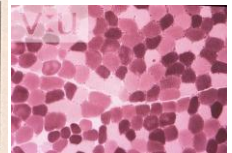
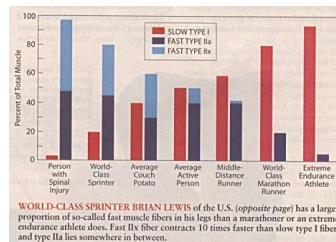
Fast and slow twitch muscle cells

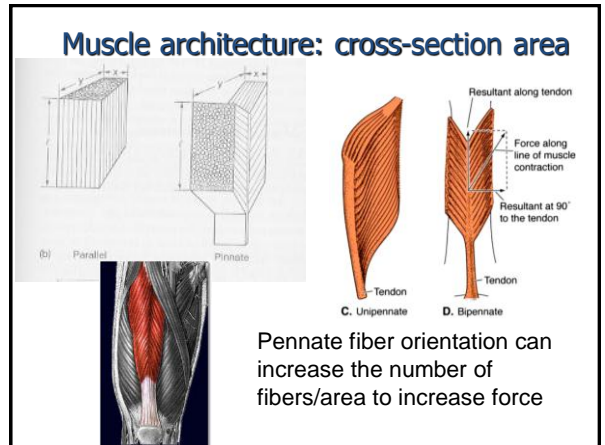
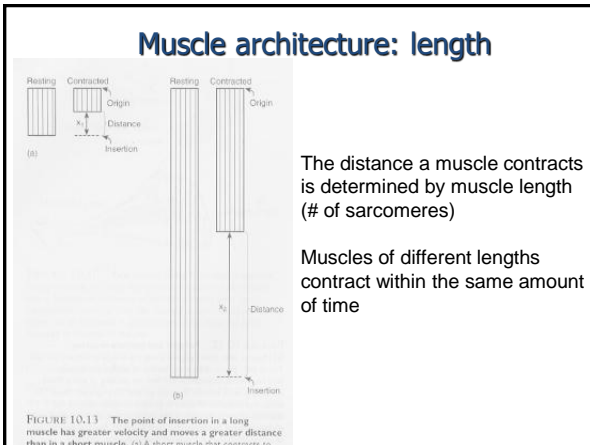
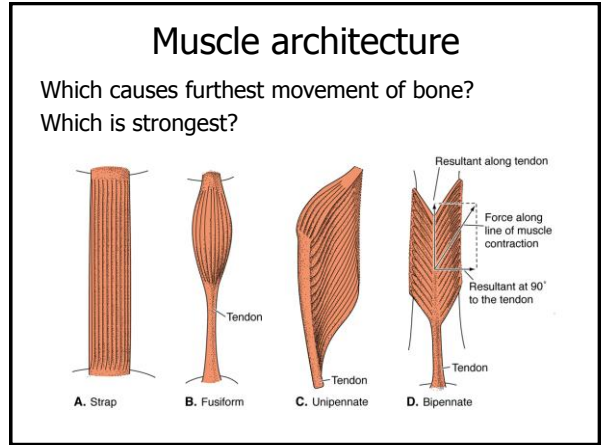
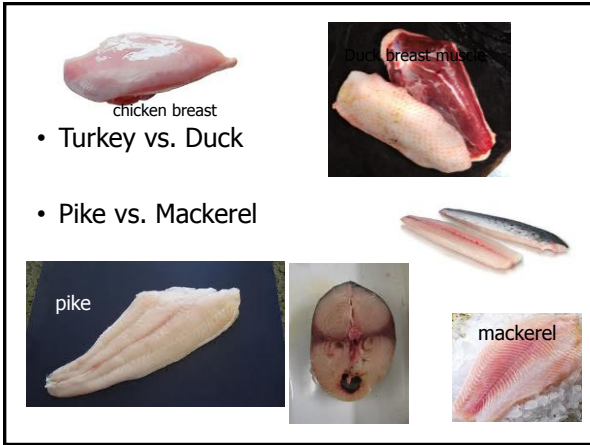


- **Oxidative** - resistant to fatigue, high rate of O_2 transfer from blood (SO)
– Myoglobin, more mitochondria
- **Glycolytic** - more prone to fatigue b/c less ATP produced (FG), ATP made quickly
- Endurance vs. Bursts of power

Fast and slow twitch muscle cells

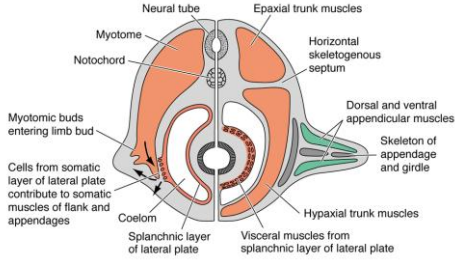
- People are born with certain ratio of slow vs. fast twitch fibers
- usually an even mix in most skeletal muscles



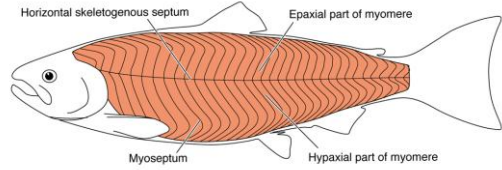


Muscle development

- Axial vs. appendicular muscle
 - Epaxials, hypaxials



Fish axial musculature and swimming

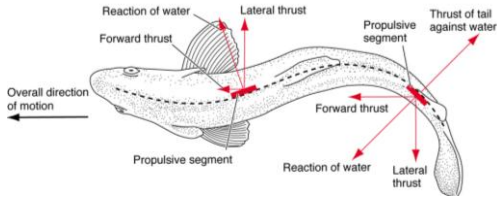


- Axials – Contraction causes bending, not shortening
- A single myomere exerts influence over a large area of spine p.355

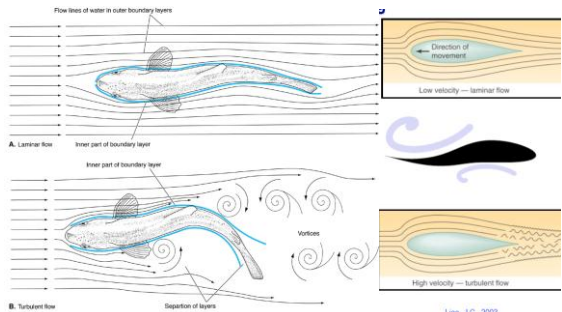
Fish axial musculature and swimming



- Zig-zag shape more pronounced at tail – affect size of undulations

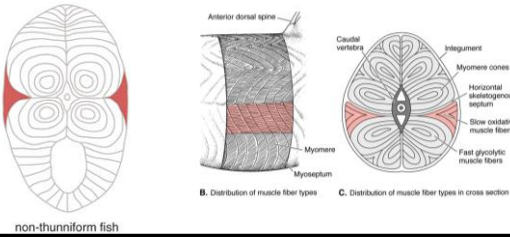


Drag increases with velocity



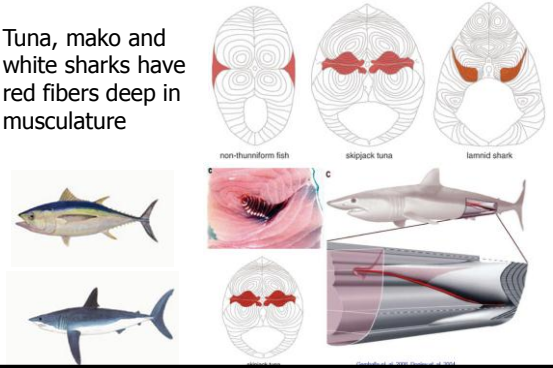
Drag increases with velocity

- Normal arrangement of red fibers allows contractions with less bending – less drag



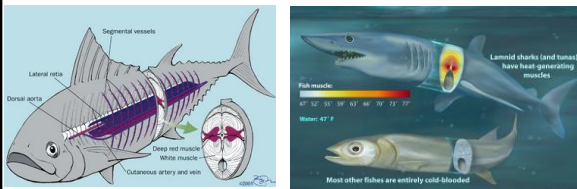
Fish endothermy

- Tuna, mako and white sharks have red fibers deep in musculature

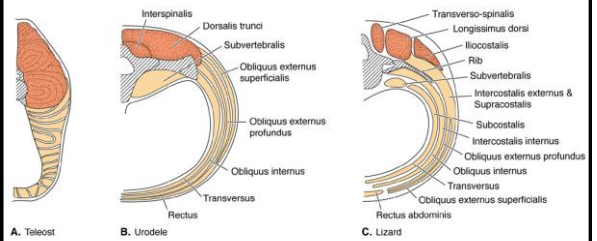


Fish endothermy

- Constant oxidation at deep red fibers allows these fish to be endothermic

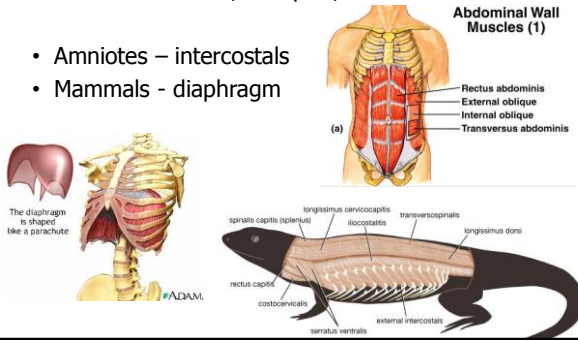


Axial muscles in tetrapods



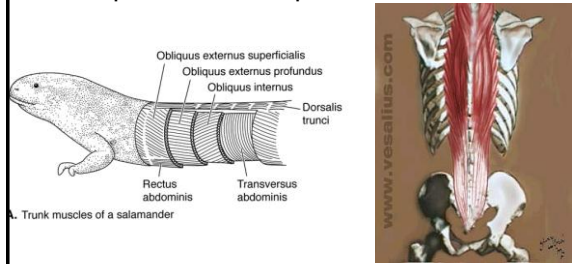
Hypaxials in tetrapods

- Rectus abdominis, Obliques, Transversus
- Amniotes – intercostals
- Mammals - diaphragm



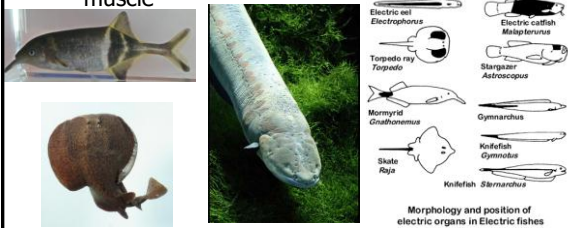
Epaxials in tetrapods

- In tetrapods, epaxial muscles function in posture and respiration



Electric organs

- Found in Chondrichthyes and Osteichthyes
- Stacked modified muscle cells, often axial muscle



Electric organs

- Cells do not contract, yet produce electrical signals via ion channels
- Strong net current is produced when many cells in a row are stimulated simultaneously

