Myology (Muscle Tissue)

1. Introduction
   A. Myology
      Homeostatic Characteristics
         i. Excitability
         ii. Contractility
         iii. Extensibility
         iv. Elasticity
   B. Functions
      i. Motion
      ii. Posture Maintenance
      iii. Heat Production

2. Muscle Types
   A. Skeletal Muscle Tissue
      i. Striated
      ii. Voluntary
   B. Cardiac Muscle Tissue
      i. Striated
      ii. Involuntary
   C. Smooth Muscle Tissue
      i. Nonstriated
      ii. Involuntary
3. Skeletal Muscle Tissue  (See illustration in text)
   A. Components
      i. Fascia.
         a. Superficial Fascia
         b. Deep Fascia
            • Epimysium
            • Perimysium
            * Fasciculi (Fascicles)
            • Endomysium
      ii. Tendon
      iii. Aponeurosis
      iv. Tendon (Synovial) Sheaths

4. Nerve and Blood Supply
   A. Blood Supply

\[
\begin{align*}
\text{ADP} + \text{P} & \rightarrow \text{ATP} \\
\text{O}_2 & \rightarrow \text{H}_2\text{O} \\
\text{e}^- & \rightarrow \text{CO}_2 + \text{H}_2\text{O}
\end{align*}
\]
B. Motor Unit (SEE HANDOUT)
   i. Large Motor Units vs. Small Motor Units.

5. Cytological / Histological Considerations
   A. Myofibers
      i. Myoblasts
   B. Sarcolemma
   C. Sarcoplasm
   D. Myofibrils
      • Fibril
   E. Myofilaments
      i. Thin Myofilaments
      ii. Thick Myofilaments
   F. Sarcomeres
      i. Z Line (or disk)
   G. Sarcoplasmic Reticulum
   H. Terminal Cisterns
   I. Transverse Tubules (T Tubules)
6. Skeletal Chemistry

   A. Thin Myofilaments
      
      i. Actin
          a. Myosin-binding site
      
      ii. Tropomyosin-troponin Complex
          a. Tropomyosin
          b. Troponin
      
      iii. Configuational Changes and Calcium

   B. Thick Myofilaments
      
      i. Myosin
          a. Cross Bridges
          b. Actin-Binding Site
          c. ATP-Binding Site

Note that there are many excellent animations on the web.
8. Neuromuscular Junction
   A. Neuron
   B. Motor Neuron
      i. Motor End Plate
      ii. Neuromuscular Junction
      iii. Synaptic End Bulbs
          a. Synaptic Vesicles
             • Calcium Gates and “Cascade of Reactions” $\rightarrow$ Exocytosis
          b. Neurotransmitters
      iv. Synaptic Cleft
      v. Acetylcholine (Ach)
         • Acetylcholinesterase (Ache)
   C. Motor Unit (Pull out your handout on this topic)
9. Energy for Contraction and Relaxation

\textit{(PULL OUT HANDOUT FROM WEB)}

A. Phosphagen System (See handout)
   - \( \text{ATP} \rightarrow \text{ADP} + \text{P} + \text{Energy} \)
   - Phosphocreatine

B. Glycogen-Lactic Acid System (See handout)
   - Calmodulin

\[ \text{1 Glucose} \rightarrow \text{2 Pyruvic acid} + \text{ATP} \]
\[ \text{Pyruvic acid} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{ATP} \]

12. Muscle Tone

A. Muscle Spindles

B. Atrophy and Hypertrophy
   i. Muscular Atrophy
      a. Disuse Atrophy
      b. Denervation Atrophy

C. Muscular Hypertrophy