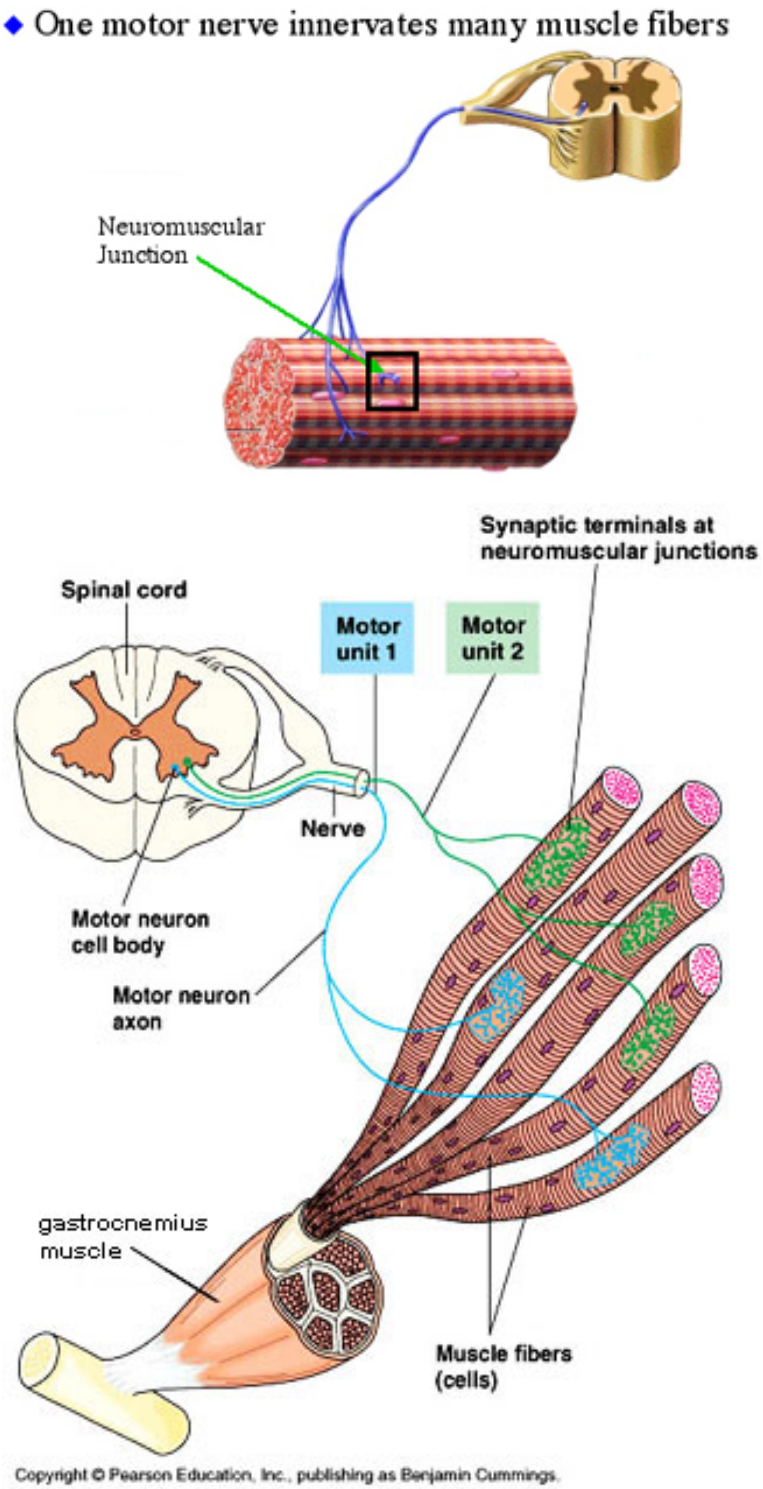
**ANSC (FSTC) 607**
**Physiology and Biochemistry of Muscle as a Food**
**Motor Unit Recruitment**

## I. Motor unit recruitment

A. The motor unit

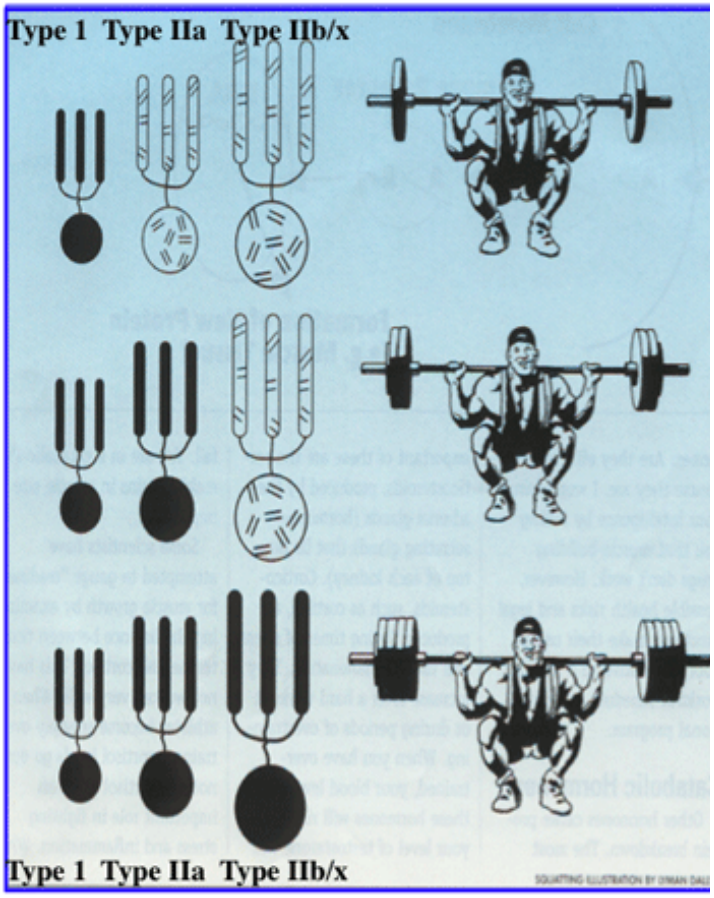
1. A motor unit consists of one motor neuron and all of the muscle fibers it contracts.
2. Size of motor unit varies with muscle and fineness of movement.
3. All muscles consist of a number of motor units and the fibers belonging to a motor unit are dispersed and intermingle amongst fibers of other units.
4. The muscle fibers belonging to one motor unit can be spread throughout part, or most of the entire muscle, depending on the number of fibers and size of the muscle



**II. Force of contraction and motor unit recruitment**

A. Motor unit recruitment depends on the force/resistance of the exercise.

1. With light intensity exercise the Type I (slow twitch) motor units are recruited.
2. When the load is increased, the Type IIa (fast twitch) will be recruited with the help of the Type I fibers.
3. When the load becomes even greater, the Type IIb/x will be recruited with the help of the Type IIa and Type I motor units.




B. Type I motor units are always firing no matter what the intensity.

**III. Motor unit recruitment, firing frequency, and fatigue**

A. The central nervous system can increase strength of muscle contraction by:

1. Increasing the number of active motor units.

B. During muscle fatigue, new motor units are recruited.

1. A 30% decline in maximal voluntary contractions was associated with a 23% increase in motor unit recruitment.
2. This occurs within 25 – 35 seconds.

C. When nearly all motor units are recruited, increase in firing frequency becomes the primary mechanism to increase motor strength.