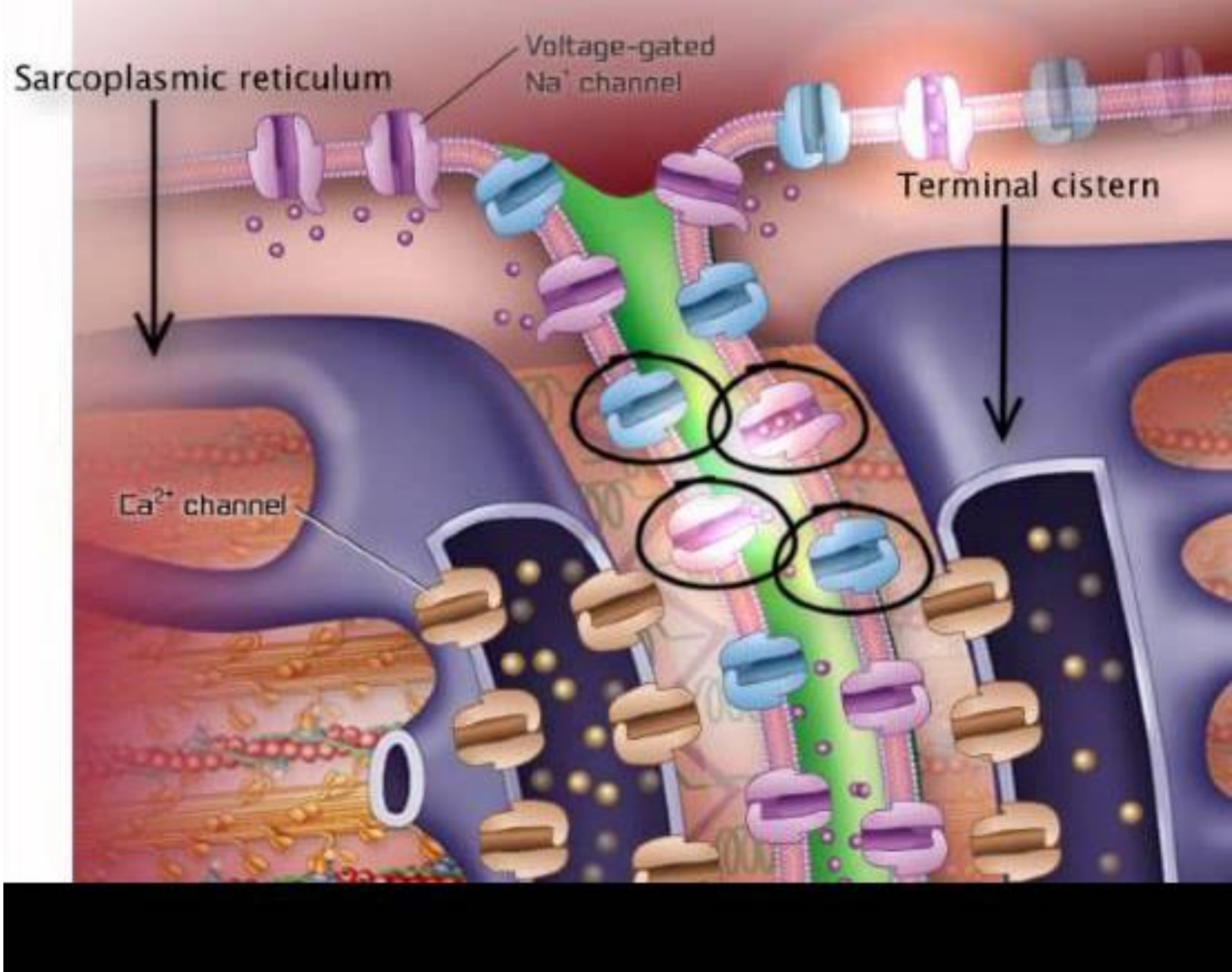
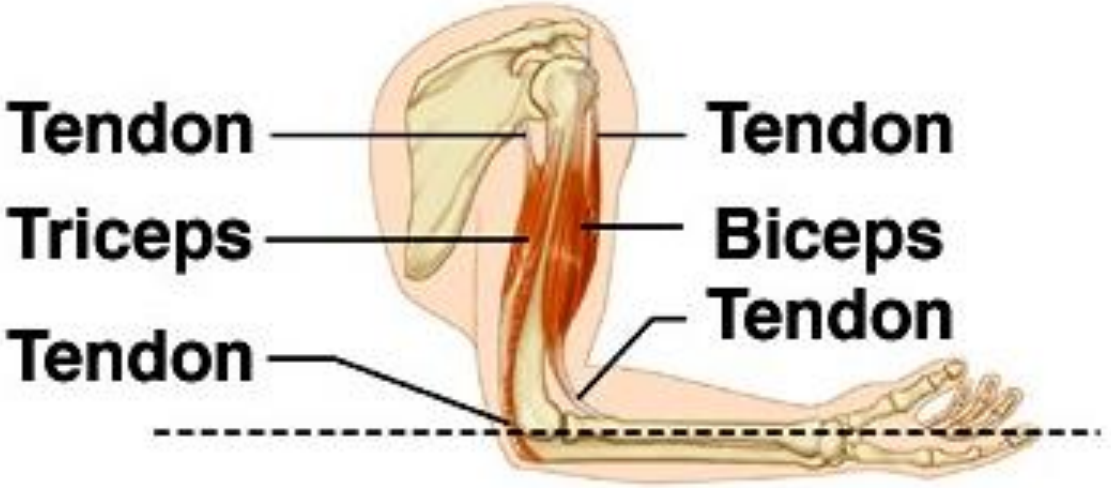
Type of Contraction

Assoc. Prof. Erkan Tuncay



Types of Contractions

- **Isometric Contraction**
- The opposite situation occurs when the muscle is fixed at both ends by its tendons. Then, when contraction occurs, the muscle cannot change its length but the tone will increase. This is called **isometric** (iso = same; metric = length)..



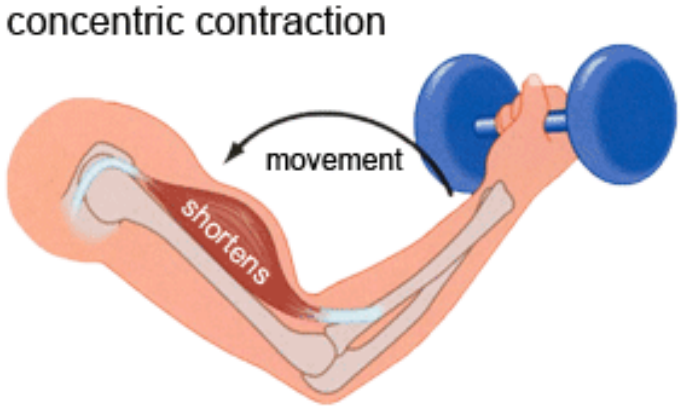
Types of Contractions

Concentric contractions

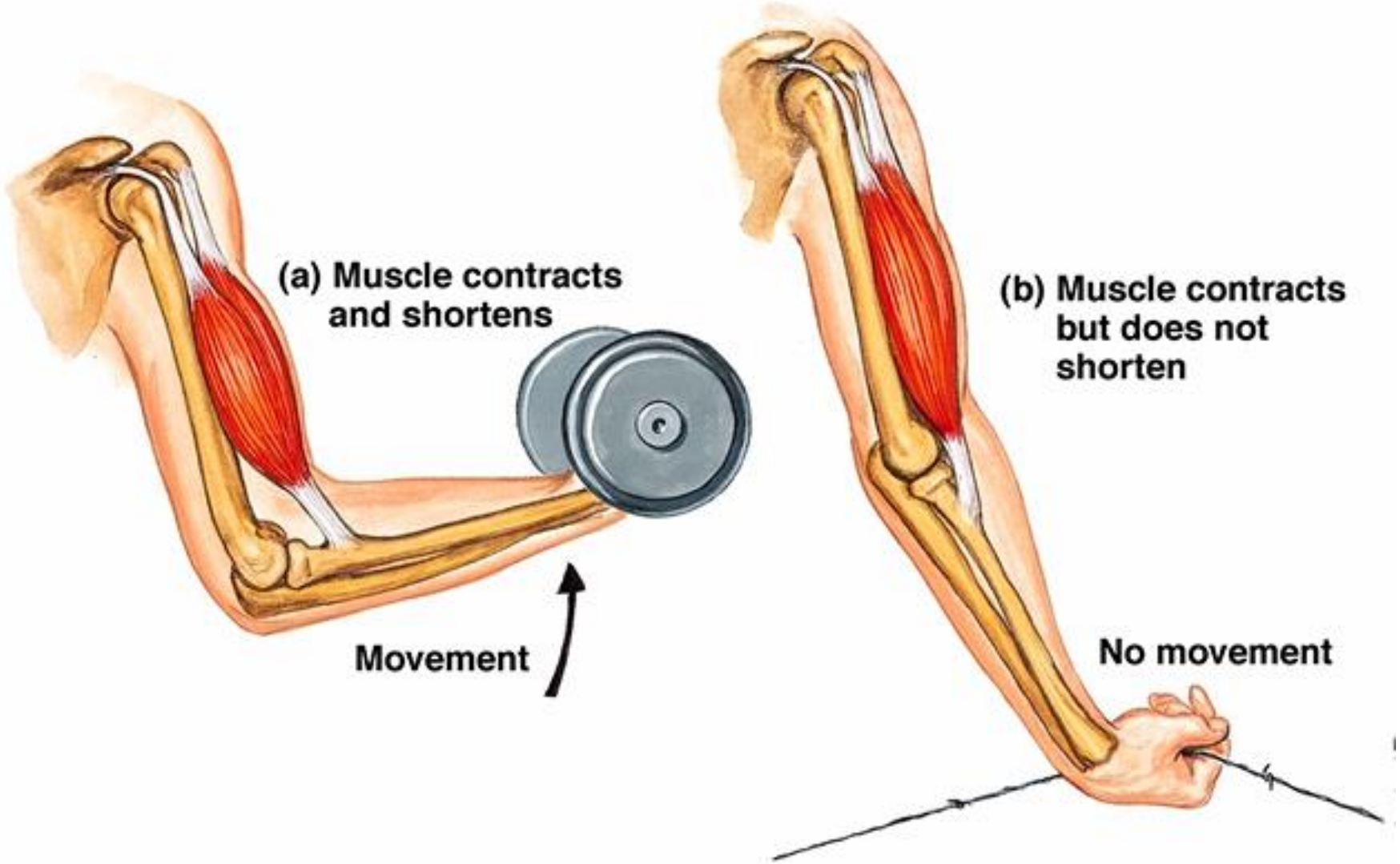
- A concentric contraction is a type of muscle contraction in which the muscles shorten while generating force, overcoming resistance.

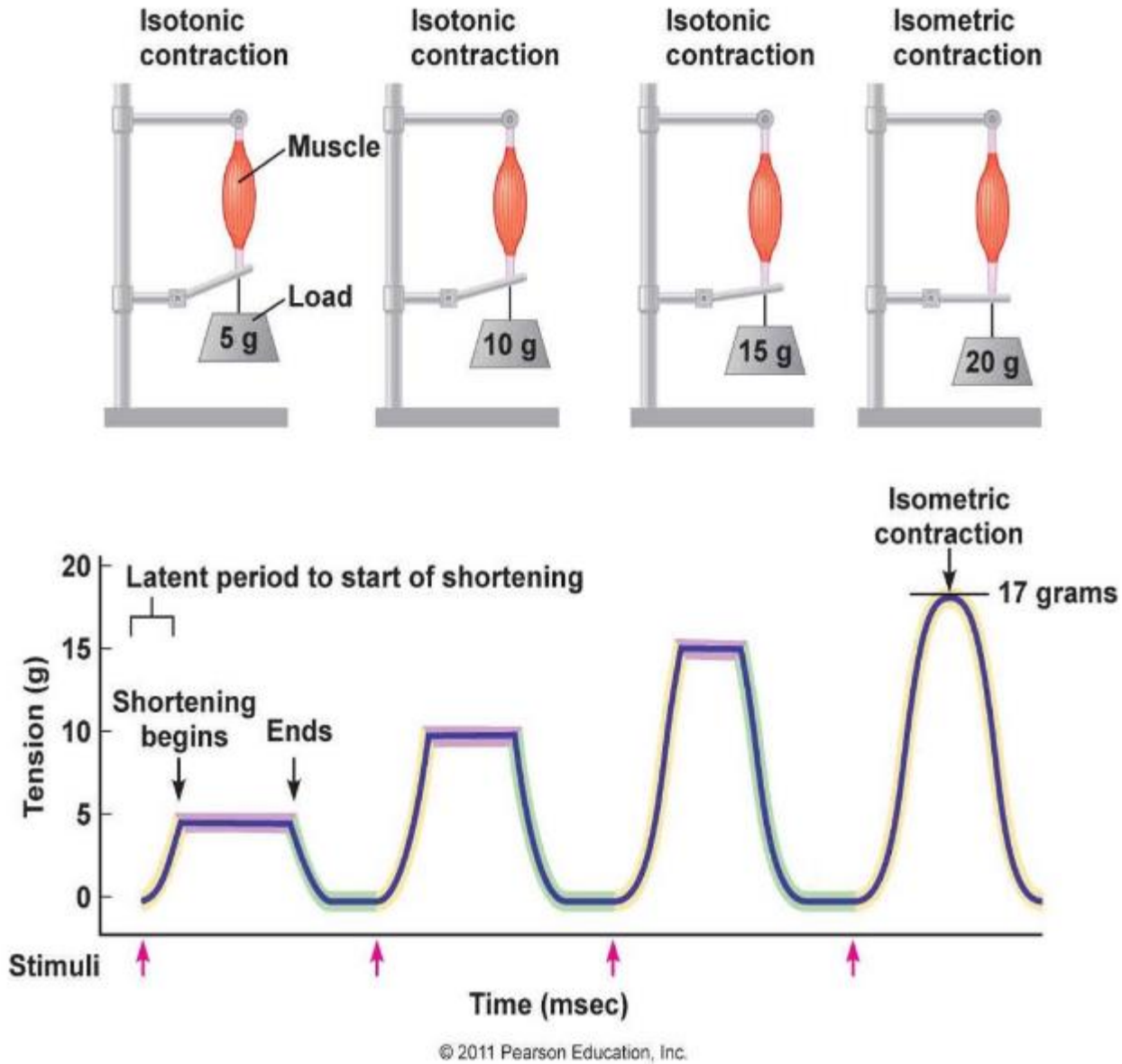
Eccentric contractions

- An eccentric contraction results in the elongation of a muscle while the muscle is still generating force; in effect, resistance is greater than force generated. Eccentric contractions can be both voluntary and involuntary.

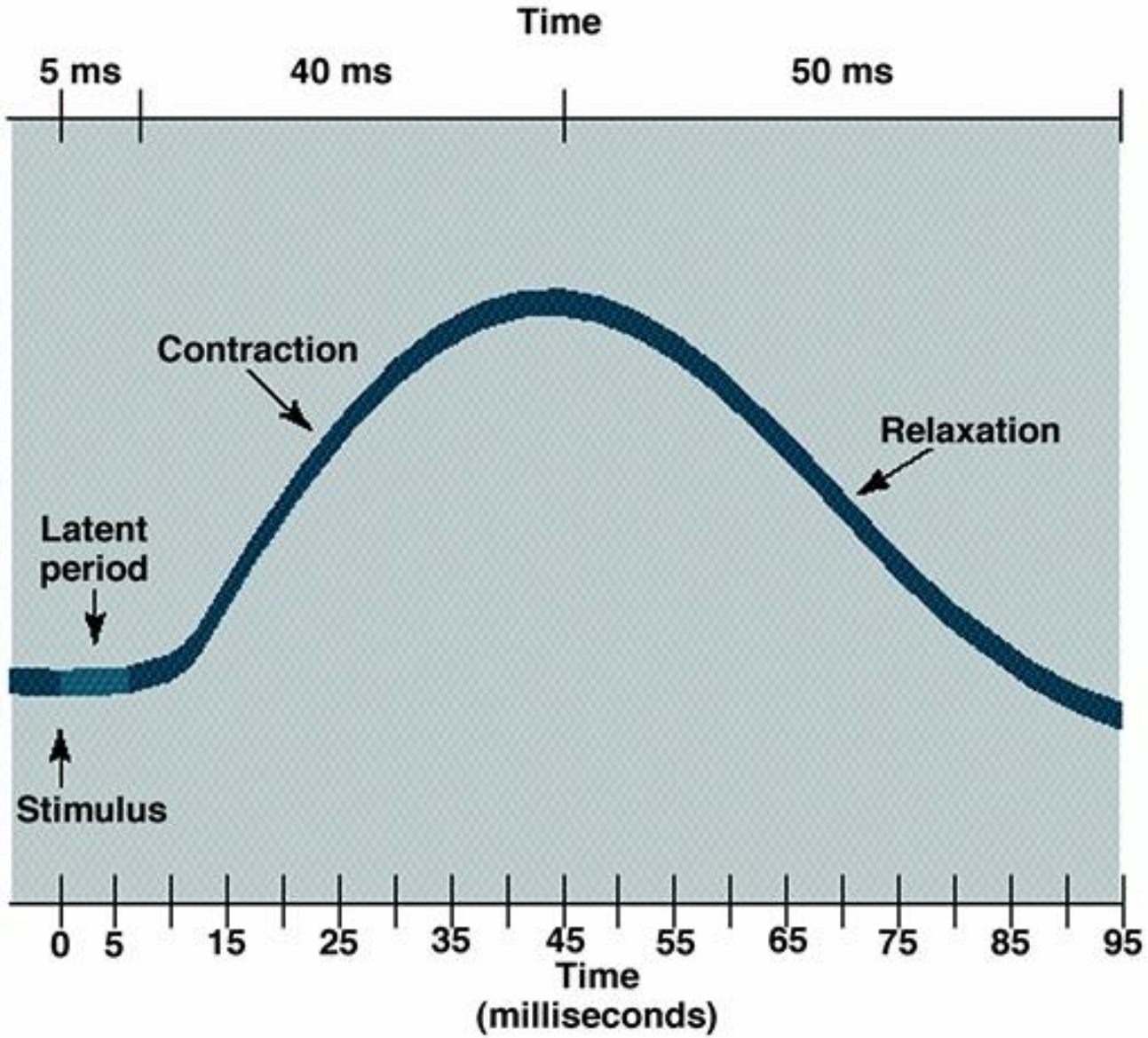


Isotonic and Isometric Contractions

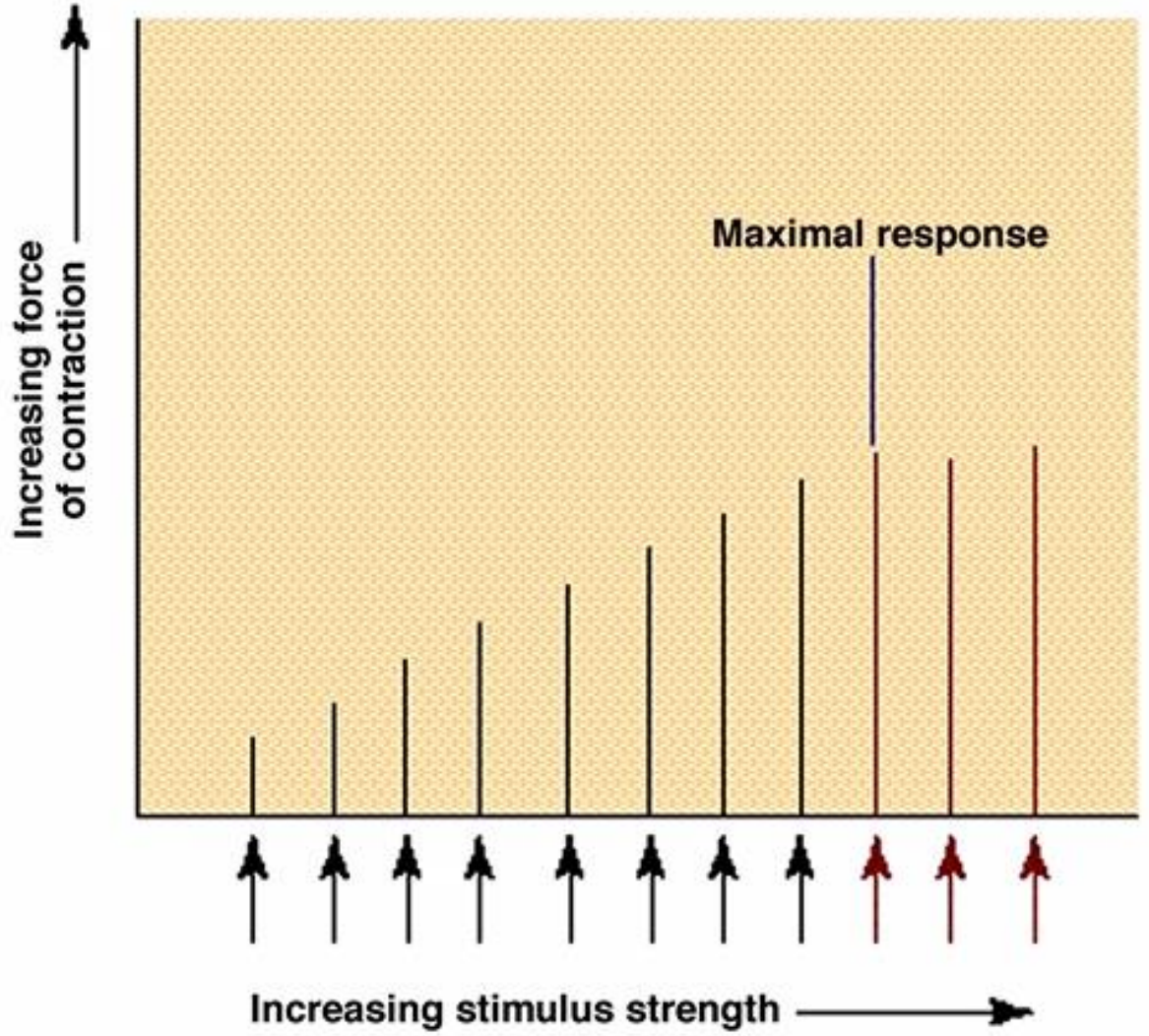




Contraction

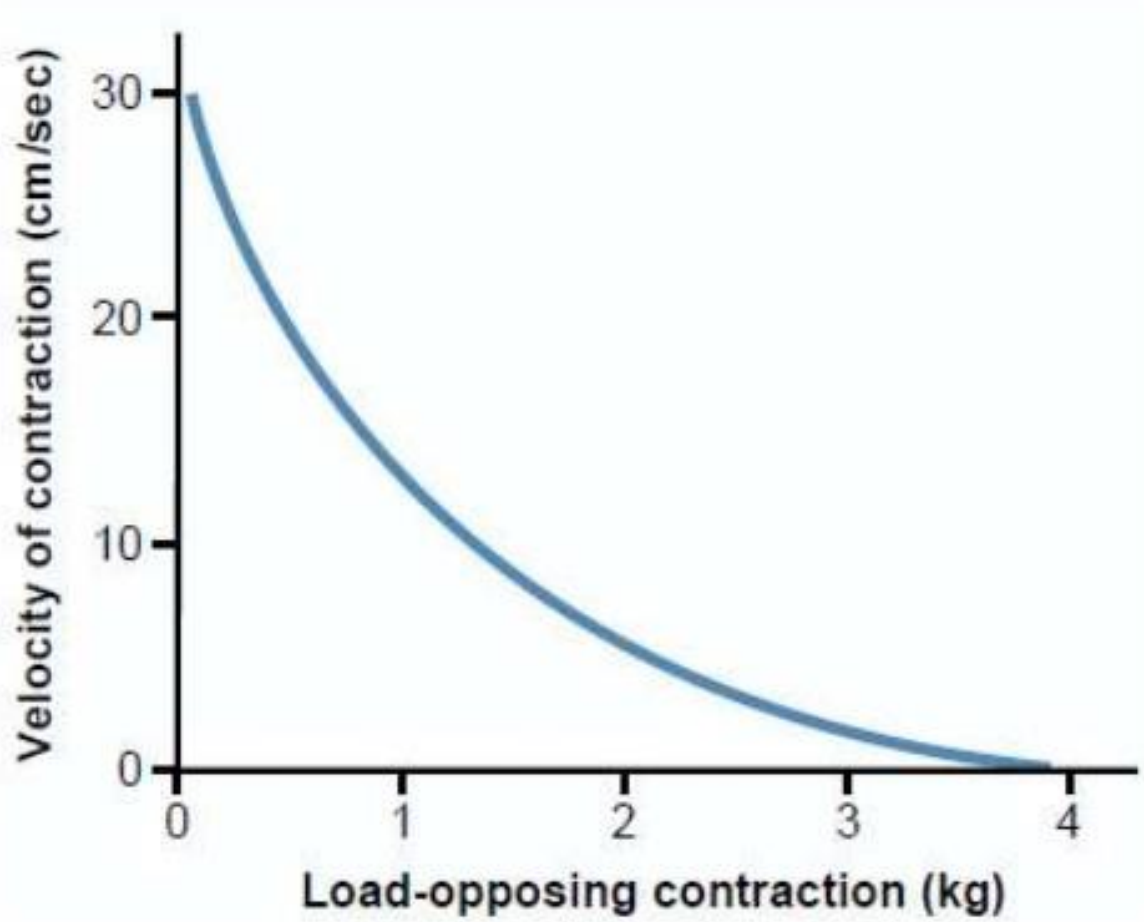


Stimulus frequency-force relationship

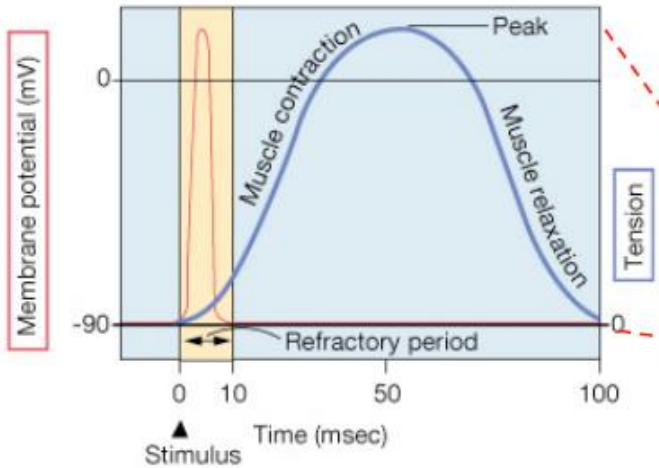


Load-Velocity relationship

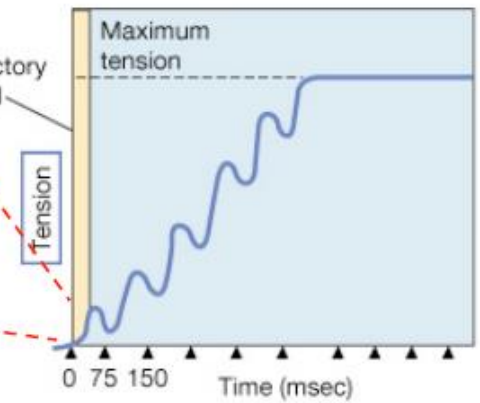
- Load velocity relationship



(a) Skeletal muscle fast-twitch fiber: The refractory period (yellow) is very short compared with the amount of time required for the development of tension.



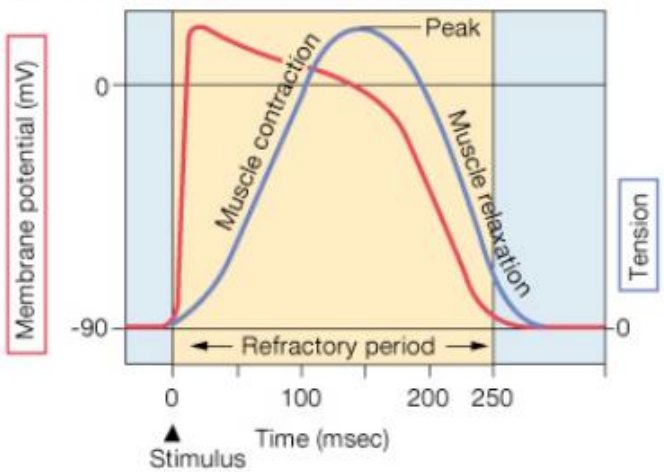
(b) Skeletal muscles that are stimulated repeatedly will exhibit summation and tetanus (action potentials not shown.)



KEY

▲ = Stimulus for action potential

(c) Cardiac muscle fiber: The refractory period lasts almost as long as the entire muscle twitch.



(d) Long refractory period in a cardiac muscle prevents tetanus.