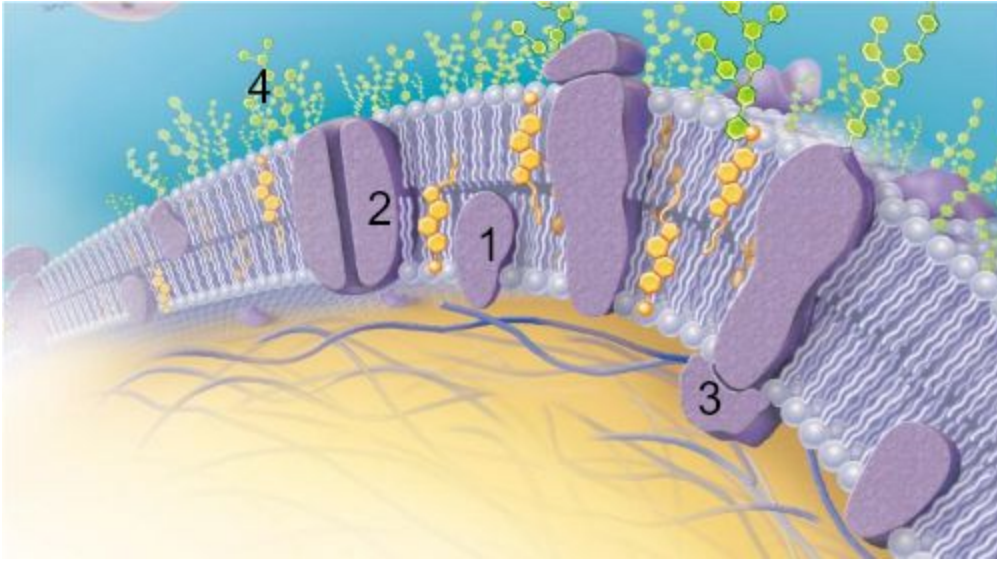
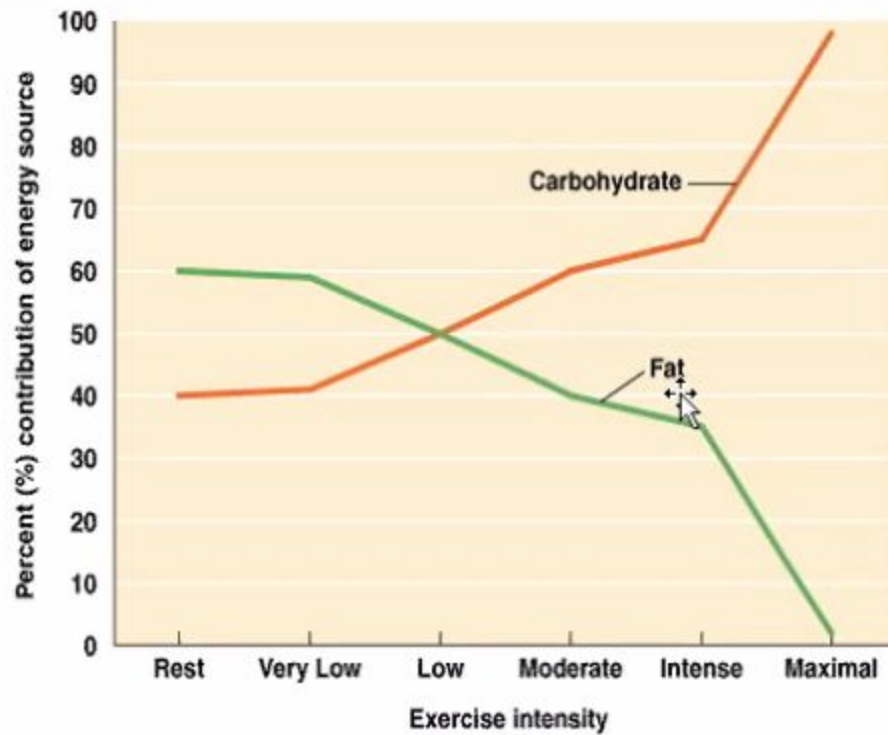


Four Types of Simple Epithelia

Simple Squamous Epithelium	Simple Cuboidal Epithelium	Simple Columnar	Pseudostratified Columnar
<ul style="list-style-type: none"> - Single layer + flattened cells - Allows material to pass by via diffusion and filtration - Protection is not important - Located in kidney glomeruli, air sacs and blood vessels as well as the Endothelium (lining of blood cells) and the Mesothelium (Epithelium of Membranes- 	<ul style="list-style-type: none"> - Single layer of cube-like cells - Made for secretion and absorption - Located in Kidney tubules, ducts and secretory portions of glands 	<ul style="list-style-type: none"> - Single layer of tall cells with oval nuclei - Made for absorption and to secrete substances like mucus and enzymes - Located in most of the digestive tract, gallbladder and ciliated variety lines 	<ul style="list-style-type: none"> - Tall with single layer of cells - Secretes substances (mucus) - Located in male sperm carrying ducts & ducts of large glands



Energy for Physical Activity





A Clinical Note



Multiple Sclerosis:

persistent inflammatory response in which **myelin sheaths** gradually destroyed (autoimmune? persistent virus?)

cycles of relapse and remission: flare-ups and then some healing and myelin regeneration; axons develop more Na⁺ channels in demyelinated areas

blindness (optic nerve), muscle weakness, clumsiness, urinary incontinence

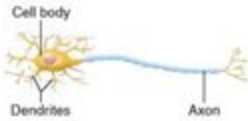
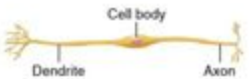
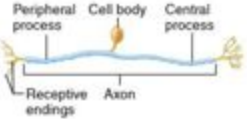
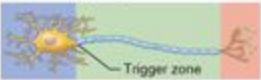
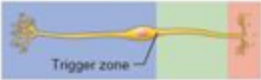

ultimately myelin destruction is permanent and axons “drop out” or degenerate

Therapy:

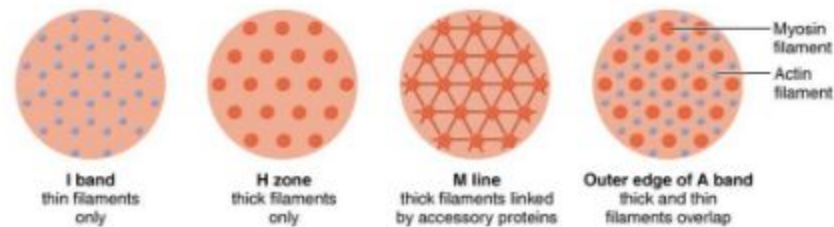
- (1) **reduce inflammatory destruction**
- (2) **manage symptoms**
- (3) **promote repair of damaged myelin**



Table 11.2-1 Comparison of Structural Classes of Neurons

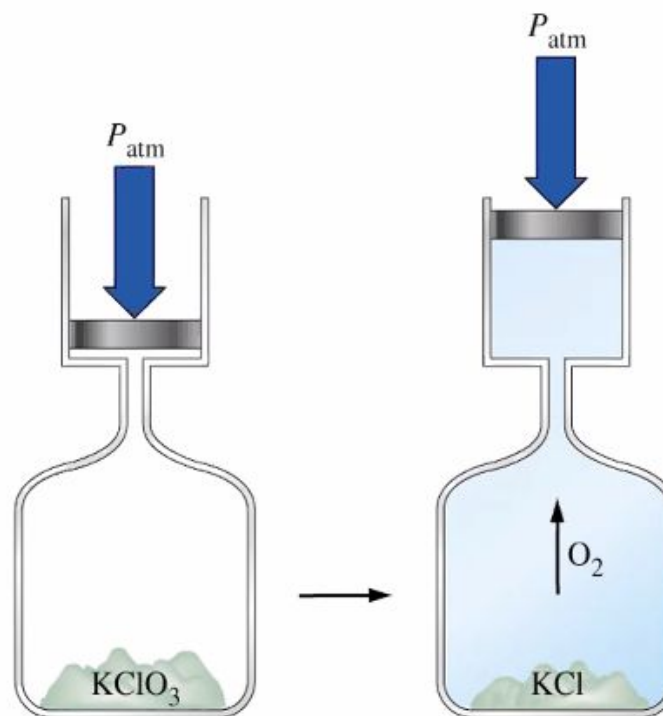
Table 11.2 Comparison of Structural Classes of Neurons		
NEURON TYPE		
MULTIPOLAR	BIPOLAR	UNIPOLAR (PSEUDOUNIPOLAR)
Structural Class: Neuron Type According to the Number of Processes Extending from the Cell Body		
Many processes extend from the cell body. All are dendrites except for a single axon.	Two processes extend from the cell body. One is a fused dendrite, the other is an axon.	One process extends from the cell body and forms central and peripheral processes, which together comprise an axon.
 <p>Cell body Dendrites Axon</p>	 <p>Cell body Dendrite Axon</p>	 <p>Peripheral process Cell body Central process Receptive endings Axon</p>
Relationship of Anatomy to the Three Functional Regions		
<ul style="list-style-type: none"> ■ Receptive region (receives stimulus). ■ Conducting region (generates/transmits action potential). ■ Secretory region (axon terminals release neurotransmitters). 		
 <p>Trigger zone</p>	 <p>Trigger zone</p>	 <p>Trigger zone</p>
<p>(Many bipolar neurons do not generate action potentials. In those that do, the location of the trigger zone is not universal.)</p>		

(e) Cross sections of a sarcomere cut through in different locations.



When potassium chlorate decomposes it produces oxygen gas. From the system's point of view (which is the convention), w is

1. positive.
2. negative.
3. No work done.



Here the gas does work on the piston to move it, so w is negative

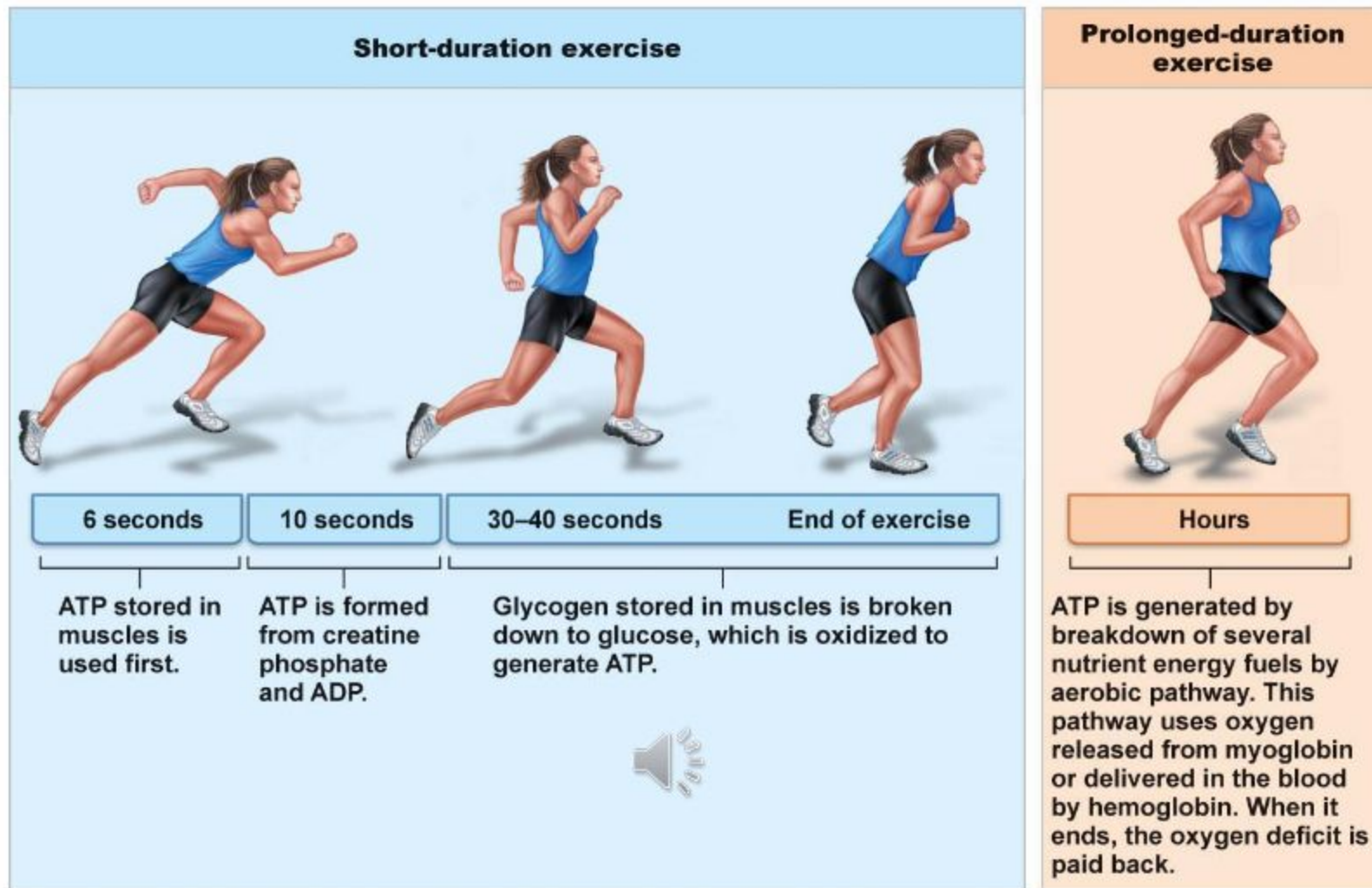
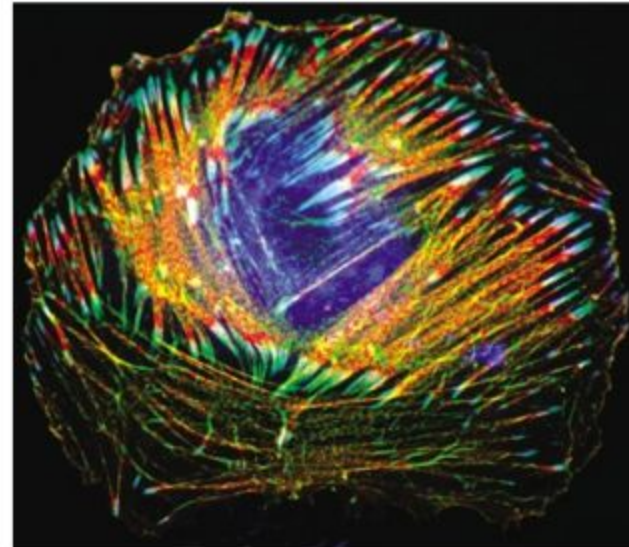


Fig. 9.17: Energy sources during short- and long-duration exercise

C1. Single-unit (unitary) smooth muscle:

- = visceral muscle; more common
 - 1) contracts as a unit & rhythmically
 - 2) electrically coupled by gap junctions
 - 3) often spontaneous action potentials
 - 4) all other smooth muscle characteristics



C2. Multiunit smooth muscle:

- eg: large airways to lungs, large arteries, arrector pili muscles of skin hair follicles, internal eye muscles for focus
 - 1) gap junctions, spontaneous, synchronized depolarizations rare
 - 2) muscle fibers structurally independent of each other
 - 3) richly supplied with nerve endings, each forms a motor unit with a number of muscle fibers
 - 4) responds to neural stimulation with graded contractions (still regulated by autonomic ns, hormones)