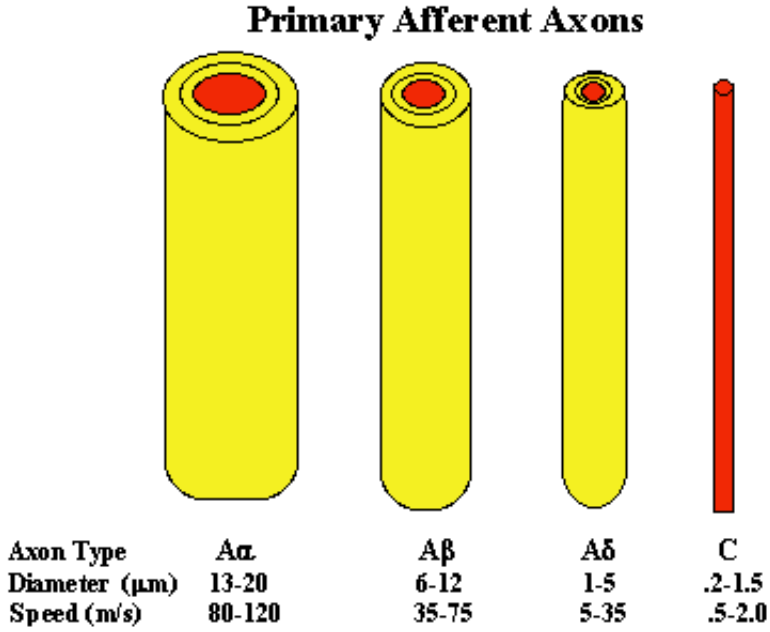
Conduction Velocity

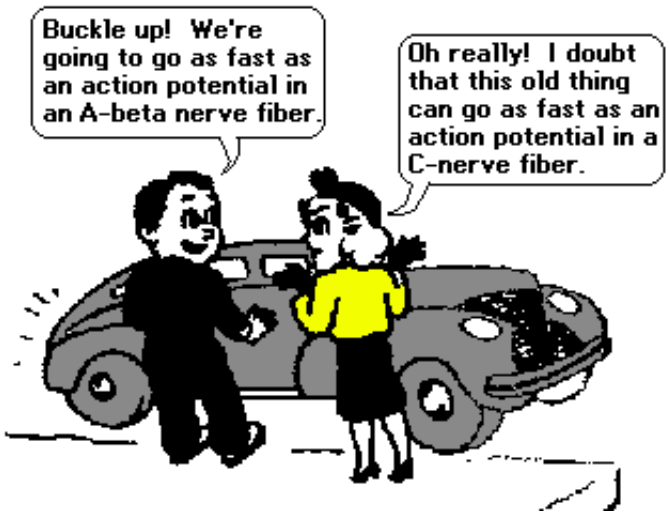
The information about touch and pain is transmitted to the spinal cord and brain by primary afferent axons - these are the nerve fibers connected to the different types of receptors in the skin, muscle and internal organs. These primary afferent axons come in different diameters and can be divided into different groups based on their size. Here, in order of decreasing size, are the different nerve fiber groups: A-alpha, A-beta, A-delta and C-nerve fibers. A-alpha, A-beta and A-delta nerve fibers are insulated with myelin. C-nerve fibers are unmyelinated. The thickness of the nerve fiber is correlated to the speed with which information travels in it - the thicker the nerve fiber, the faster information travels in it.

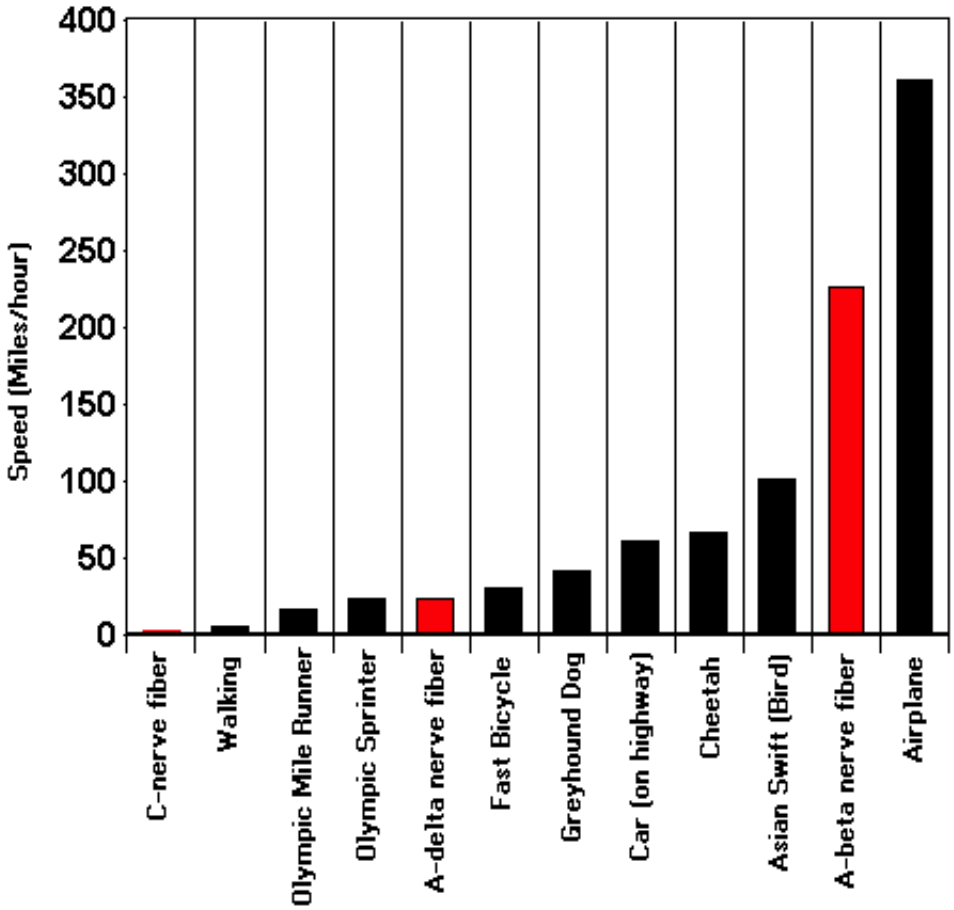


Here is some more information on the different primary afferent axons:

A-alpha nerve fibers carry information related to proprioception (muscle sense).
A-beta nerve fibers carry information related to touch.
A-delta nerve fibers carry information related to pain and temperature.
C-nerve fibers carry information related to pain, temperature and itch.

To get an idea about how these different types of nerve fibers work, think about this the next time you stub you toe. First you will feel the touch sensation of your toe hitting the ground. This is because the information related to your toe touching the ground is carried by the large, fast conducting A-beta nerve fibers...this reaches your brain first. A little bit later you will feel the pain because the information related to tissue damage (to your toe) is carried by slower conducting A-delta and C-nerve fibers.
OUCH! Here's more information on pain.





To get an idea of the speed at which action potentials travel in different types of primary afferent nerve fibers, examine this graph on the left. Action potentials in C-nerve fibers travel only about 2.2 mph - slower than you can walk. A-delta nerve fibers can conduct action potentials as fast as a sprinter in the Olympics. The large A-beta nerve fibers, which transmit information related to touch, can have action potentials traveling near the speeds of airplanes. Perhaps you can add to this graph - how fast can you run? how fast does a turtle walk?

BACK TO: Exploring the Nervous System | Table of Contents

E-mail Dr. Chudler	Survey	Newsletter	Search	Notes
				
Send E-mail	Fill out survey	Get Newsletter	Search Pages	Take Notes