**Effectors: Outline of Terms and Concepts**

**Effectors are cells specialized to give some response, e.g., muscle cells and gland cells.**

**Consider muscles as examples of effectors.**

**Contractile Proteins convert chemical energy into mechanical energy of motion and are very numerous in muscle cells.**

**A single muscle cell is called a muscle fiber. A muscle consists of many fibers bound together. The functional contracting parts of a muscle cell are the myofibrils. They consist of the contractile proteins and may occupy about 80% of the cell’s volume.**

**Types of Muscles:**

**A. Skeletal Muscles = Striated Muscles**

**Skeletal muscles make up about 40% - 45% of total body weight and move bones.**

**A tendon attaches the muscle to the bone. A ligament connects bone to bone.**

**The use of skeletal muscle is voluntary and these muscles must be stimulated by the nervous system to become activated.**

**Types of Skeletal Muscles:**

**1. Red Fibers = Slow Fibers**

 **Contain very high concentration of myoglobin.**

 **Contract more slowly than white fibers.**

 **Do not get tired easily.**

 **Do not get bigger when exercised, but increase endurance.**

**2. White Fibers = Fast Fibers**

 **Contain low concentration of myoglobin.**

 **Contract faster than red fibers.**

 **Do get tired easily.**

 **Do get bigger and stronger when exercised.**

**B. Cardiac Muscle**

**The heart is made up of cardiac muscle. The heart overall and individual heart cells can contract spontaneously – without stimulation from the nervous system.**

**Specialized for endurance.**

**Cardiac cells look striped, similar to skeletal muscle.**

**C. Smooth Muscle**

**Makes up about 3% of the body. Examples: surrounds intestines and blood vessels; forms the iris.**

**Much smaller than skeletal muscle cells.**

**Contractions are slower than either type of skeletal muscle.**

**Automatic contractions, i.e., not controlled consciously.**

**Cells do not look striped.**