# A.4.8. The Smooth Muscle

**Purpose:** To understand the major differences in action potentials and contractions in the smooth muscles.

## A. Different Types of Smooth Muscle Action Potentials

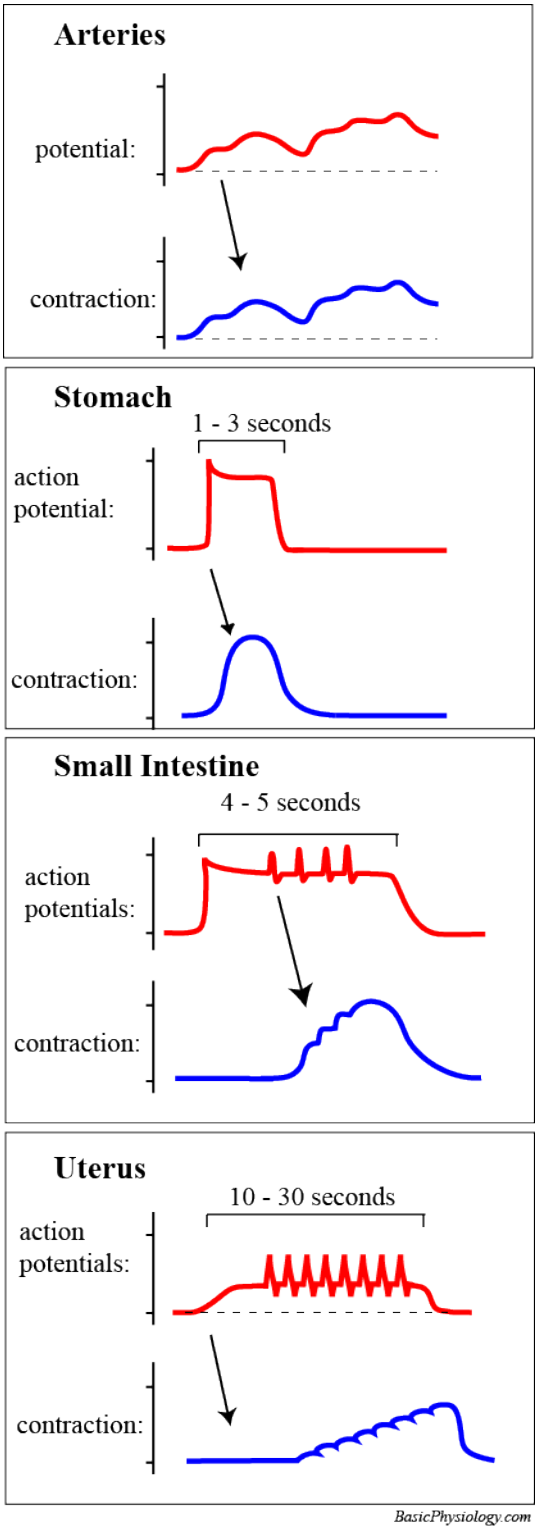
1.
There are **many types** of smooth muscles in the body and they all display different types of (action) potentials and contractions.

2.
Some smooth muscles, such as the smooth muscles in the walls of blood vessels (the **arteries and the veins)** do not even display an action potential at all! But they do show slow depolarization and repolarizations, the level of which is determined by the action of local nerve endings.

3.
Other smooth muscles resemble the heart, such as the **stomach**, with a pacemaker region, an action potential that propagates in the wall of the organ and a resulting contraction. Note that the stomach action potential lasts much longer than the cardiac action potential (5-10x).

4.
Smooth muscle action potentials in the **gastrointestinal system** often last very long. In the small intestine they can have a **plateau** that lasts for many seconds. Note here that it is the "**spikes**" that induce the contraction, not the action potential itself. These spikes occur in the plateau phase of the action potential.

5.
Other smooth muscles, such as the **uterus** and the **bladder**, show very brief action potentials, also



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| called "**spikes**". Often, these spikes occur in **bursts** and will lead to summation of contractions (**temporal summation**). | |
| 6.<br>The major ion channels in smooth muscles are **Calcium-channels** (for influx and depolarization) and **Potassium-channels** (for efflux and repolarization).<br>Sodium and sodium channels do occur in smooth muscles but do not seem to be very important. | |
| 7.<br>Please note that this is only a **very brief** introduction in smooth muscles. A much more elaborate presentation will be given at a later time (*Link*). | |