**Smooth Muscle Physiology**

**Special characteristics of smooth muscle**
- **NO CROSS-STRIATIONS!**
- This is because actin and myosin are not arranged in orderly arrays. But they are still present
- Instead of Z-lines, there are DENSE BODIES in the cytoplasm
- **TROTONIN IS ABSENT**
- There are relatively few mitochondria
- There is no steady “resting membrane potential” – it fluctuates according to activity

**Types of smooth muscle**
- **Unitary, or Visceral:**
  - Large sheets
  - Many low-resistance gap junctions
  - Functions as a syncytium
  - Mainly found in hollow viscera
  - Nerve endings arrive at only a few of the cells; the action potential spreads to the others by gap junction conduction
- **Multiunit smooth muscle:**
  - Individual muscle units with few (or none) gap junctions
  - An example is the iris of the eye
  - Each cell has its own nerve ending

**Blood vessels have both unitary and multi-unit smooth muscle in them.**

**UNITARY SMOOTH MUSCLE ELECTRICAL ACTIVITY**
- UNITARY SMOOTH MUSCLE Characterized by
  - **INSTABILITY OF THE MEMBRANE**
  - **CONTINUOUS, INVOLUNTARY, IRREGULAR CONTRACTIONS**
  - This continuous state of partial contraction is called TONUS
  - Resting membrane potential varies – in periods of quiescence its between -20 to -65mV, but it all depends on how active the tissue is.
  - There are slow sine-wave fluctuations of membrane potentials, with random spikes which sometimes overshoot the 0-line
  - The spikes last about 50 ms
  - If you manage to catch a smooth muscle in a moment of inactivity, and stimulate it, the delay of the excitation-contraction coupling is about 0.5 seconds