1. Dr K’s office hours:

   Today          2:30 - 3:30 PM       (Meeting room: 3502 Pacific Hall)
   Fridays        11:00 AM - noon      (Meeting room: 3501 Pacific Hall)

2. Dr K’s problem-solving session: Wed 5-6 in 3500 Pacific Hall
   Thurs 5-6 in 3500 Pacific Hall.

3. Midterm exam will cover through Autonomic Nervous System (not Hormones)

4. Dr. K’s e-mail: wkristan@ucsd.edu (put BIPN 100 in the subject line)

5. TA sections, office hours:

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<td>SEQUO 148.....Winjet Chou...............</td>
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<td>SEQUO 147.... Saatchi Patell...............</td>
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<td>WLH 2115 ..... Justine Liang...............</td>
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<td>WLH 2206 ...... Hao Shi....................</td>
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<td>WLH 2208...... Mallorie Nguyen............</td>
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Last lecture: Reflex arcs in the spinal cord

**Stretch reflex** (monosynaptic, myotatic)
Stretch receptors in a muscle.
Make monosynaptic, excitatory connections to motor neurons.
Activates the same muscle (and **agonists**)
Makes di-synaptic inhibitory connections that inactivates the **antagonists**.

**Flexion reflex**
Pain receptors in the arms and legs.
Make polysynaptic, excitatory connections to activate flexor motor neuron.
Make polysynaptic, inhibitory connections to inactivate extensor motor neurons.

**Crossed extension reflex**
Interneurons go across the spinal cord that make polysynaptic:
excitatory connections to activate extensor motor neuron.
inhibitory connections to inactivate flexor motor neurons.

Also, ways to record from the human brain:
Brain electrodes (single neurons); EEG; MEG; fMRI; PET
Stimulating the brain

Focal electrical stimulation
- extremely invasive
- well localized

(Wilder Penfield, 1959)

Transcranial magnetic stimulation (TMS)
- non-invasive
- poorly localized
Major components of the nervous system

1. Peripheral nervous system (PNS)

**Dorsal root ganglia** (singular: **ganglion**)--group of neurons.

Located just outside the spinal cord or near sensory organs.

**Nerves**--bundles of sensory and/or motor neuron axons.

Major nerves (l/r paired) named for their origin:

- **12 cranial nerves**: in the head (the cranium)
- **30 spinal nerves**: from the spinal cord

Nerve branches usually named for where they end, usually in Latin.
Major components of the nervous system

1. Peripheral nervous system (PNS)

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2. Autonomic nervous system (ANS)

   Ganglia, nerve networks, and nerves outside the CNS

   Also includes part of the CNS

   More later.....
3. Central nervous system (CNS)
Major areas of the cerebrum (aka cerebral cortex)
Regions of the spinal cord

From the back

Cervical cord

Thoracic cord

Lumbar cord

Sacral cord

From the side

Vertebrae

Spinal cord
Dermatomes viewed from the front

Dermatomes viewed from the side

Spinal cord segments

Cervical

Thoracic

Lumbar

Sacral

From: Berne & Levy Physiology, 6th Ed.
Organization of the nervous system:
Sensory pathways
Somatosensory cortical representations
Dorsal column-medial lemniscus system
Anterolateral system

aka: ventrolateral tract
aka: spinothalamic tract
Connections between the thalamus and somatosensory cortex:

SI = primary somatosensory cortex
SII = a second somatosensory area in the cortex
VPLo and VPLc = ventral posterolateral nuclei of the thalamus
VPM = ventral posteromedial nucleus of the thalamus
LP = lateral posterior nucleus of the thalamus
Areas 1, 2, 3a&b, 4, 5, 6 are all sub-areas within somatosensory cortex

Connections between sub-areas of somatosensory cortex:

SSA = supplementary sensory area of the cortex

Please note: the purpose of this figure is not to make you memorize all of these connections, but rather to show you the richness and complexity of connections that participate in just the primary processing of somatosensory information.