Introduction to Bioelectricity

Week 1: Introduction to the Nervous System
Lecture 1.2: Simple neural circuits

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Week 1: Introduction to the nervous system

- Lecture 2: Simple neural circuits
1.2: Simple neural circuits

- Sensory input

1. Hammer tap stretches tendon, which, in turn, stretches sensory receptors in leg extensor muscle

2. (A) Sensory neuron synapses with and excites motor neuron in the spinal cord
   (B) Sensory neuron also excites spinal interneuron
   (C) Interneuron synapse inhibits motor neuron to flexor muscles
1.2: Simple neural circuits

- Motor output

3A (A) Motor neuron conducts action potential to synapses on extensor muscle fibers, causing contraction
3B
3B (B) Flexor muscle relaxes because the activity of its motor neurons has been inhibited
4. Leg extends
1.2: Simple neural circuits

- Bioelectric signals
1.2: Simple neural circuits

- Histogram
1.2: Simple neural circuits

- Muscle stretch receptors
1.2: Simple neural circuits

• Stretch reflex
1.2: Simple neural circuits

- Signaling flow

![Diagram of neural circuit](NEUROSCIENCE, Third Edition, Figure 15.9 (Part 3) © 2004 Sinauer Associates, Inc.)
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• Anatomy of the inner ear
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- Sensory input
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- Signal pathway
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- Motor output
1.2: Simple neural circuits

- Simulated head-turning
1.2: Simple neural circuits

- Clinical use

![Diagram of ocular reflexes in conscious patients](image-url)
1.2: Simple neural circuits

- Clinical use

| Ocular reflexes in unconscious patients |  
|----------------------------------------|---|
| (3) MLF lesion (bilateral)             | (4) Low brainstem lesion |
| Cold H₂O                               | Cold H₂O                  |
| Warm H₂O                               | Warm H₂O                  |

![Diagram showing ocular reflexes in unconscious patients](https://example.com/diagram.png)