

# The Nervous System

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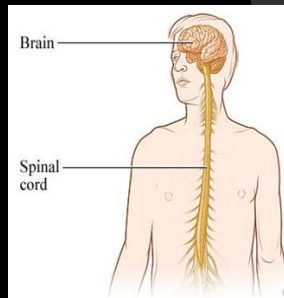
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## The Nervous System : Design

Central Nervous System (CNS): brain and spinal cord.

Peripheral Nervous System (PNS): nerves of the body



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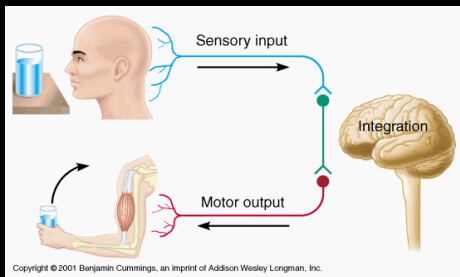
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## The Nervous System : 3 Steps

*Sensory* - gathers info

*Integrative* - information is brought together

*Motor* - responds to signals, homeostasis



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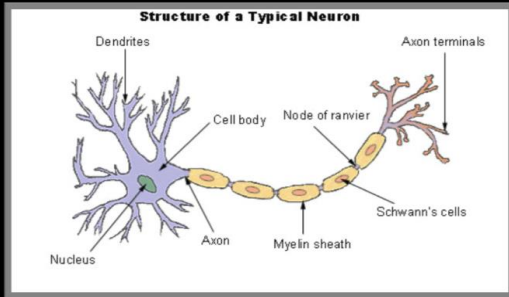
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## The Nervous System : Cell Design

*Myelin* - insulation surrounding axons

*Nodes of Ranvier* - gaps in the insulation




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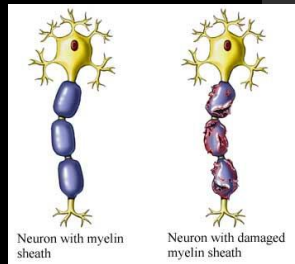
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## The Nervous System : Cell Design

### Myelin Sheaths

- these serve as insulation around the axon

Schwann cells supply the myelin for neurons.




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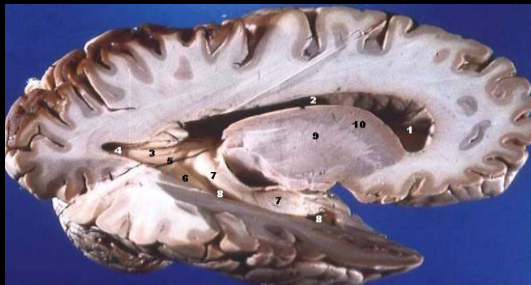
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## The Nervous System : To sheath or not to sheath

Myelinated (white matter) – myelinated axons

Unmyelinated (grey matter) - unmyelinated




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## Interesting Facts about the Neuron

- Longevity
- Do not divide
- High metabolic rate

The nerve fibers of newborns are unmyelinated - this causes their responses to stimuli to be coarse and sometimes involve the whole body. Try surprising a baby!



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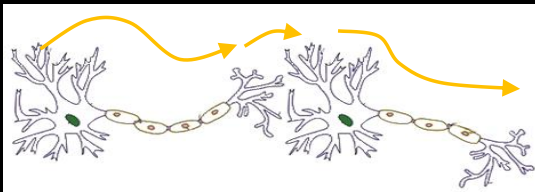
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## The Nervous System : Pathway

Dendrite → cell body → along axon →  
synapse (gap) → dendrite



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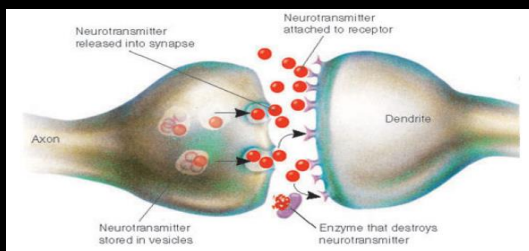
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## The Nervous System : Pathway

To complete the signal, a NEUROTRANSMITTER is released at the gap to signal the next neuron.

Receptors on the dendrite receive the message



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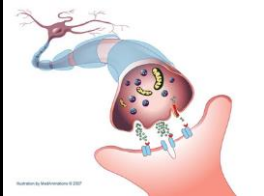
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### Types of Neurotransmitters

Acetylcholine - stimulates muscle contraction  
 Monoamines - Norepinephrine & Dopamine  
 (sense of feeling good, low levels = depression)  
 Serotonin (sleepiness) and mood




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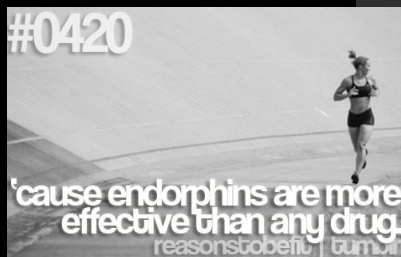
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Endorphins = reduction of pain

produced during exercise, excitement, pain, love  
 and they resemble the opiates in their abilities to  
 produce a feeling of well-being.

The name  
 "endorphin" comes  
 from endo- and -  
 orphin; intended to  
 mean "a morphine-  
 like substance  
 originating from  
 within the body."




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### Impulse Processing

Neuronal pool - groups of neurons that work  
 together to perform a common function



These "pools" help us  
 remember sequential tasks,  
 like tying a shoe or riding a  
 bike.




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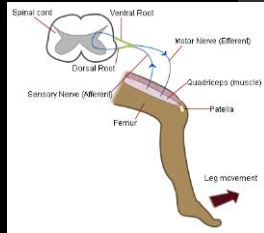
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## Simple Nerve Pathways : Reflex

Reflex arc = simple path, only includes a few neurons ( involuntary, instantaneous )

Knee-jerk reflex  
= maintains uprightedness

Withdrawal reflex  
= avoidance of painful stimuli




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## Nerve Pathways

Your goal for this week is to follow a complete nerve pathway:

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