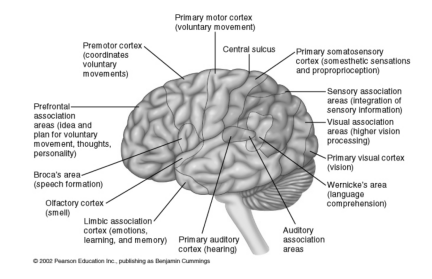
Brain

Forebrain	Consists of Cerebrum and Diencephalon
Cerebellum	Inferior to the forebrain
Brainstem	Consists of Midbrain, Pons and Medulla Oblongata

Forebrain (Cerebrum)



Cerebrum (Forebrain)

Primary Somato sensory Cortex	Processes somatic sensory inform-ation	1)Somesthetic sensations such as touch, temperature and pain
		2)Proprioception such as awareness of muscle tension, joint and limb position
Primary Motor Cortex	Initiates voluntary movement	Actions that require thought such as playing the piano

Cerebellum

Cerebellum

Location	Inferior to forebrain, posterior to brain stem
No direct connection with muscles	Functions at uncons-cious level

Roles of Cerebellum

Receives variety of information	Information about voluntary muscle activity from motor cortex
	Sensory information from proprioceptors throughout body
	Information from visual and equilibrium pathways
Integrate this information and elicit a coordinated response	Sends its coordination plan to primary motor cortex
	Primary motor cortex signals the muscles to elicit desired response

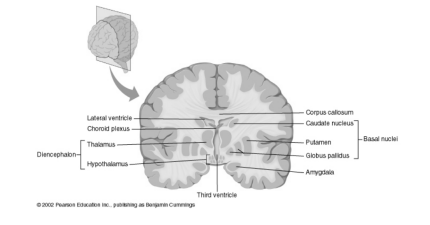
Cortical Control of Voluntary Movement

Pyramidal Tracts	**Direct** pathways from primary motor cortex to spinal cord	Corticospinal tracts (Anterior & Lateral)
		Control small group of muscles that contract independently of each other
Extrap-yramidal Tracts	**Indirect** connec-tions between brain and spinal cord	Includes all motor pathways outside pyramidal system
		Control large group of muscle that contract together to maintain posture and balance

Cerebrum (Anterior)

Subcor-tical Nuclei	Regions of gray matter in the cerebrum
~ Includes Basal Nuclei	Masses of gray matter scattered in the cerebrum
	Components : Caudate Nucleus, Putamen, Globus Pallidus
	Important in modifying movements (to make sure they don't interfere with one another)

Basal Nuclei



Basal Nuclei Function

Inhibits motor function	Controls muscle activity
Receives input from:	Entire cerebral cortex and other subcortical nuclei like subthalamic nucleus of diencephalichalon and red nucleus
No direct connection with motor pathway	Sends impulses to primary motor cortex through the thalamus
Complex role in motor control	In charge of stopping, starting and monitoring movements by primary motor cortex

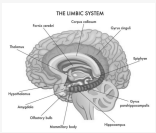
Basal Nuclei Function (cont)

	Particularly involved in sustained, stereotyped movements (riding a bicycle, eating)
Inhibits antagonistic (unnecessary) movements	Ex of antagonistic - bicep and tricep contraction
	This enables multitasking

Basal Nuclei Damage

Impairment results in	Disturbance in muscle tone and posture
	Tremors
	Abnormally slow movements

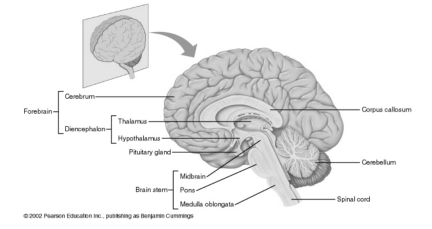
Limbic System



Role of Limbic System

Control emotional aspect of behaviour	Amygdala
Involved in memory	Hippoc-ampus
Works with prefrontal lobes to elicit relati-onship between feelings and thoughts	

Diencephalon (Forebrain)



Diencephalon

Includes 2 stuctures	Thalamus
	Hypothalamus

Thalamus

Relay station for all sensory input except for smell	Relay station for emotion impulses
	Relay station for motor impulses from cerebellum and basal nuclei
Gateway of cerebral cortex	Process the information before sending it to cerebral cortex to be interpreted
Contains most of afferent neuron synapse	

Nuclei of Thalamus

Nuclei of Thalamus

Ventral Posterola-teral Nucleus	Receives somatic sensory information (touch, pain, pressure)
	Relays information to somato-sensory cortex
Ventral Lateral Nucleus	Receives motor information from basal nuclei and cerebellum
	Relays information to motor cortex
Medial Geniculate Body	Sends auditory information from auditory receptors to auditory region of cerebral cortex
Lateral Geniculate Body	Sends visual information to occipital region of cerebral cortex

Hypothalamus

Location	Inferior to thalamus, superior to brain stem
	Interconnected to cerebral cortex, thalamus and other parts of brain stem

Role of Hypothalamus

Important in regulating homeostasis	Senses chemical and thermal qualities of blood
It is crucial to :	Regulate the heart rate and arterial blood pressure
	Control movements and glandular secretions of stomach and intestines
	Regulate respiratory rate
	Regulate water and electr-olyte balance
	Control hunger and regulate body weight