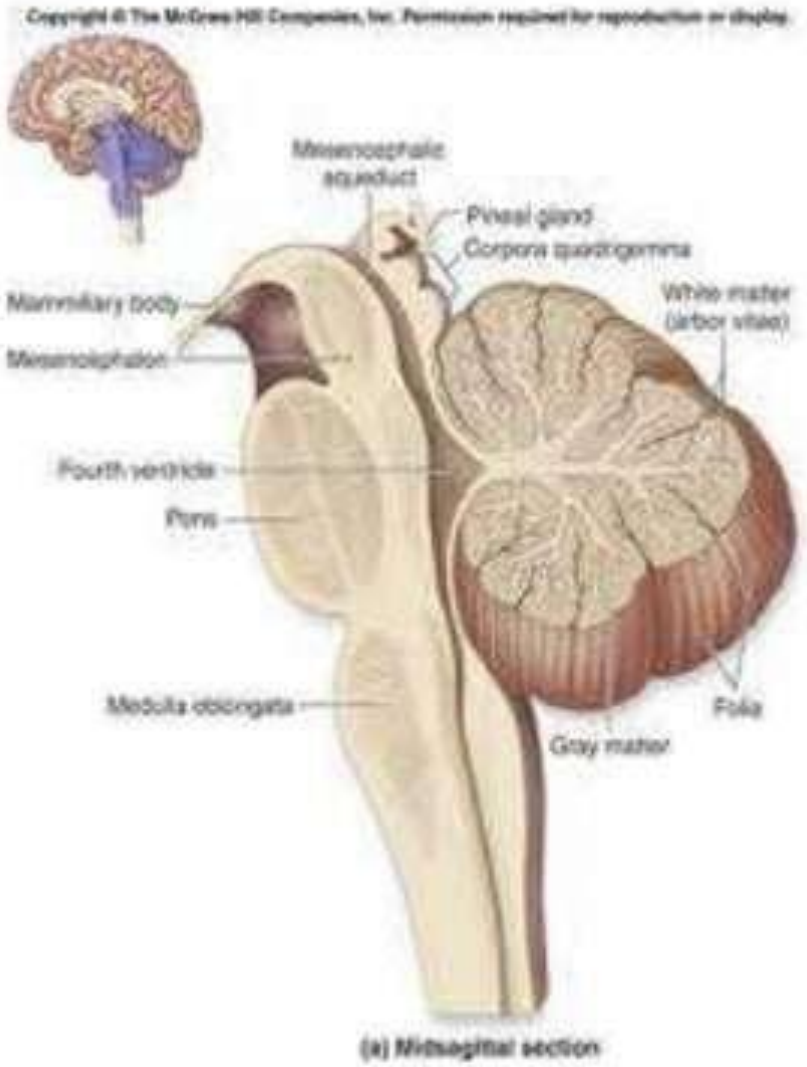
Cerebellum
Zulcaif

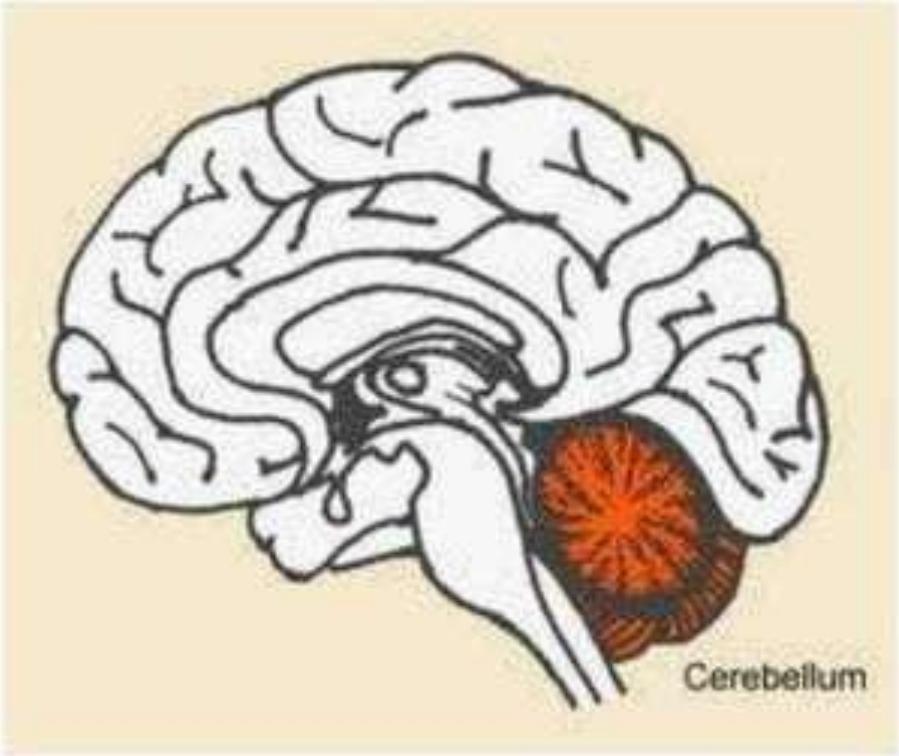


DEFINITION

The cerebellum (Latin for little brain) is a region of the brain that plays an important role in motor control..

LOCATION

It is located at the back of the brain, underlying the occipital and temporal lobes of the cerebral cortex



ANATOMY

Main parts

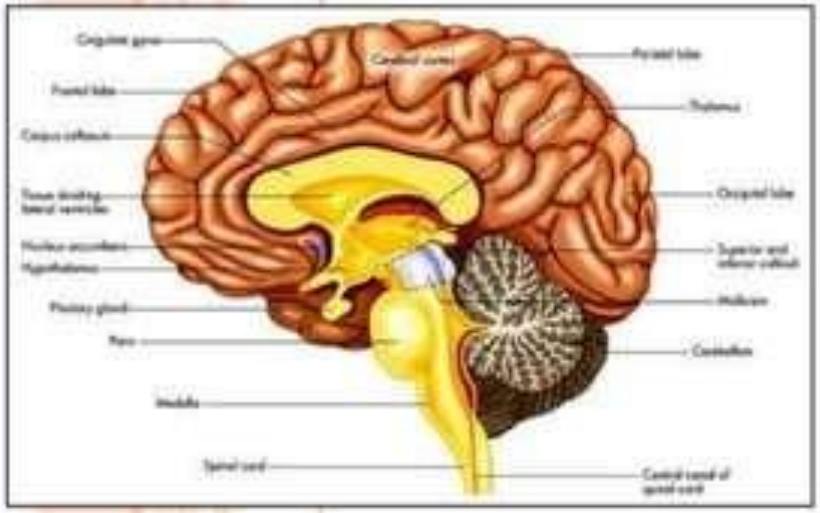
- two hemispheres
- vermis

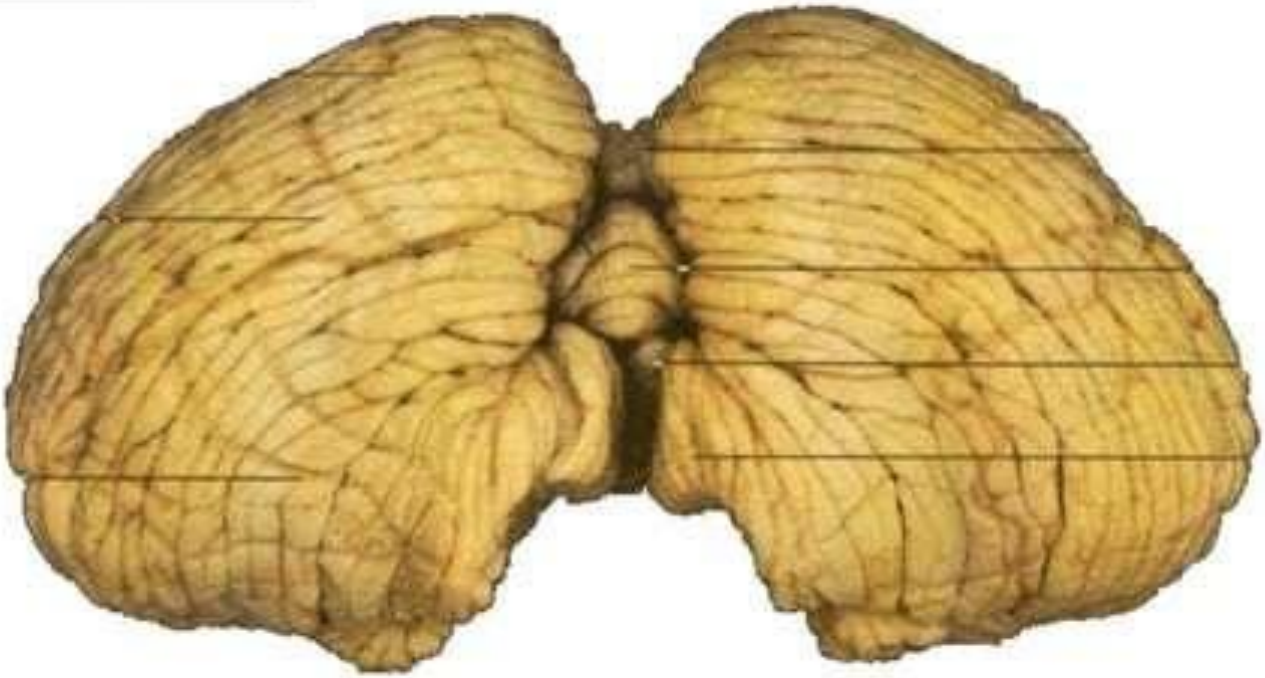
Fissures

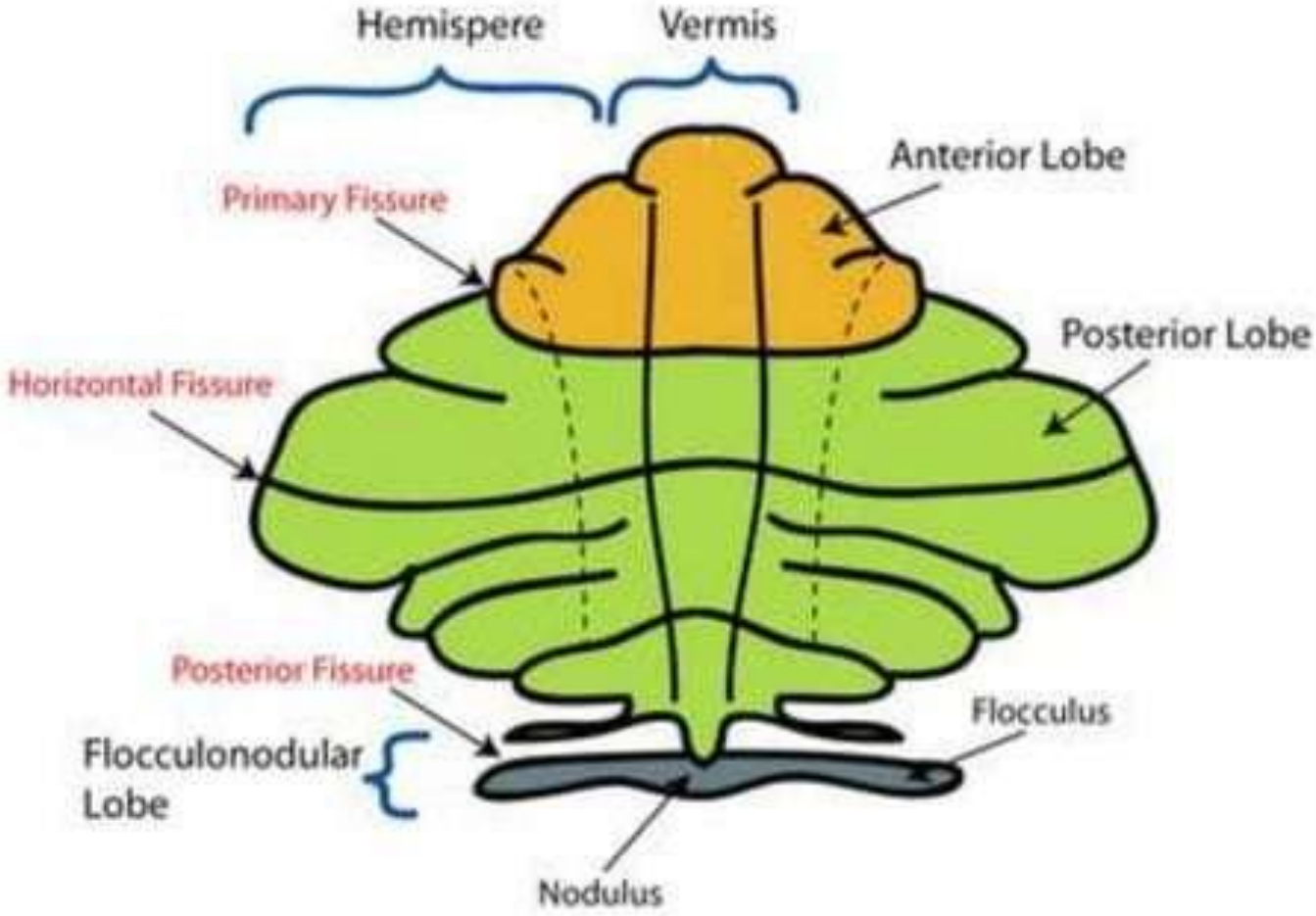
- primary fissure
- horizontal fissure(prepyramidal fissure)
- posterior fissure(posteroletral fissure)

Lobes

- anterior lobe
- posterior lobe
- Flocculonodular lobe


Cingulate gyrus
Frontal lobe
Corpus callosum
Pituitary gland
Pons
Medulla
Spinal cord
Parietal lobe
Thalamus
Occipital lobe
Midbrain
Cerebellum




Hemispere
Vermis
Anterior Lobe
Primary Fissure
Posterior Lobe
Horizontal Fissure
Posterior Fissure
Flocculus
Flocculonodular Lobe
Nodulus

HISTOLOGY

It consists of two parts

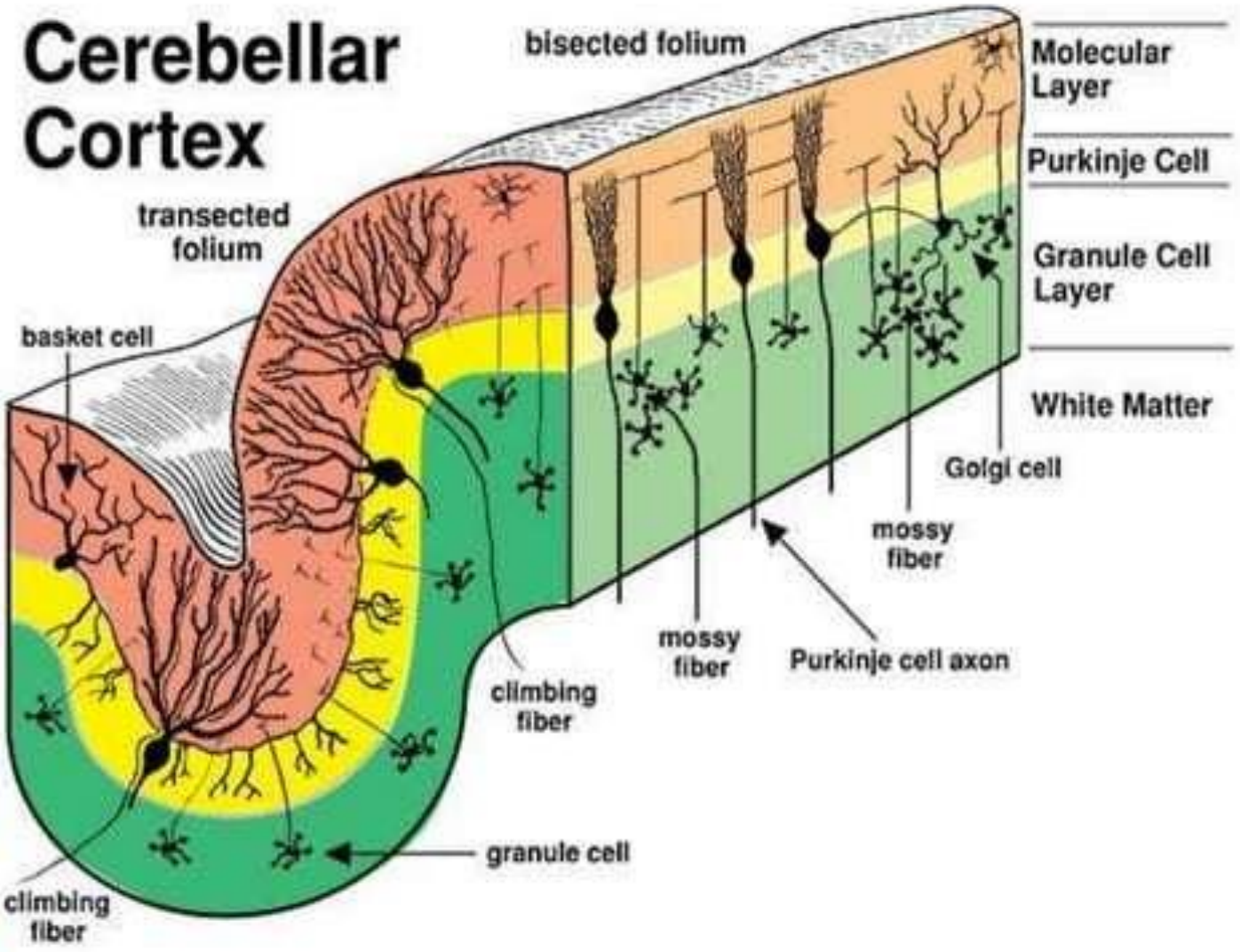
outer grey matter

cerebellar cortex

cerebellar nuclei

inner white matter

Cerebellar Cortex



CEREBERAL CORTEX

It is composed of three layers of cellular structures.

- outer_molicular/plexiform layer
- intermediat_purkinje layer
- inner_granular layer

All the layers are uniform in thickness and structure

Molecular layer

- Outer most layer
- Arranged in two strata
- Superficial layer contain star shape cells stelite cells
- Deep stratum contain basket cells
- Except that
  - axons of granular cells
  - terminal portion of climbing fibers
  - Dentristes of purkinji cells

PURKINJI LAYER

- Intermediate layer
- Thinnest layer
- Have a single layer of cells called purkinji cells
- Purkinji cells are called finale common path path way because all the impulses from the cortex to the other parts of brain go from these cells

GRANULAR LAYER

Inner most layer

Formed by granular cells and golgi cells(interneurons)

Afferent fiber to cerebellar cortex

Climbing fibers

coming from medulla

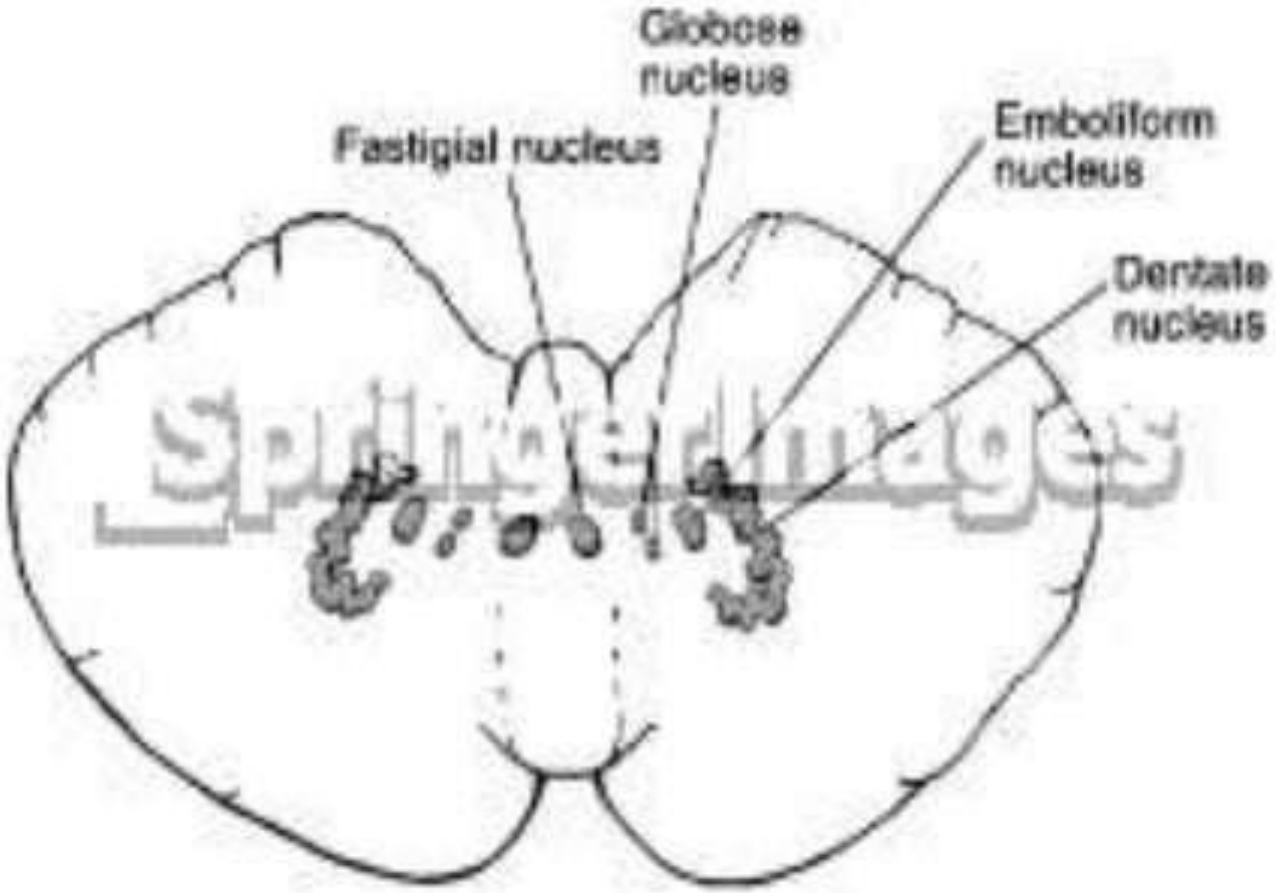
Mossy fibers

coming from all other parts of brain

CEREBERLLAR NUCLEI

Masses of grey scattered in white matter

- Fastigial nucleus
  - near the middle line
- Globosus nucleus
  - lateral to nucleus fistigi
- Emboliform nucleus
  - below the nucleus fastigi
- Dentate nucleus
  - lateral to all other nuclei


Globose nucleus
Fastigial nucleus
Emboliform nucleus
Dentate nucleus

WHITE MATTER

It is formed by afferent and efferent fibers

These are classified into three groups

- projection fibers
  - it connect cerebellum to the other parts of brain
- associate fibers
  - it connects regions of same hemisphere
- commissural fibers
  - it connects areas of both hemispheres

Physiological or functional division

Based on functions it is divided into three divisions

vestibulocerebelllum (archecerebellum)

spinocerebellum (paleocerebellum)

corticocerebellum (neocerebellum)

Functions of cerebellum

Regulation of tone, posture and equilibrium

- vestibulocerebellum
- spinocerebellum

Regulation of coordinated movements

- corticocerebellum

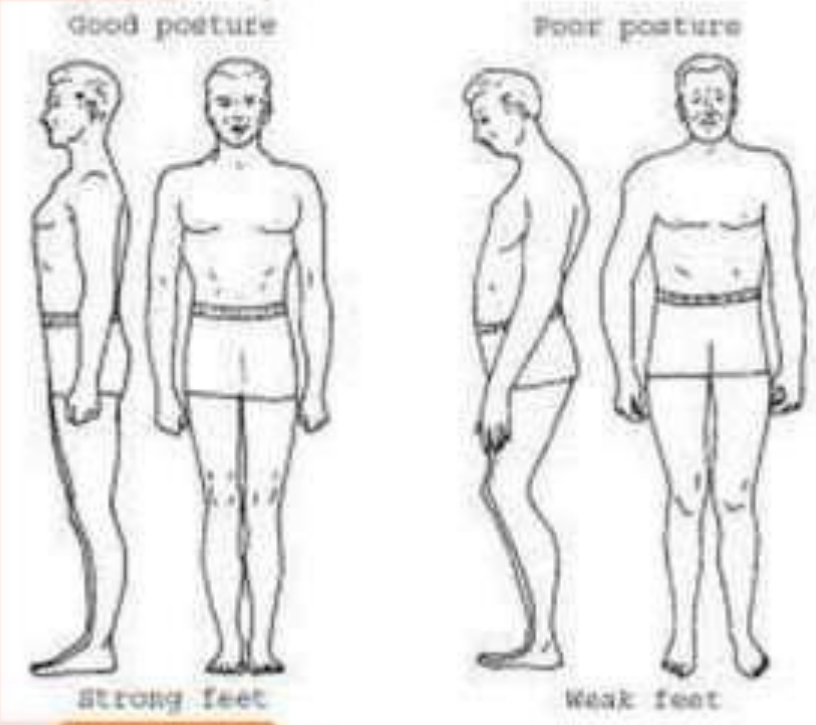
Equilibrium and posture

Posture

subconscious adjustment of tone in different muscle in relation to position

Equilibrium

different balanced movements of body in relation to different body parts


Good posture
Poor posture
Strong feet
Weak feet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VESTIBULOCEREBELLUM (ARCHICEREBELLUM)

Connected with vestibular apparatus so it is calle vestibulocerebellum

Composition
Basically it consist of flucculonodular lobe lobe

PHYSIOLOGY

It regulates

Muscle tone ,Posture and Equilibrium by receiving message from vestibular apparatus regarding

- linear motion
- angular acceleration
- gravity

VESTIBULAR APPARATUS PHYSIOLOGY

Vestibular apparatus is responsible for detecting the position of head during angular or rotatory movements

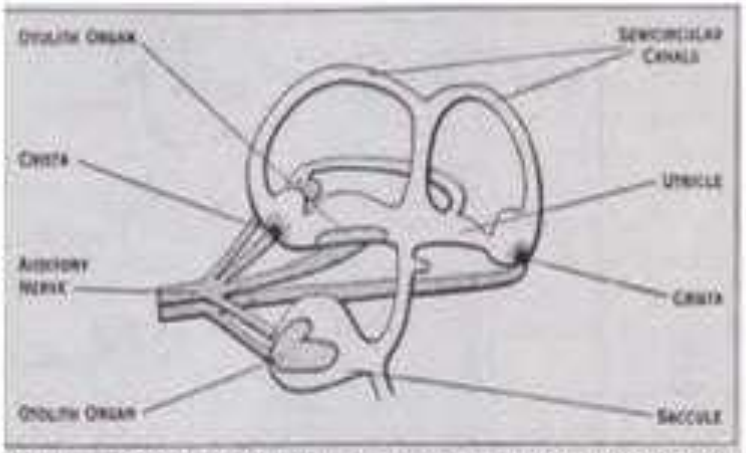


FIG. 1.—THE MEMBRANOUS LABYRINTH AND ITS NERVOUS CONNECTIONS IN THE INTERNAL EAR, ENTIRELY RELATED TO POSTURE AND EQUILIBRIUM, THOUGH CLOSELY CONNECTED WITH THE HEARING APPARATUS

SPINOCEREBELLUM (PALEOCEREBELLUM)

Connected with spinal corh hence named spinocerebellum

Composition
It is consists of medial portion of cerebellum

PHYSIOLOGY

Maintain Muscle tone, Equilibrium And posture by receiving information from

- Tactile receptors
- Propiocepters
- Visual receptors
- Auditory receptor
- cortical impulse from pontine nuclei

CORTICOCEREBELLUM (NEOCEREBELLUM)

Largest part

Connected with cereberal cortex so named corticocerebellumS

Composition

It consists of lateral portions of cerebellum

PHYSIOLOGY

Damping action

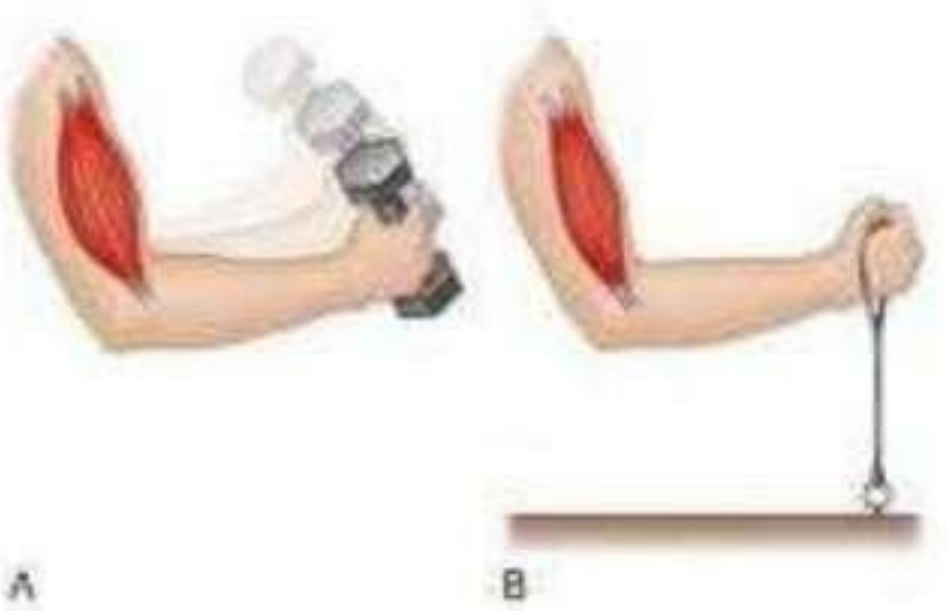
Control of ballistic control

Timing and programming the movements

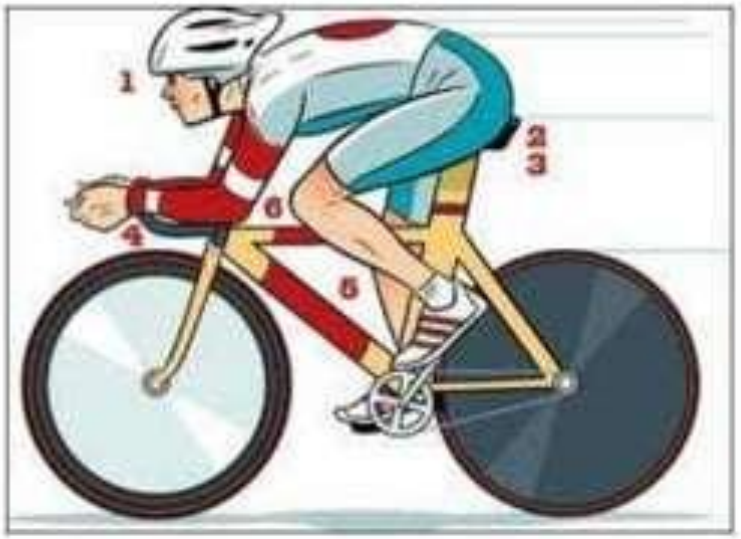
Servomechanism

Comparator function

DAMPING ACTION



Control of ballistic movements



Timing and programming the movements

SERVOMECHANISM

COMPARATOR MOVEMENT

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