Cerebellum Review

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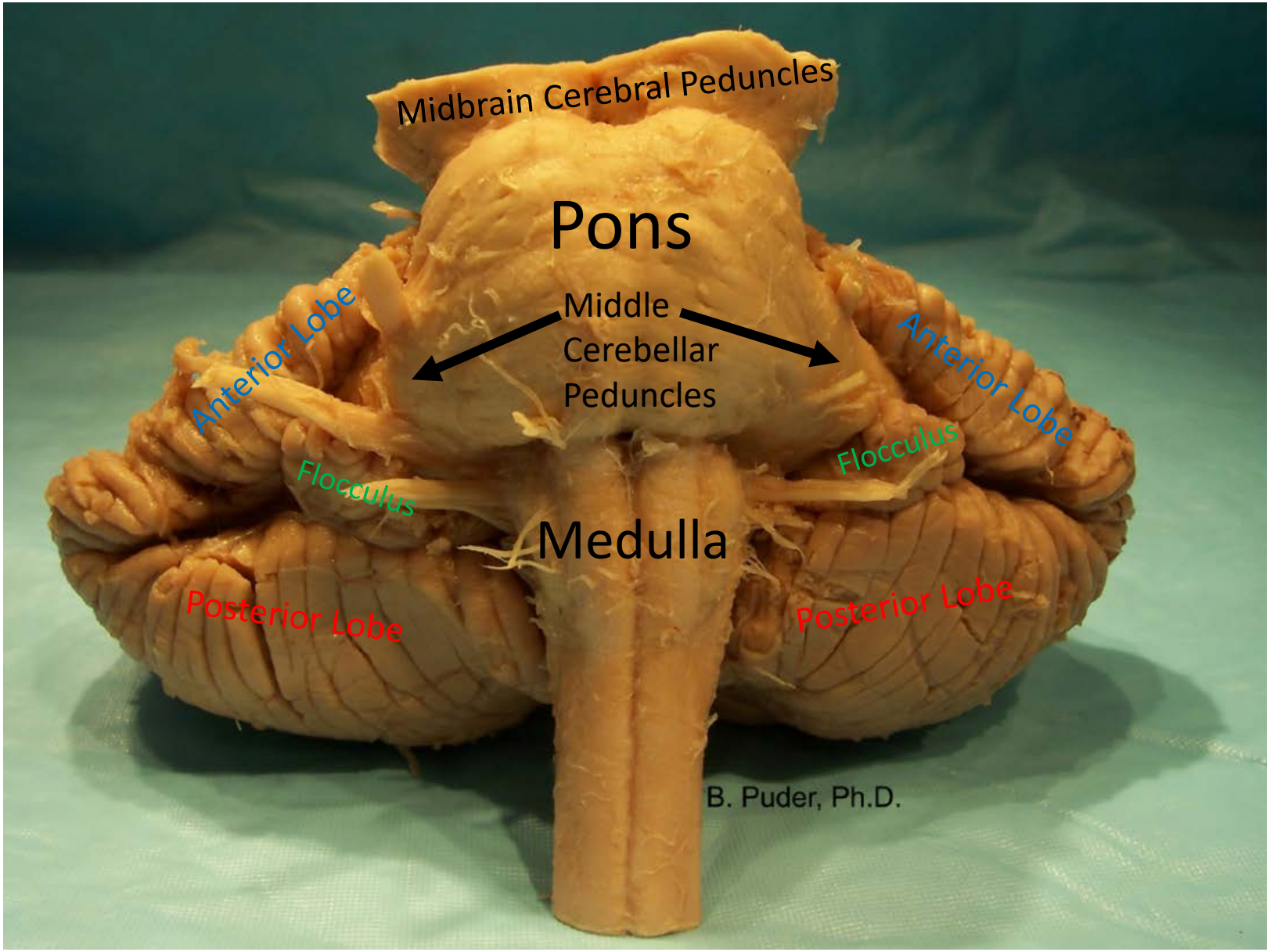
Cerebellum Overview

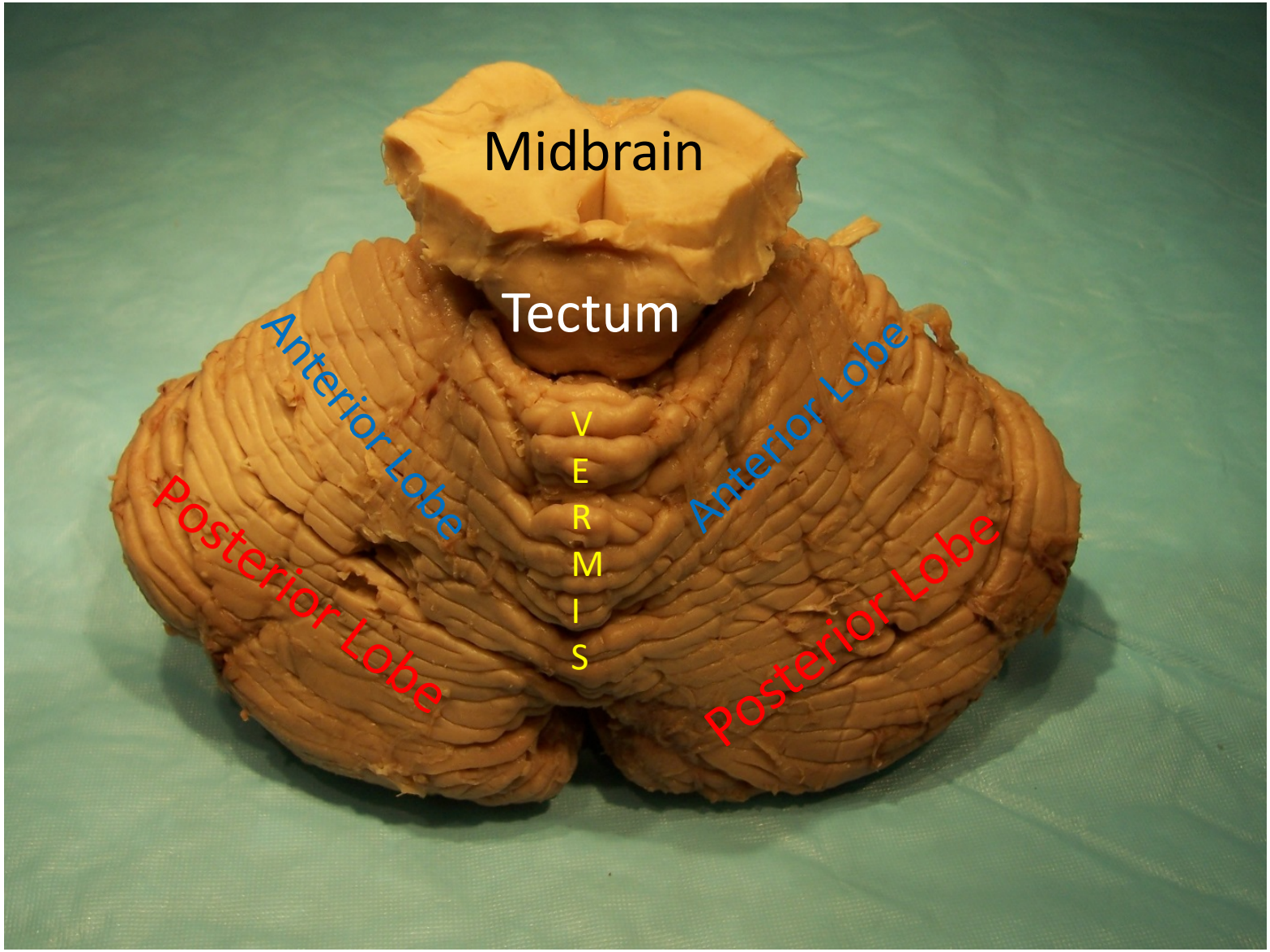
The word “cerebellum” is Latin for “Little Brain”

Function: responsible for coordinating movement and postural controls by comparing actual motor output to the intended movement and then adjusting the movement as necessary

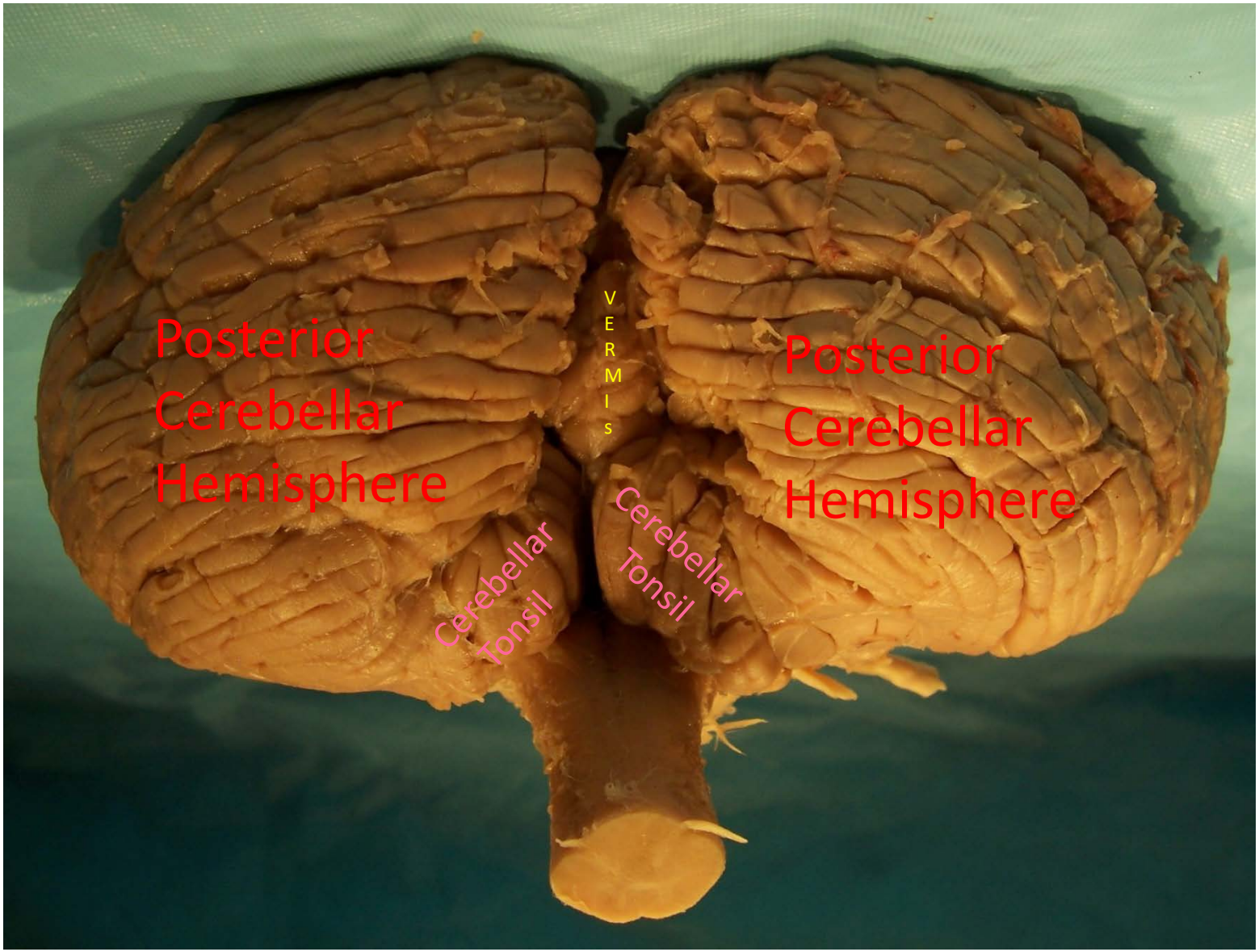
Cerebellum: Anterior view Anatomy



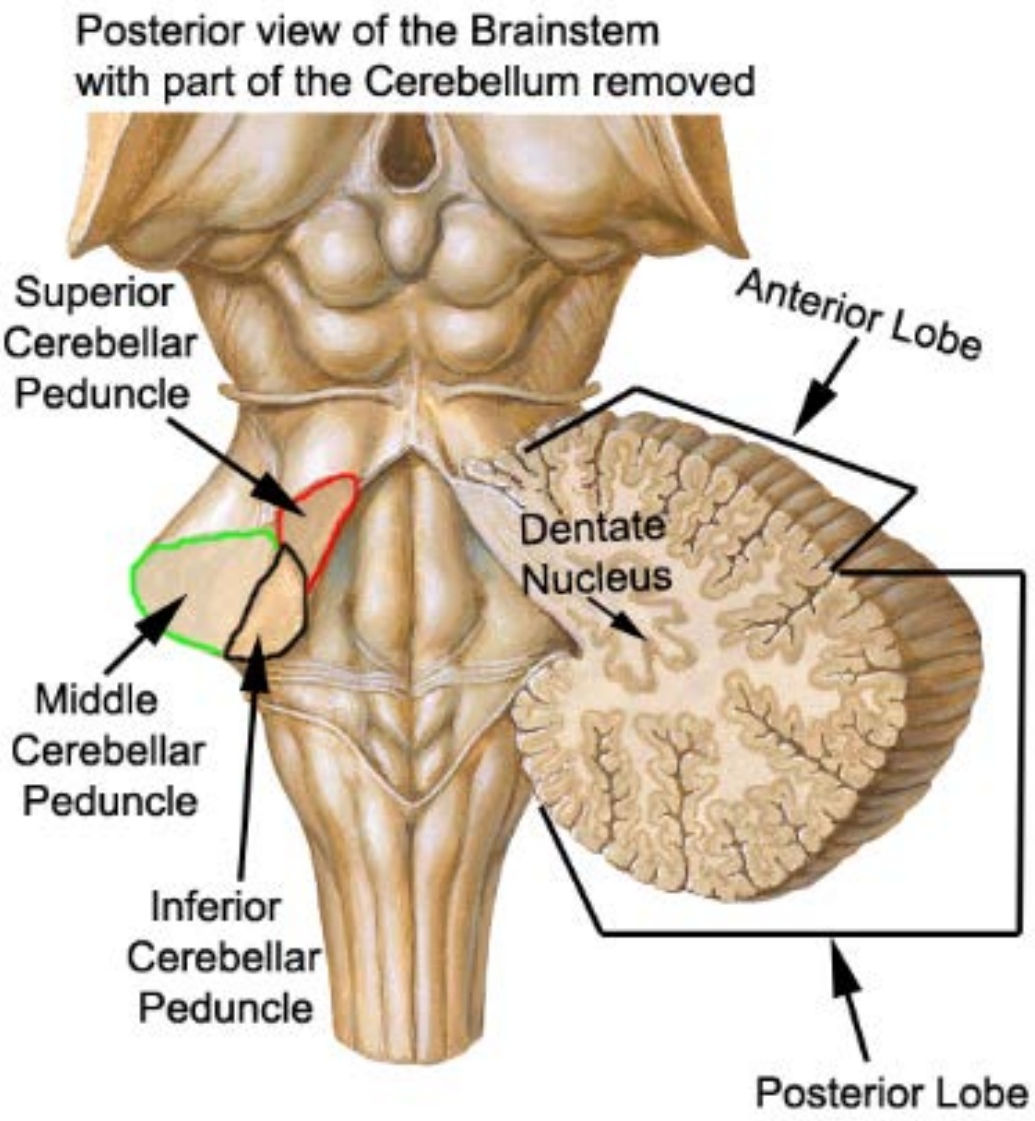
Cerebellum: Posterior view Anatomy



Cerebellum: Posterior & Inferior view Anatomy



Cerebellar Peduncles



Netter's drawing of posterior brainstem and ½ cerebellum

Cerebellum Blood Supply

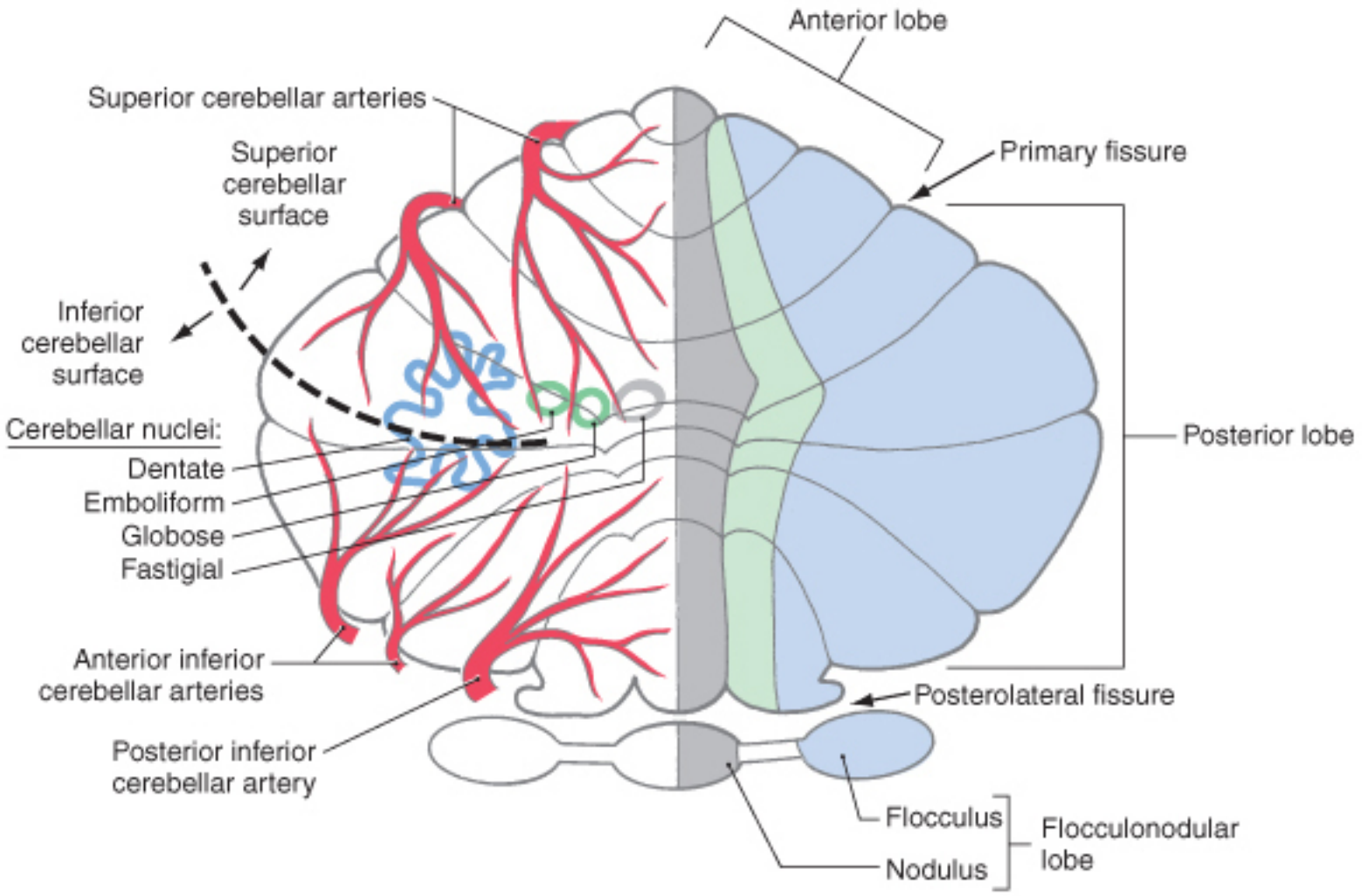
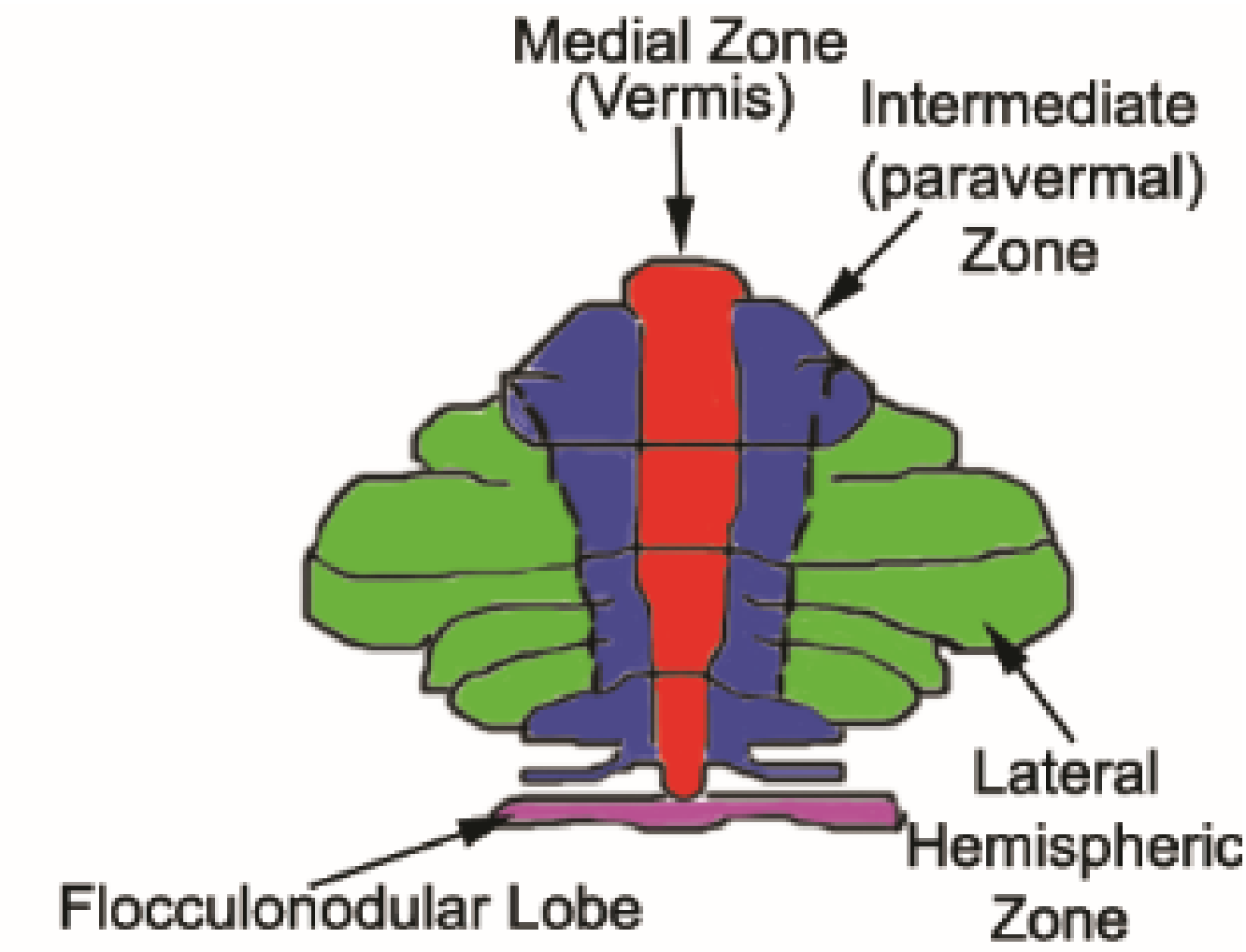
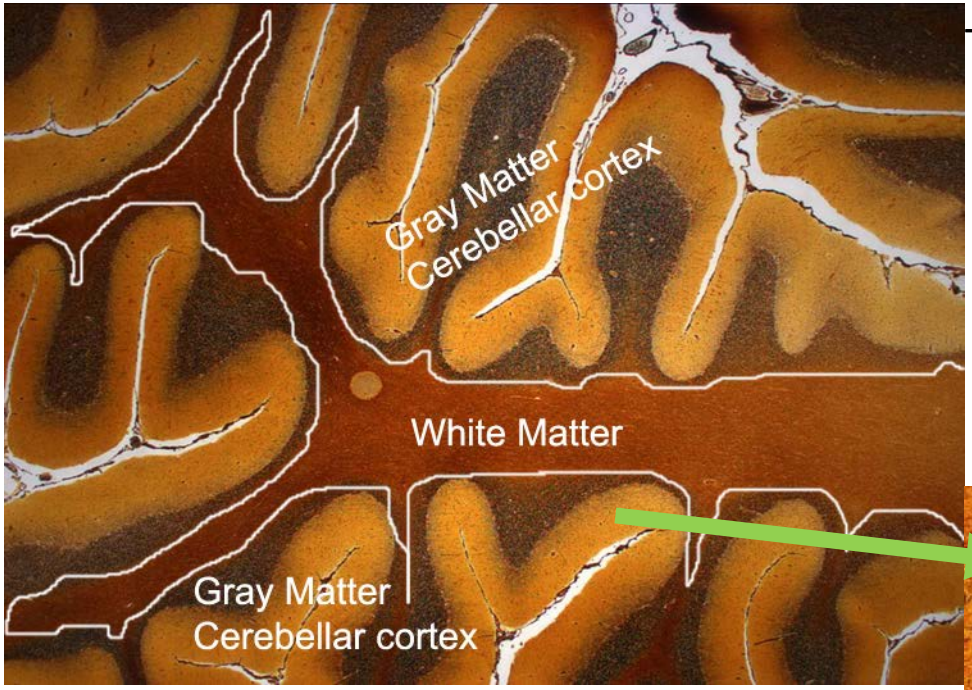


Image from Fundamental Neuroscience for basic and clinical applications, D.E. Haines

Cerebellar Functional Zones



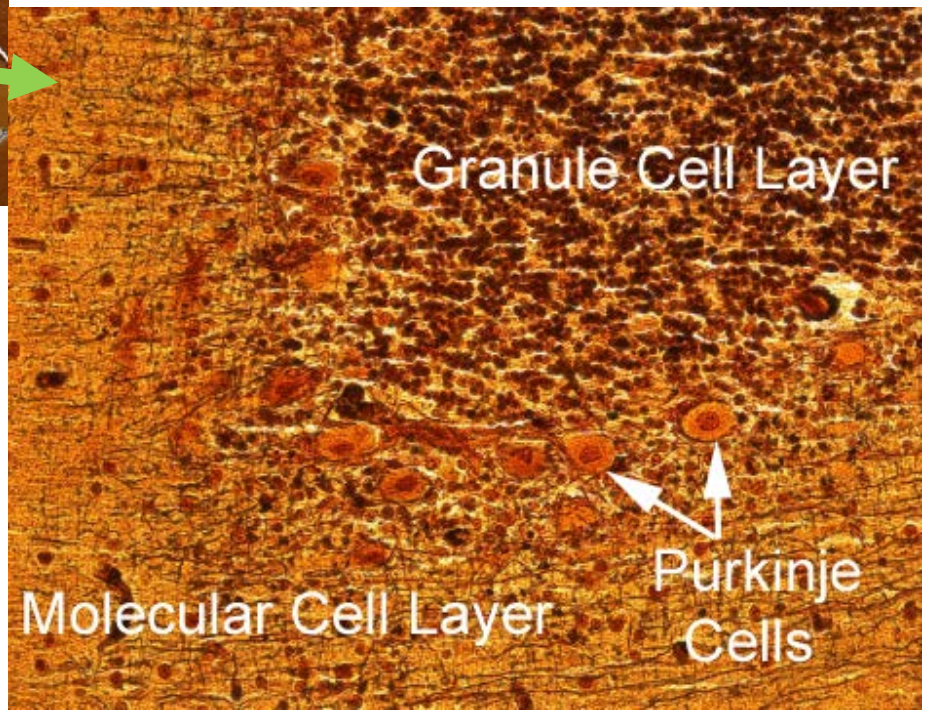
Cerebellar Histology



Low magnification view of cerebellar cortex

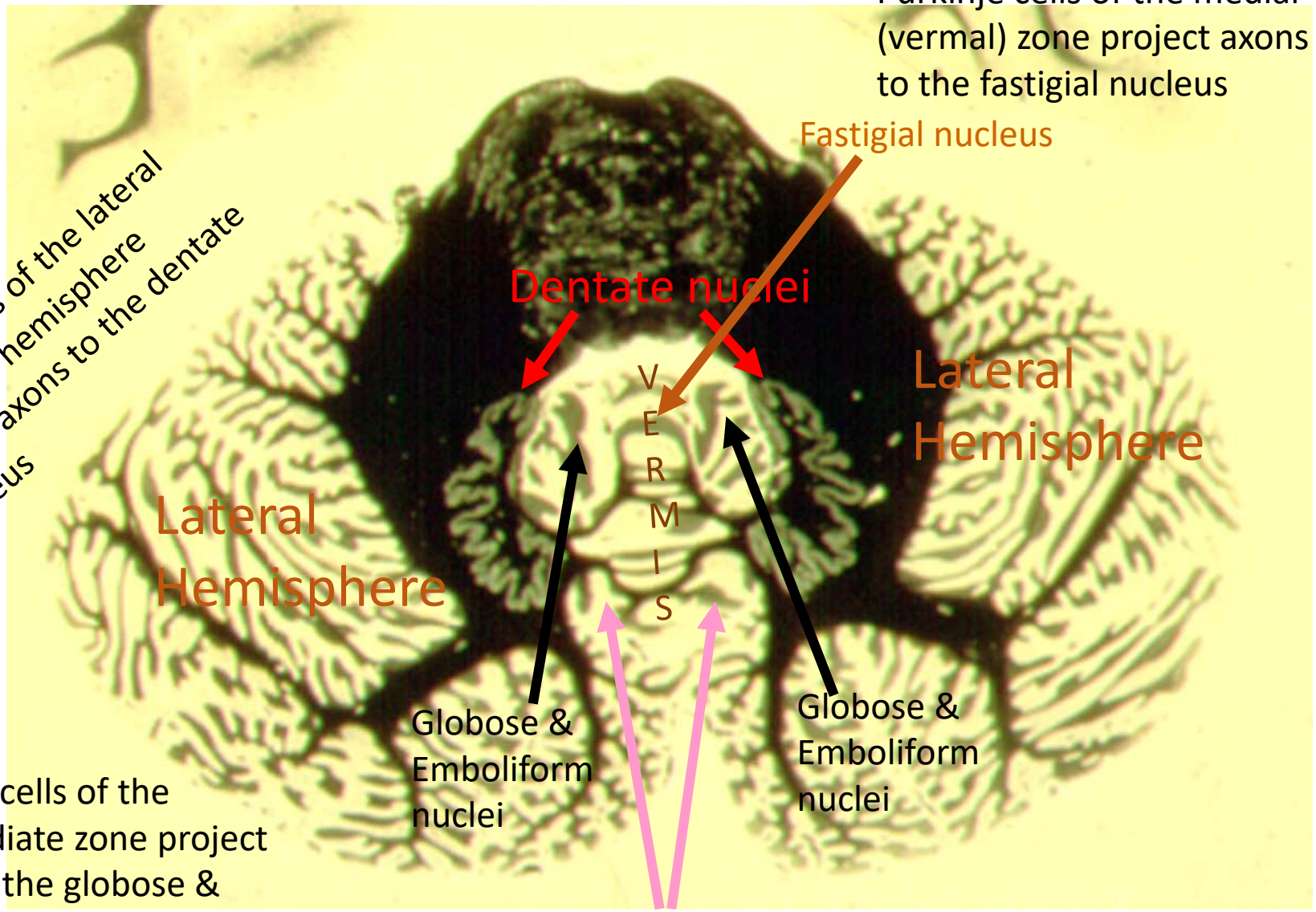
The cerebellar cortex contains 3 cellular layers:

1. Granule cell layer
2. Purkinje cell layer
   projects its axons to deep cerebellar nuclei
3. Molecular cell layer

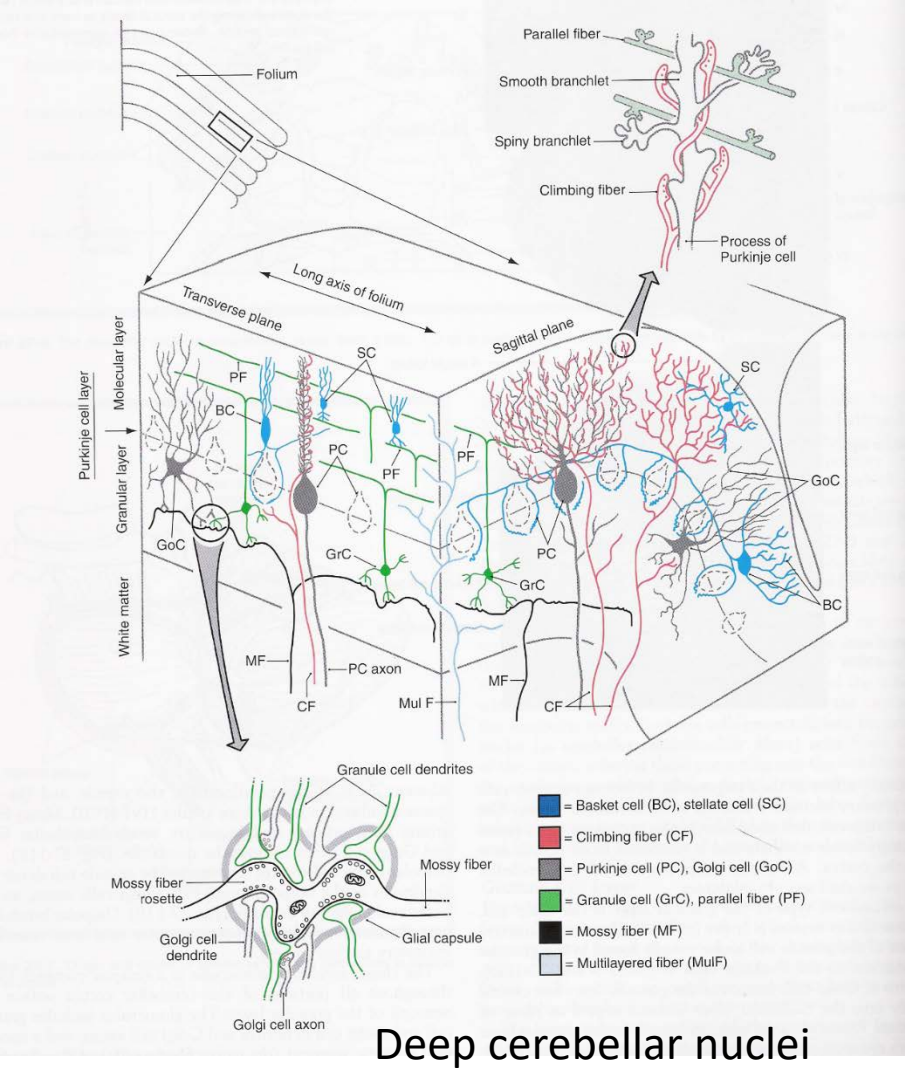


High magnification view of cerebellar cortex

Cerebellum: Myelin stained section



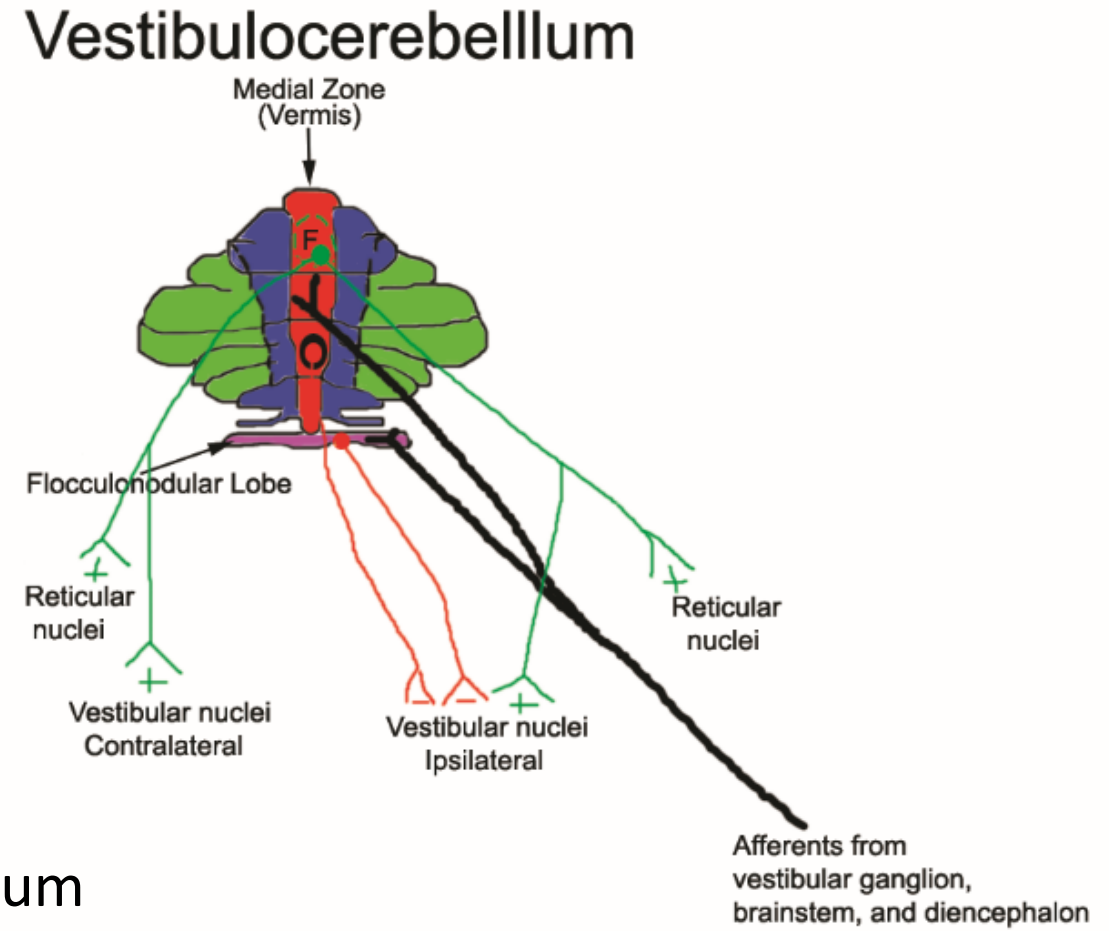
Cerebellar Physiology



Deep cerebellar nuclei

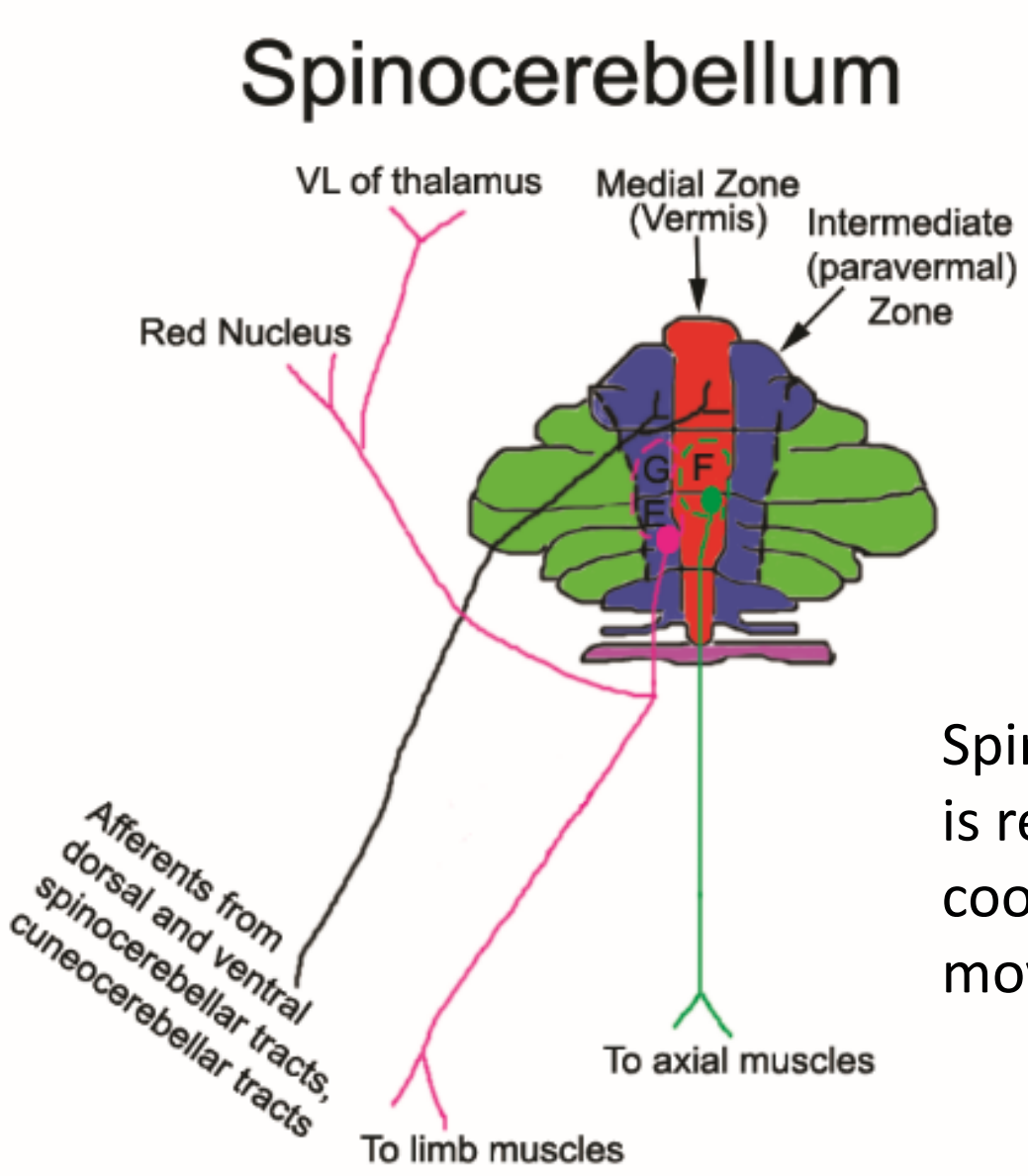
Image from Fundamental Neuroscience for basic and clinical applications, D.E. Haines

Cerebellar Functional Module: Vestibulocerebellum



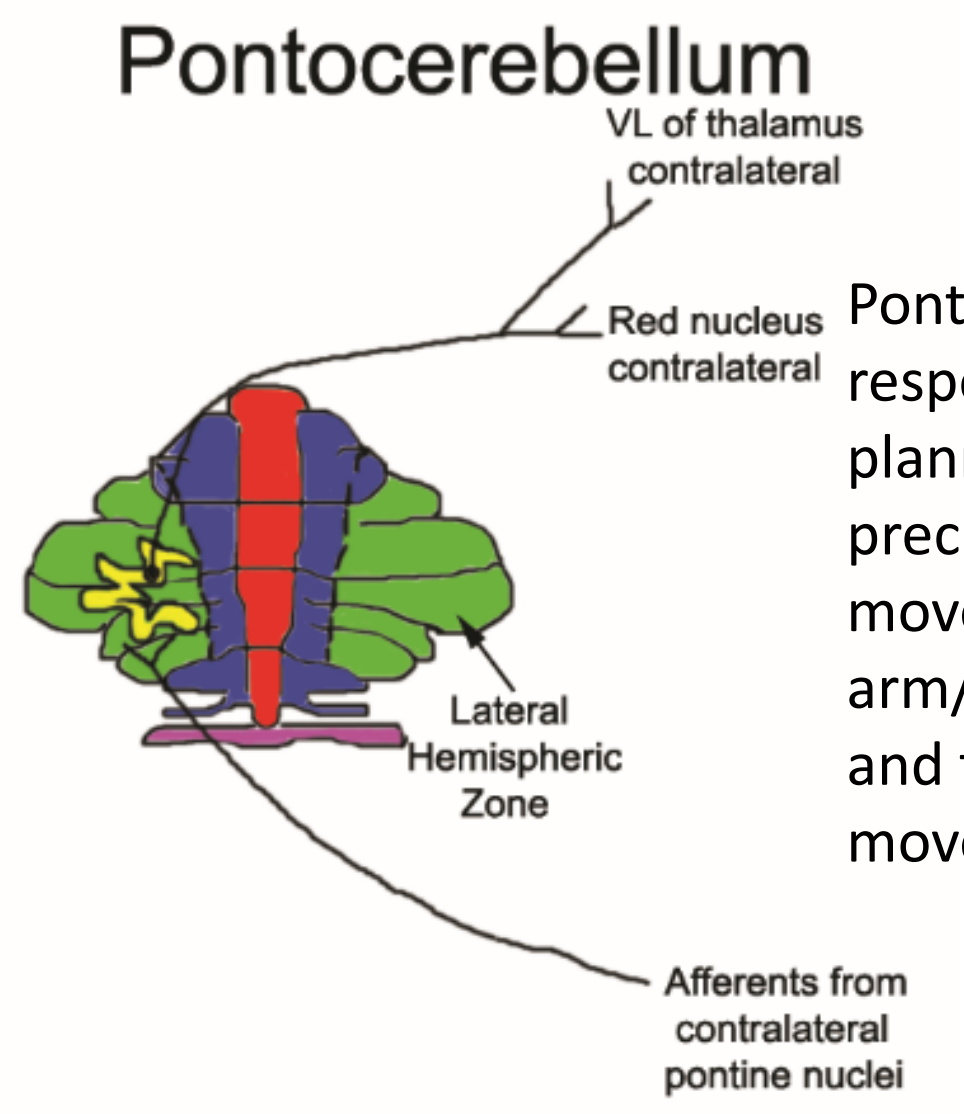
Vestibulocerebellum influences posture, balance, and equilibrium

Cerebellar Functional Module: Spinocerebellum



Spinocerebellum is responsible for coordinating limb movements

Cerebellar Functional Module: Pontocerebellum



Pontocerebellum is responsible for planning and control of precise dexterous movements of the arm/forearm and hand and the timing of these movements

Cerebellar Lesions

Cerebellar lesions affect the ipsilateral side of the body

A lesion to the **vestibulocerebellum** will result in:

- Trunkal ataxia
- Falls
- A wide based stance
- Inability to walk in a heel to toe fashion
- Nystagmus

Cerebellar Lesions

A lesion to the **spinocerebellum** will result in:
Gait and Limb ataxia

A lesion to the **pontocerebellum** will result in:
Hand ataxia

Terms used to describe Spino and Pontocerebellar dysfunction:

Dyssynergia = deterioration of coordinated movement and decomposition of movement

Hypotonia = decreased muscle tone and deep tendon reflexes

Ataxia = jerky, inaccurate movements

Dysmetria = past pointing either by overshooting the target (hypermetria) or undershooting the target (hypometria)

Tremor (intention tremor) = during performance of a voluntary movement, the tremor becomes more obvious as the movement is nearing the end point

Dysdiadochokinesia = awkward performance of rapidly alternating movements