

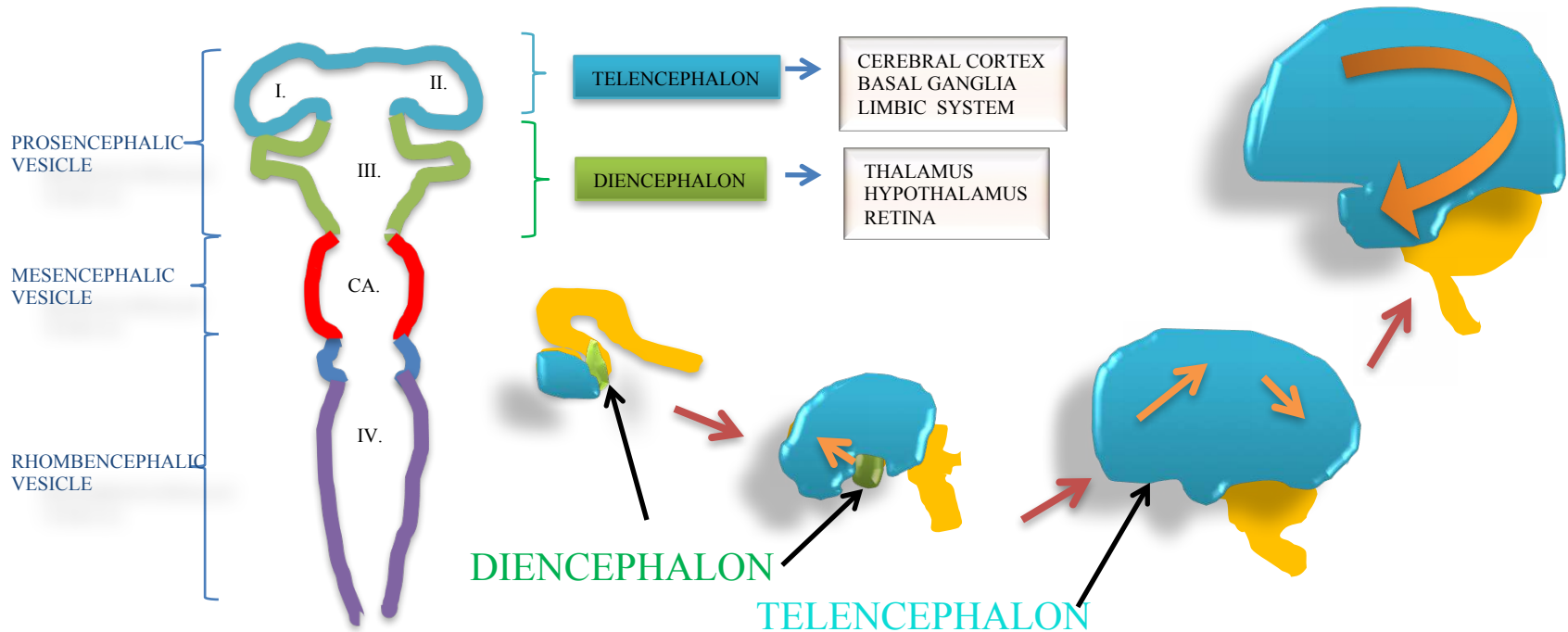
BASICS OF NEUROBIOLOGY

DIVISIONS OF THE TELENCEPHALON

ZSOLT LIPOSITS

Basics of Neurobiology: Divisions of the telencephalon

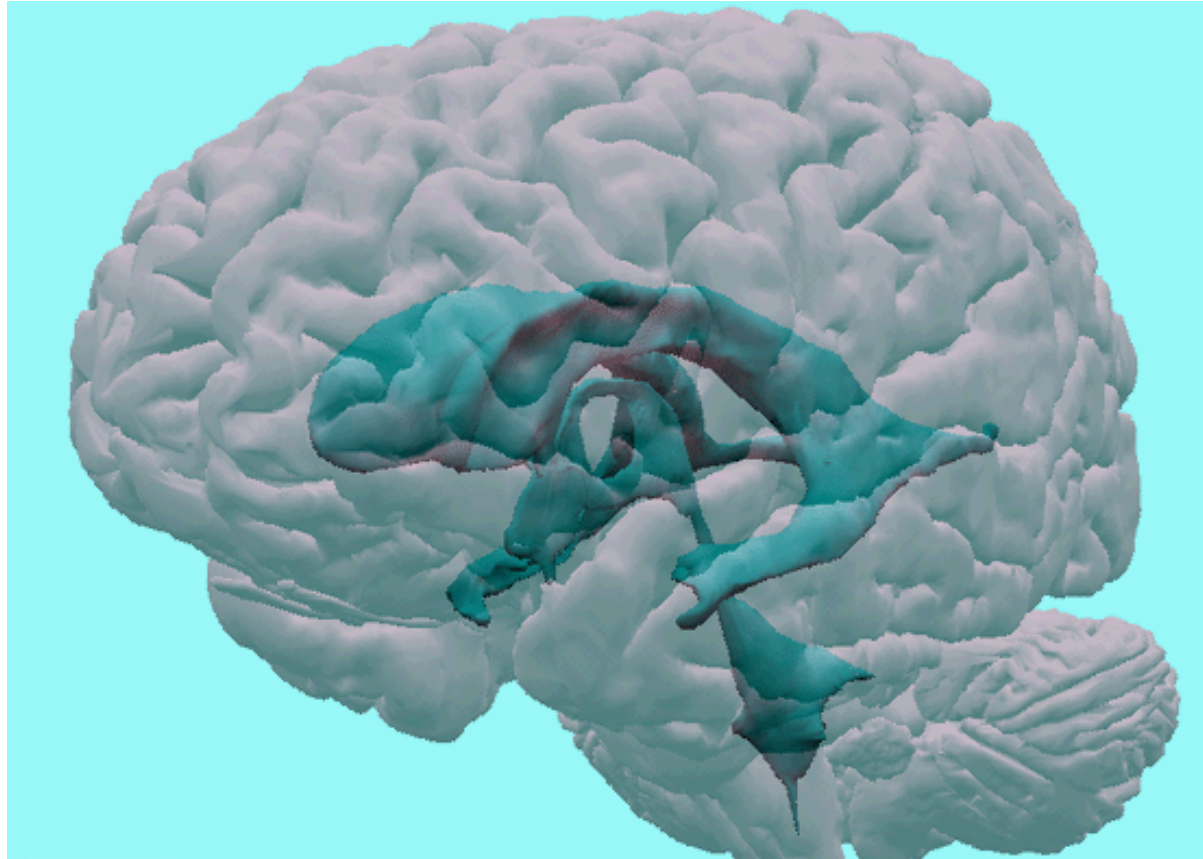
DEVELOPMENT OF THE TELEENCEPHALON



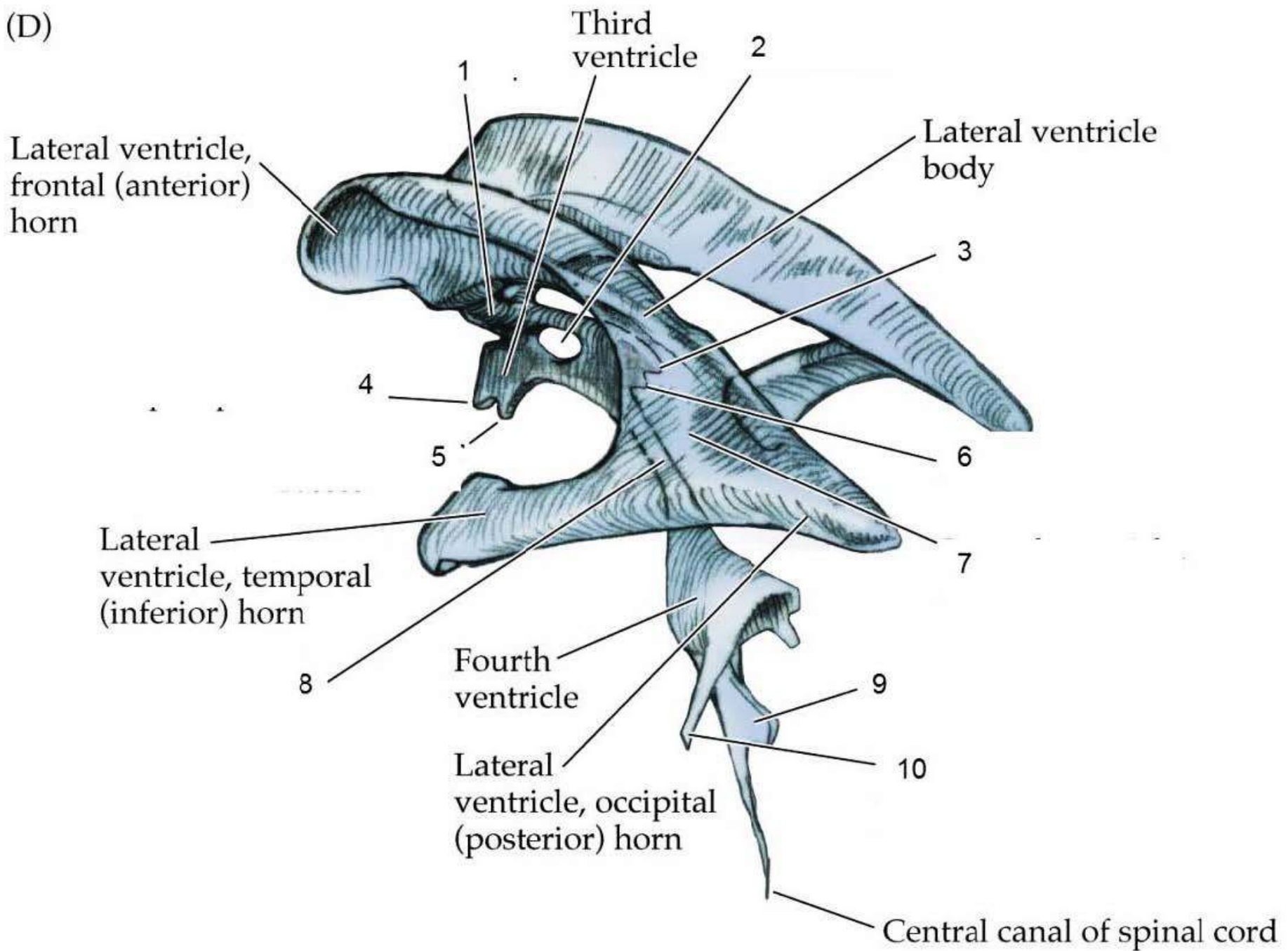
THE TELEENCEPHALON AND THE DIENCEPHALON DERIVE FROM THE PROSENCEPHALIC VESICLE. THE TELEENCEPHALIC VESICLES GROW Laterally AND ROSTRO-CAUDALLY. GRADUALLY THEY COVER AND HIDE MOST OF THE DIENCEPHALON AND THE ROSTRAL PART OF THE BRAIN STEM. THE CEREBRAL CORTEX, THE BASAL GANGLIA AND CONSTITUENTS OF THE LIMBIC SYSTEM DERIVE FROM THEM.

VENTRICULAR SYSTEM

Basics of Neurobiology: Divisions of the telencephalon



(D)



Basics of Neurobiology: Divisions of the telencephalon

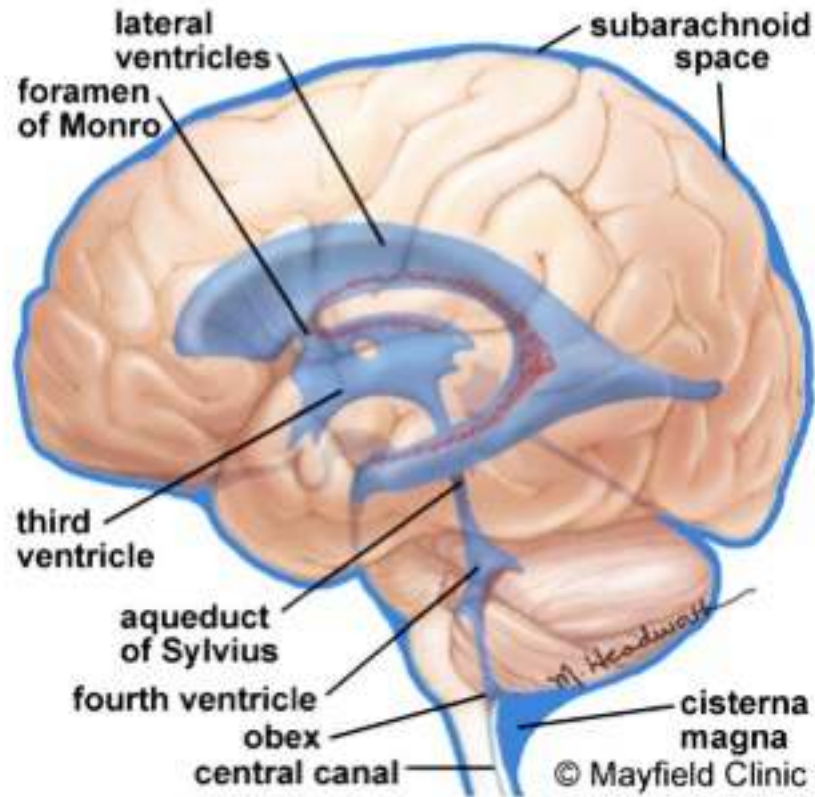
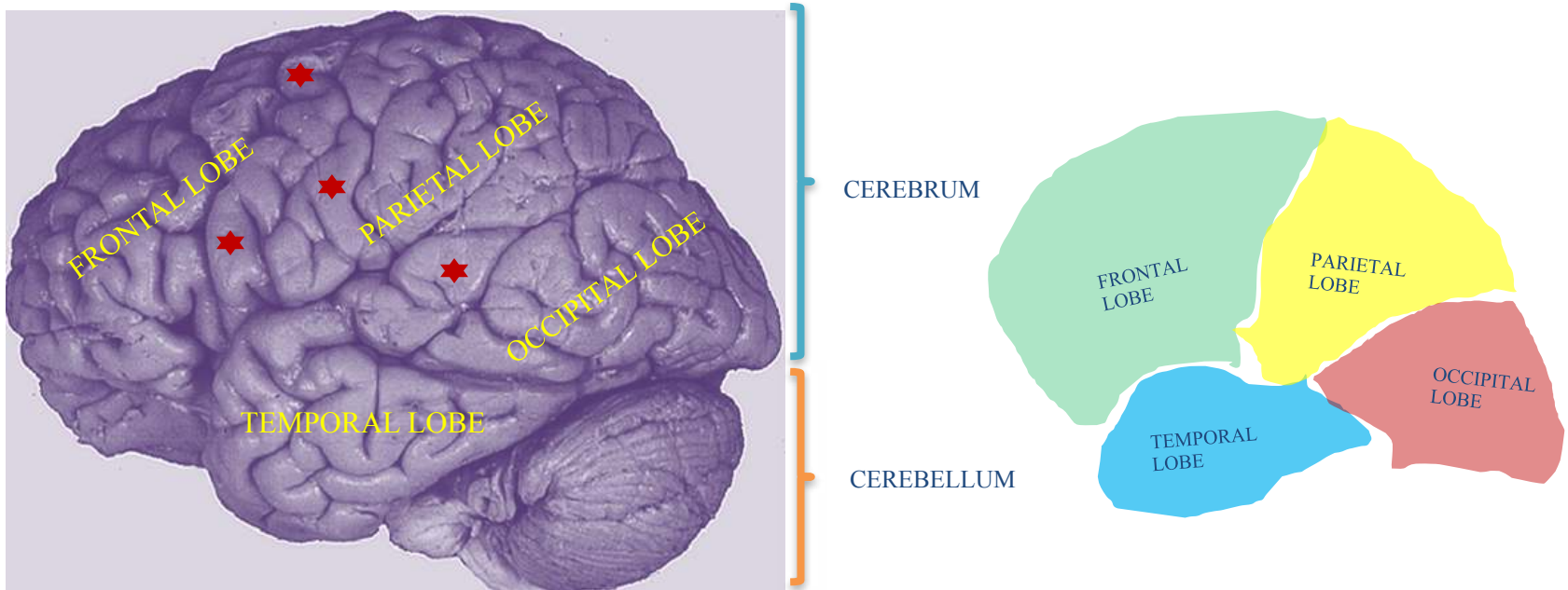


Figure 1. Cerebrospinal fluid (CSF) circulates through the ventricles inside the brain to the subarachnoid spaces surrounding the brain and spinal cord.

Basics of Neurobiology: Divisions of the telencephalon

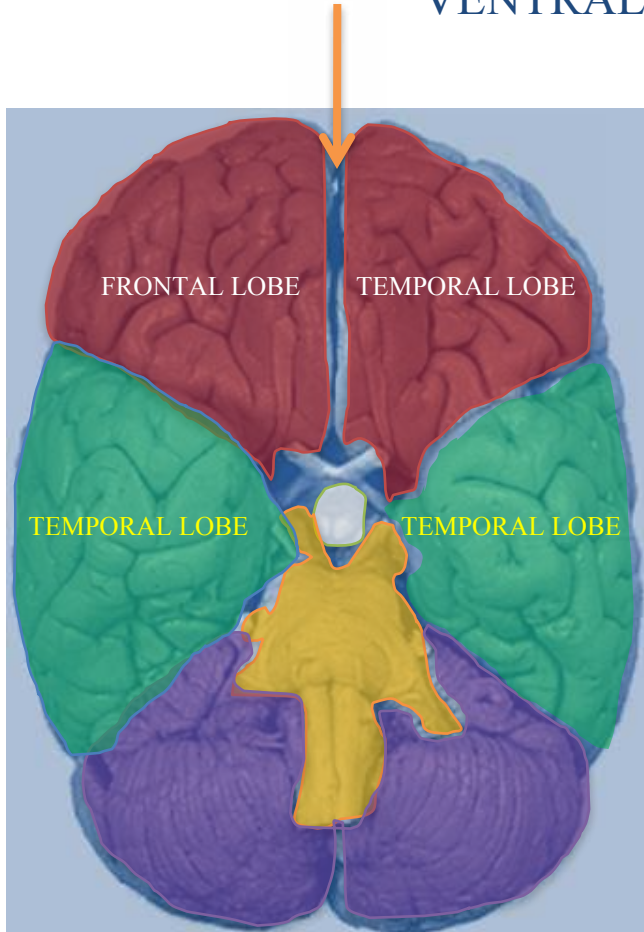
LOBES AND GYRI OF THE CEREBRUM



FROM A LATERAL VIEW THE FRONTAL, PARIETAL, OCCIPITAL AND TEMPORAL LOBES OF THE CEREBRUM ARE VISIBLE. NOTE, THAT THE LOBES CONSIST OF CONVOLUTED STRUCTURAL UNITS CALLED GYRI (ASTERISKS), THAT ARE SEPARATED BY GROOVES. BEHIND THE CEREBRUM THE CEREBELLUM IS SITUATED. THE BRAIN STEM IS REPRESENTED BY THE PONS AND MEDULLA

Basics of Neurobiology: Divisions of the telencephalon

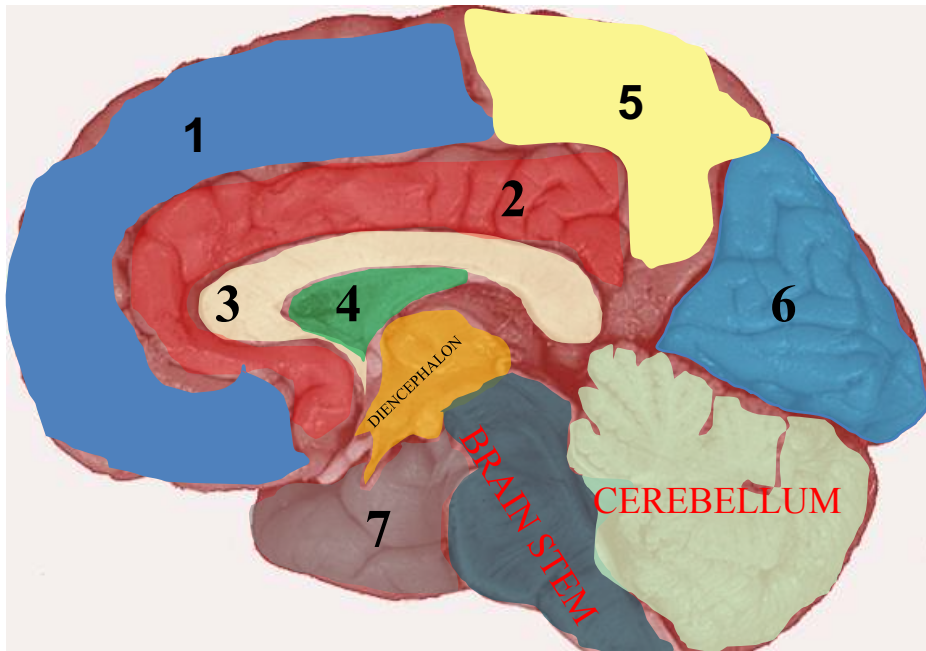
VENTRAL VIEW OF THE TELECEPHALON



THE VENTRAL SURFACE OF THE CEREBRUM IS DOMINATED BY THE FRONTAL AND TEMPORAL LOBES. THEY SURROUND THE HYPOTHALAMUS HIGHLIGHTED IN WHITE COLOR. THE TEMPORAL LOBE IS IN THE NEIGHBORHOOD OF THE BRAIN STEM (YELLOW HIGHLIGHT) AND THE CEREBELLUM (PURPLE HIGHLIGHT). THE FISSURE (ARROW) BETWEEN THE CEREBRAL HEMISPHERES IS OBVIOUS

Basics of Neurobiology: Divisions of the telencephalon

SCHEME OF THE MEDIAN SAGITTAL BRAIN SURFACE

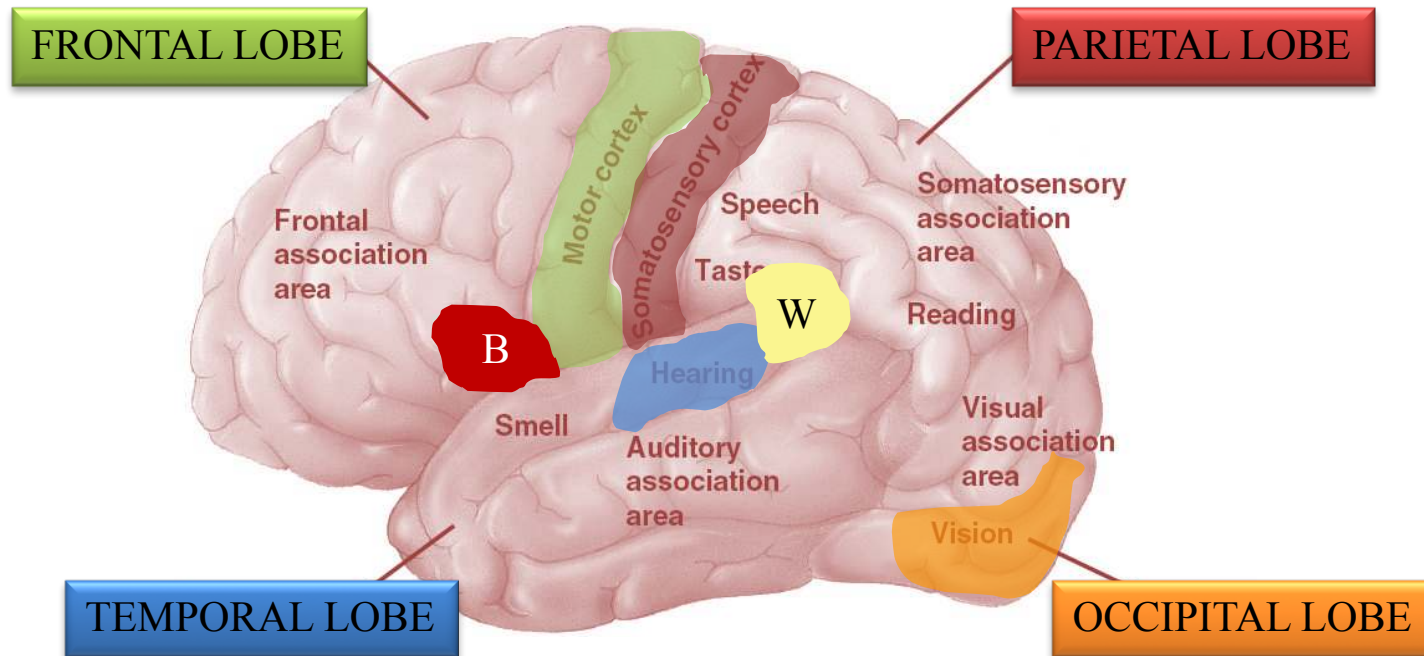


1. FRONTAL LOBE
2. GYRUS CINGULI
3. CORPUS CALLOSUM
4. SEPTUM PELLUCIDUM
5. PARIETAL LOBE
6. OCCIPITAL LOBE
7. TEMPORAL LOBE

THE PICTURE DEPICTS THE MAIN CEREBRAL STRUCTURES OF THE MEDIAN SAGITTAL BRAIN SURFACE. THE NOMENCLATURE OF THE COLOR CODED REGIONS IS SHOWN IN THE RIGHT PANEL

Basics of Neurobiology: Divisions of the telencephalon

ASSOCIATION OF SPECIFIC FUNCTIONS WITH CORTICAL AREAS



MOST NEURONAL FUNCTIONS OF THE BODY ARE REPRESENTED IN THE CEREBRAL CORTEX. COLOR CODED ARE THE PRIMARY MOTOR CENTRE IN THE FRONTAL, THE PRIMARY SOMATOSENSORY CENTER IN THE PARIETAL, THE VISUAL CENTER IN THE OCCIPITAL AND THE HEARING CENTER IN THE TEMPORAL LOBE. THE SENSORY, WERNICKE (W) AND THE MOTOR, BROCA (B) SPEECH FIELDS ARE ALSO INDICATED

Basics of Neurobiology: Divisions of the telencephalon

SOME SIGNS OF DAMAGE TO THE SENSORY AND MOTOR SPEECH FIELDS

DAMAGE TO BROCA'S AREA (BROCA'S APHASIA)	DAMAGE TO WERNICKE'S AREA (WERNICKE'S APHASIA)
PREVENTS A PERSON FROM PRODUCING SPEECH	LOSS OF THE ABILITY TO UNDERSTAND LANGUAGE
PERSON CAN UNDERSTAND LANGUAGE	PERSON CAN SPEAK CLEARLY, BUT THE WORDS THAT ARE PUT TOGETHER MAKE NO SENSE. THIS WAY OF SPEAKING HAS BEEN CALLED "WORD SALAD" BECAUSE IT APPEARS THAT THE WORDS ARE ALL MIXED UP LIKE THE VEGETABLES IN A SALAD
WORDS ARE NOT PROPERLY FORMED	
SPEECH IS SLOW AND SLURRED.	

Basics of Neurobiology: Divisions of the telencephalon

FUNCTIONS RELATED TO THE FRONTAL CORTEX

Attention

Behavior

Abstract thought

Problem solving

Creative thought

Emotion

Intellect

Judgment

Initiative

Coordinated movements

Generalized, mass movements

Some eye movements

Muscle movements

Skilled movements

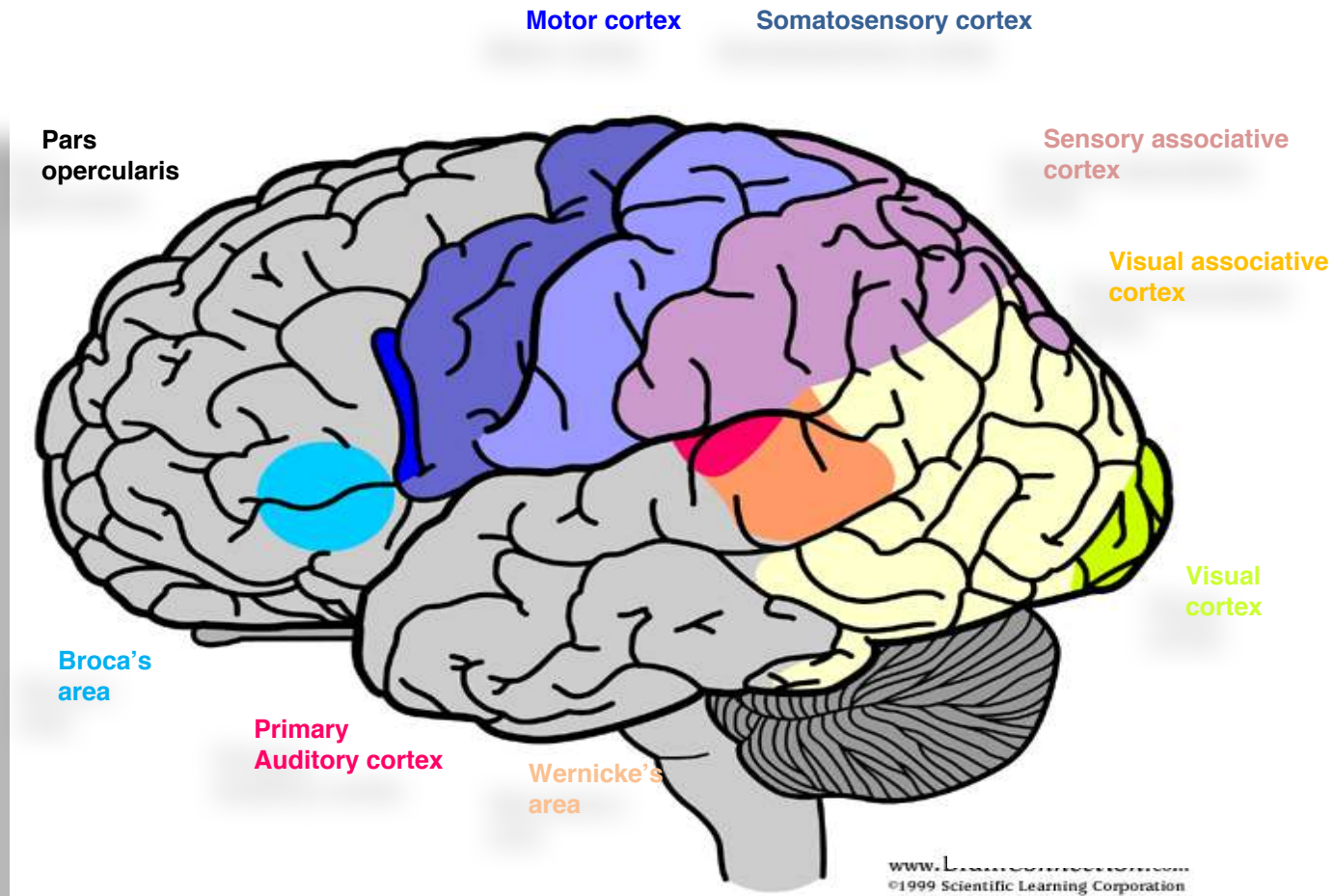
Sense of smell

Supplementary motor skills

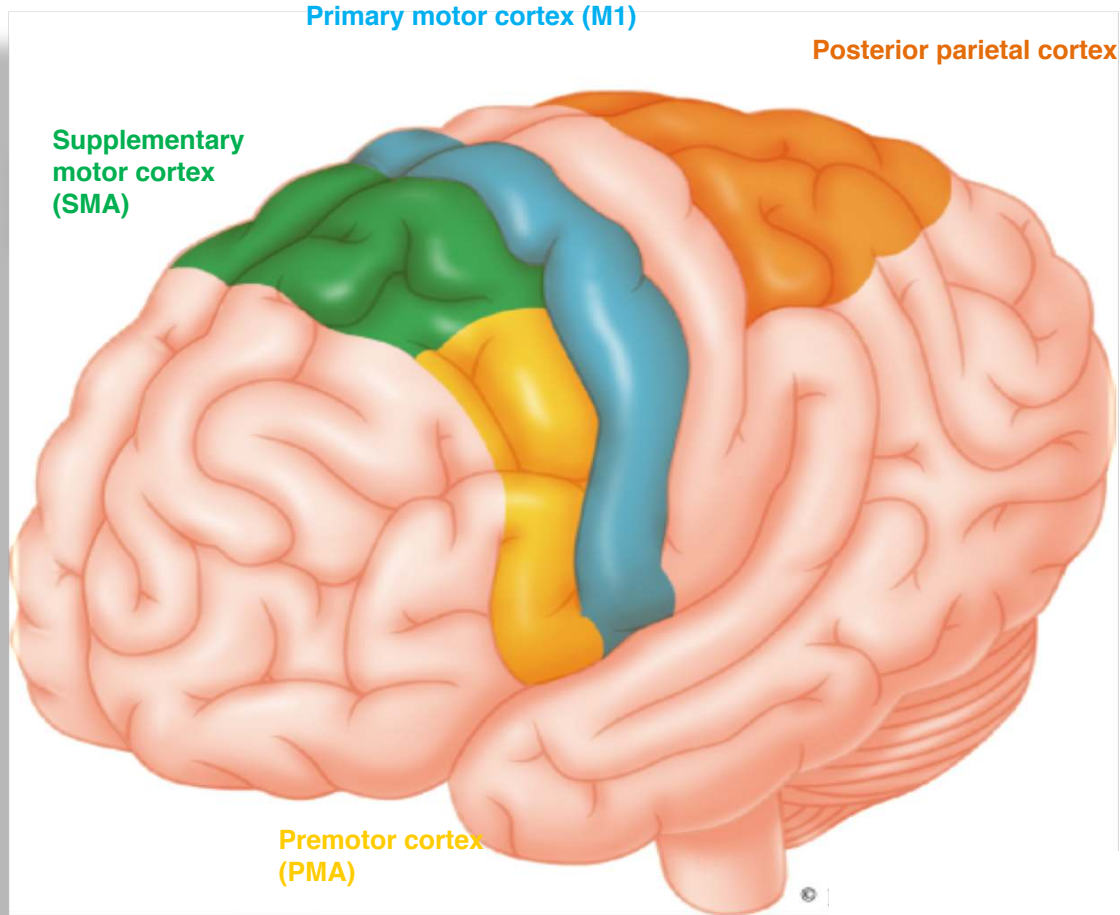
Physical reaction

Sexual urges

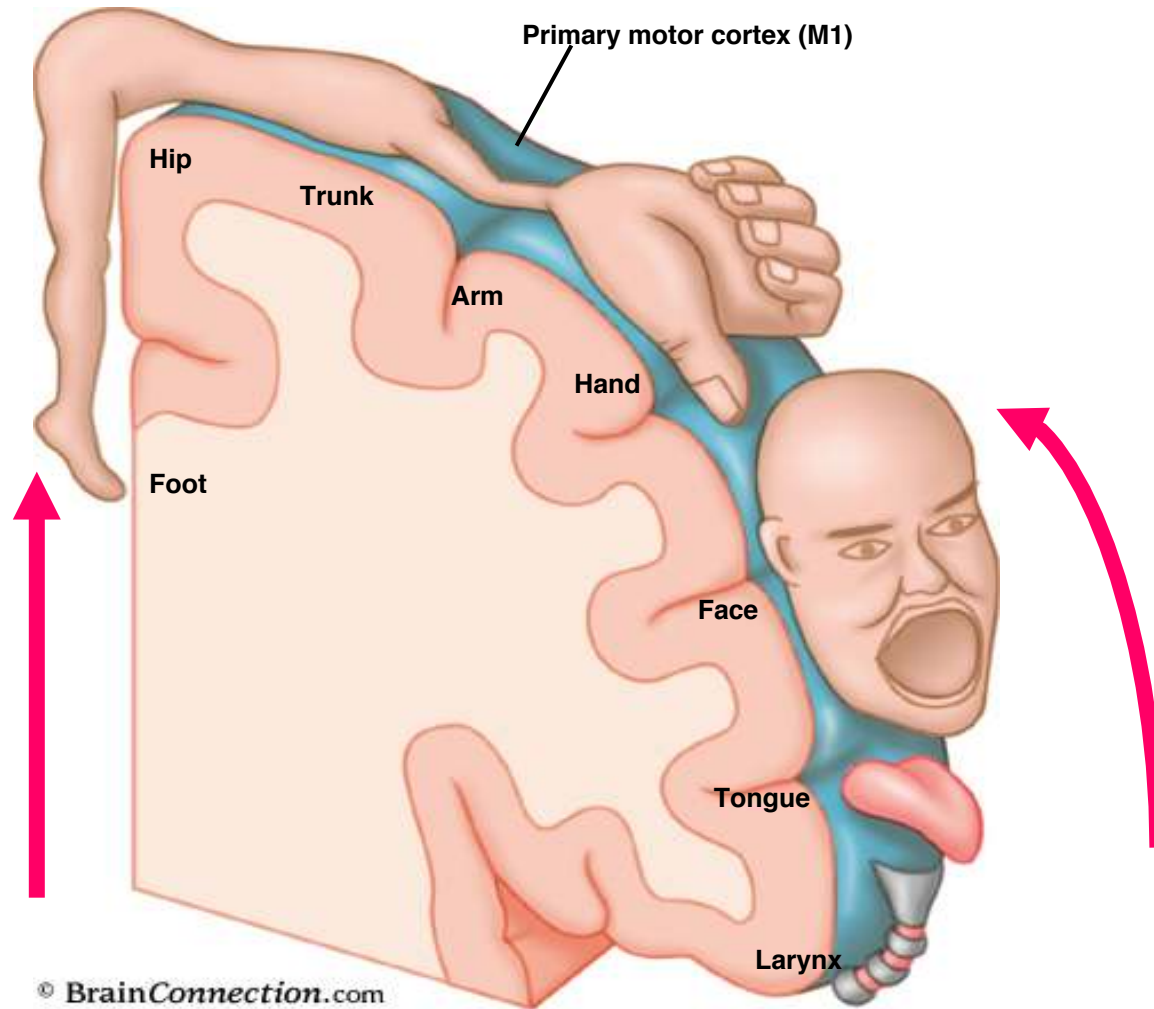
Basics of Neurobiology: Divisions of the telencephalon



Basics of Neurobiology: Divisions of the telencephalon



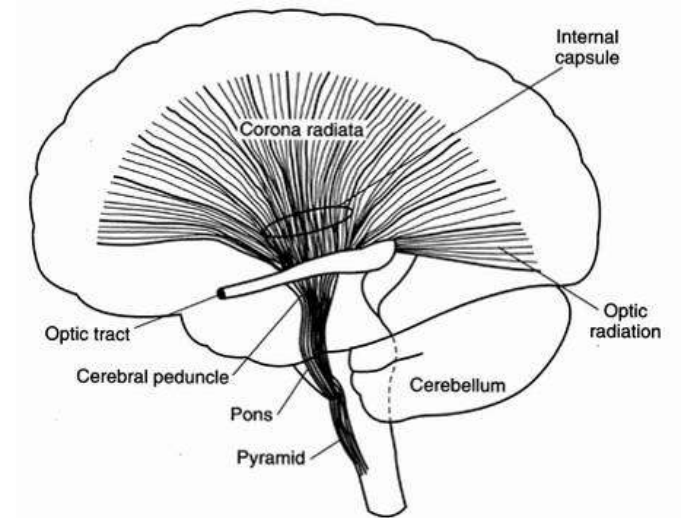
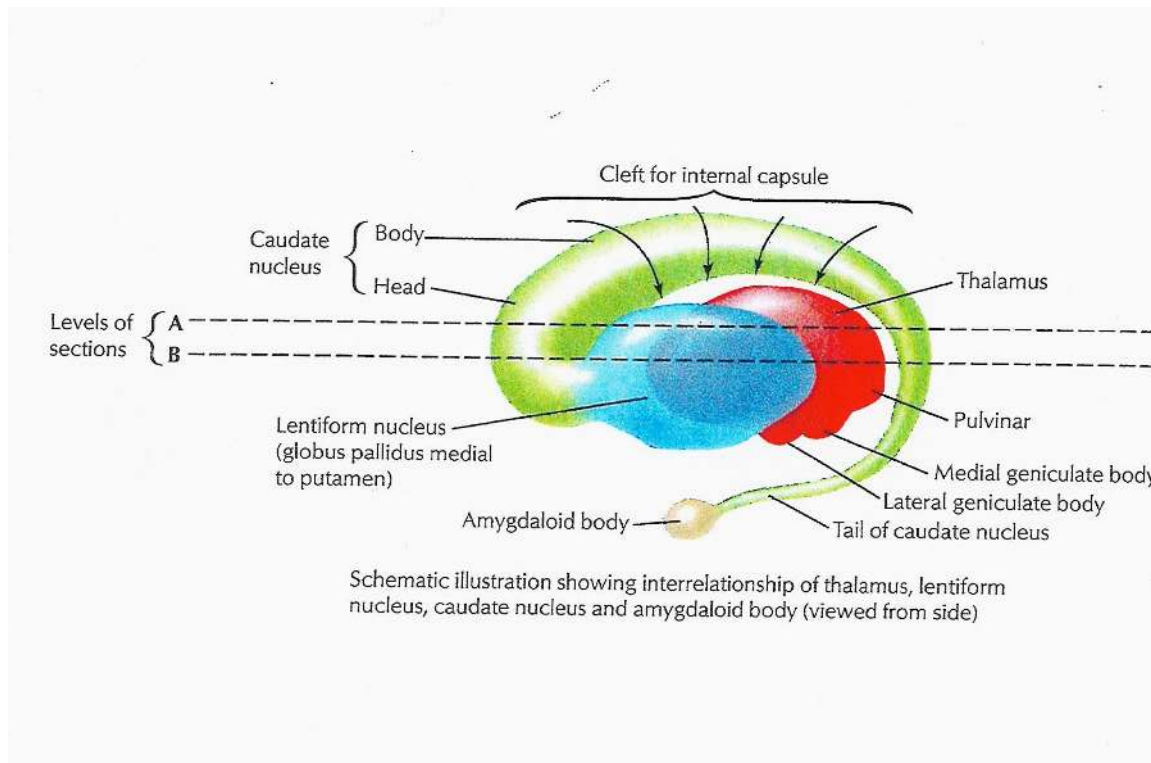
Basics of Neurobiology: Divisions of the telencephalon



BASAL GANGLIA

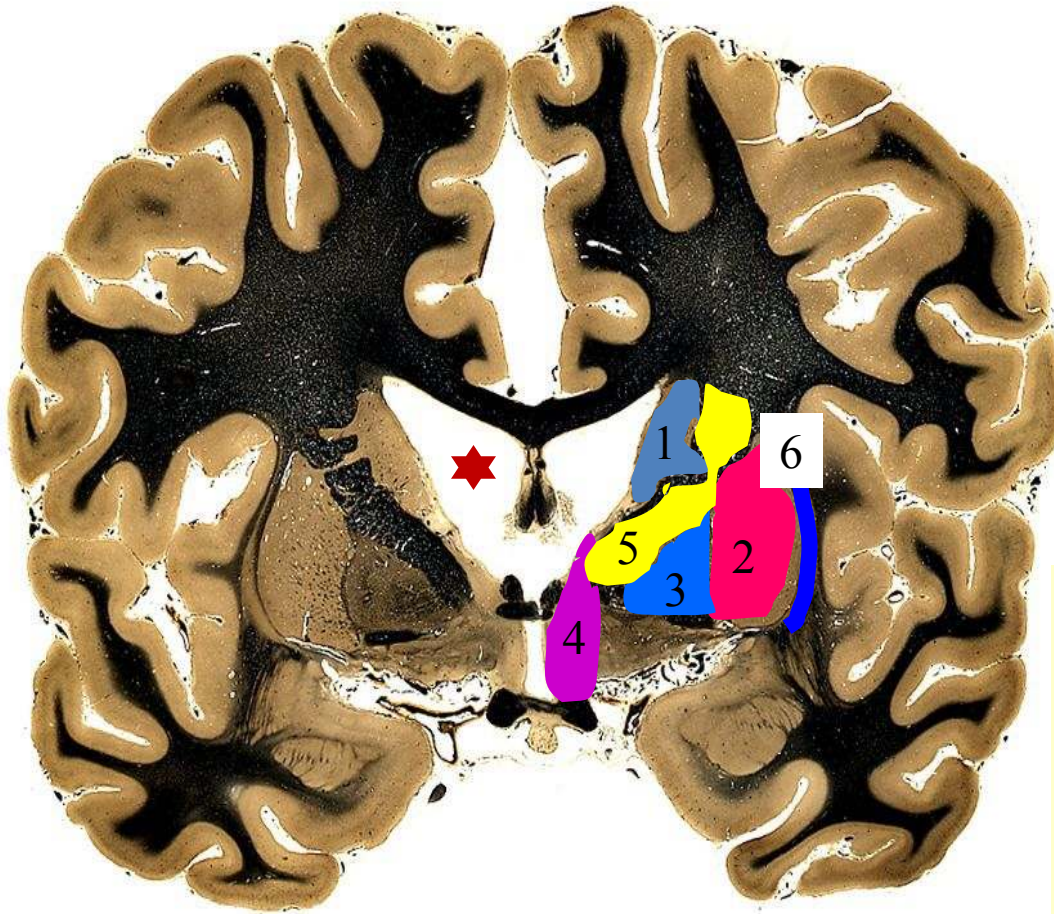
Basics of Neurobiology: Divisions of the telencephalon

THALAMUS, CAUDATE NUCLEUS AND LENTIFORM NUCLEUS



Basics of Neurobiology: Divisions of the telencephalon

BASAL GANGLIA AND THE INTERNAL CAPSULE

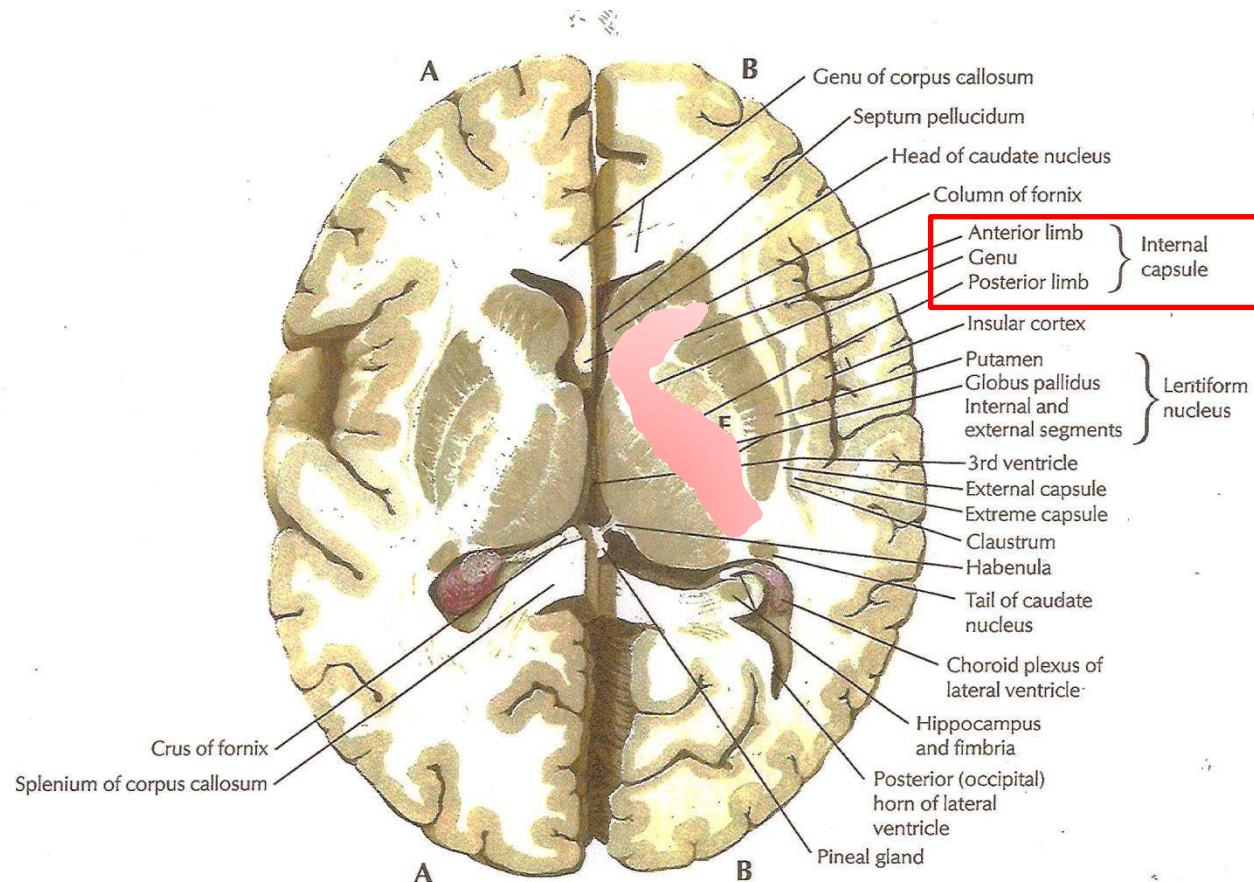


CROSS SECTION OF THE CEREBRUM AT THE LEVEL OF THE OPTIC CHIASM SHOWS THAT IT CONTAINS A MASSIVE NUCLEAR COMPLEX, THE BASAL GANGLIA. IT IS COMPOSED, AT THIS LEVEL, OF THE HEAD OF THE CAUDATE NUCLEUS AND TWO UNITS OF THE LENTIFORM NUCLEUS, THE PUTAMEN AND THE GLOBUS PALLIDUS. THEY SURROUND THE ANTERIOR WING OF THE INTERNAL CAPSULE. ASTERISK: LATERAL VENTRICLE

1. N. CAUDATUS
2. PUTAMEN
3. GLOBUS PALLIDUS
4. DIENCEPHALON
5. CAPSULA INTERNA
6. CLAUSTRUM

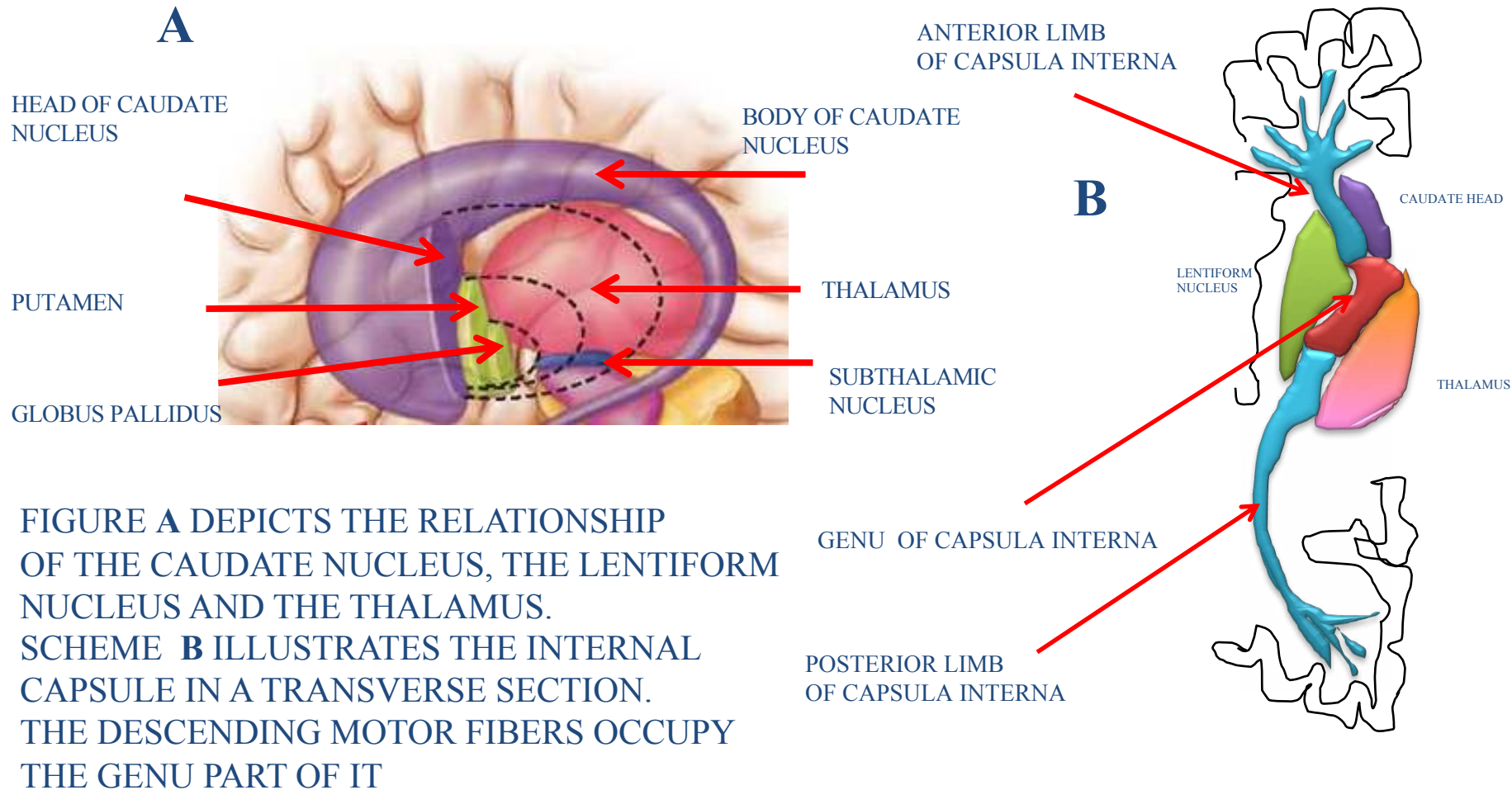
Basics of Neurobiology: Divisions of the telencephalon

HORIZONTAL SECTION OF THE BRAIN



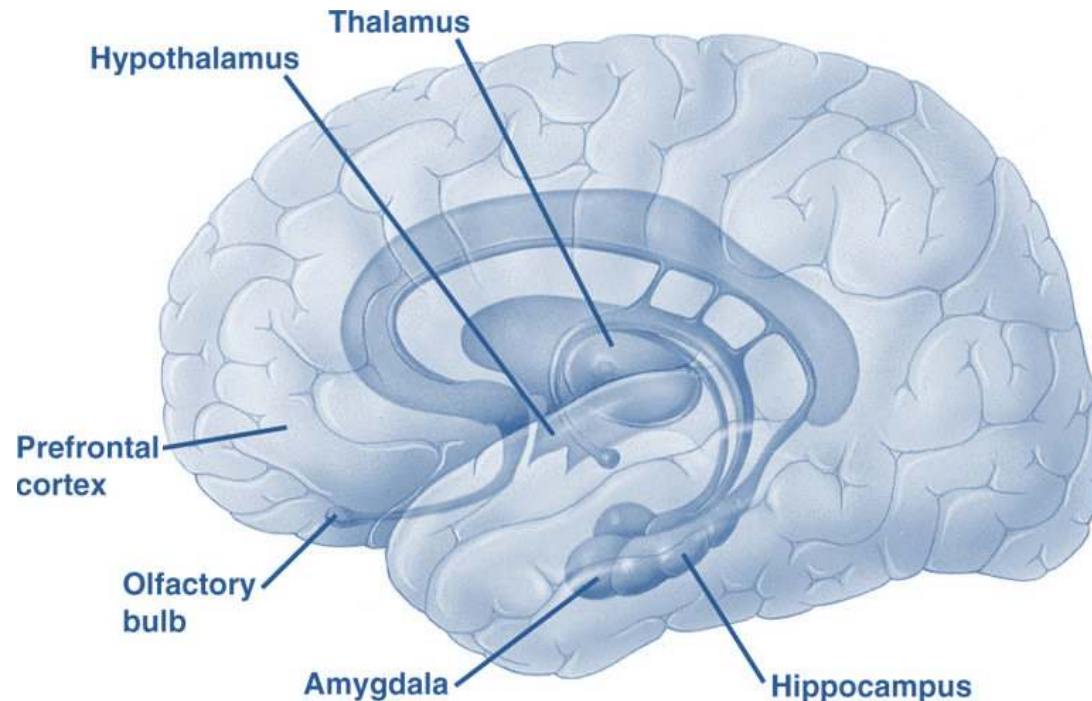
Basics of Neurobiology: Divisions of the telencephalon

THE BASAL GANGLIA AND THE INTERNAL CAPSULE



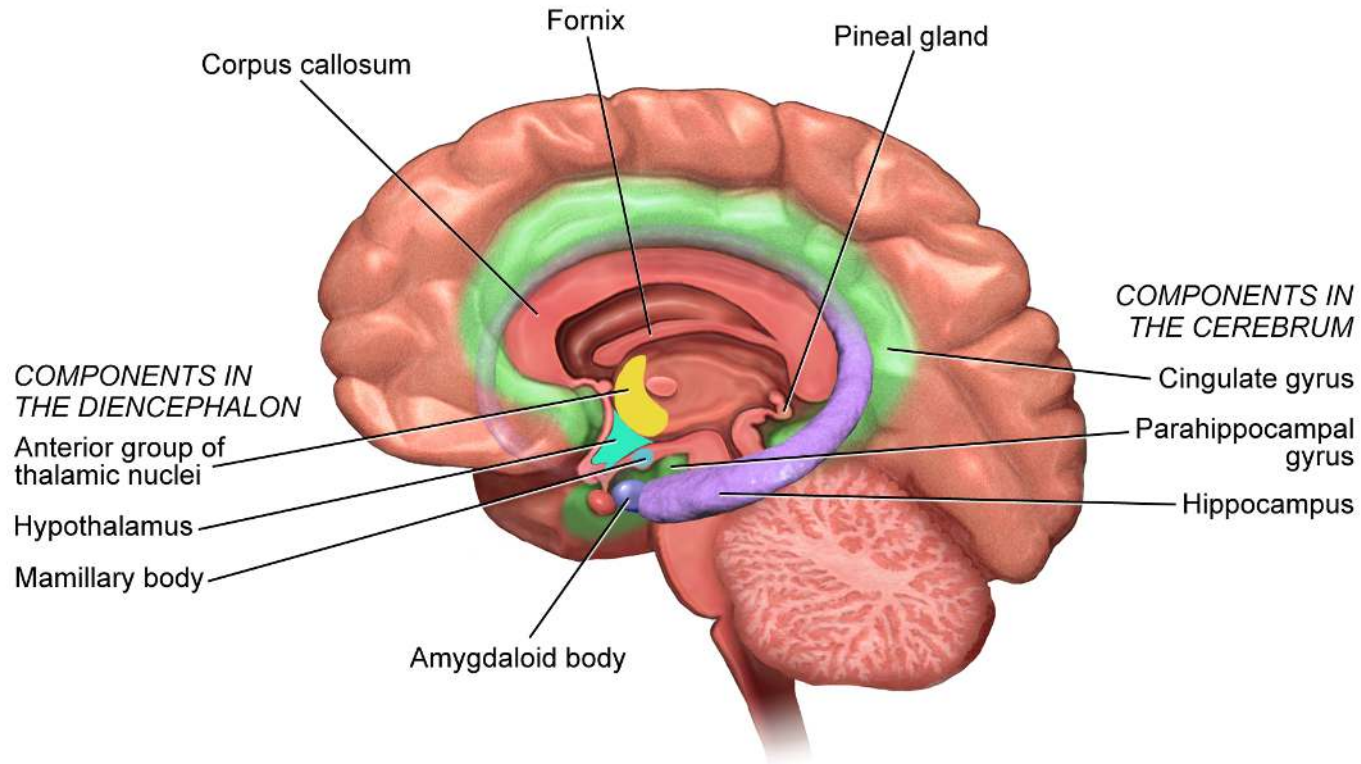
Basics of Neurobiology: Divisions of the telencephalon

OUTLINE OF THE LIMBIC SYSTEM

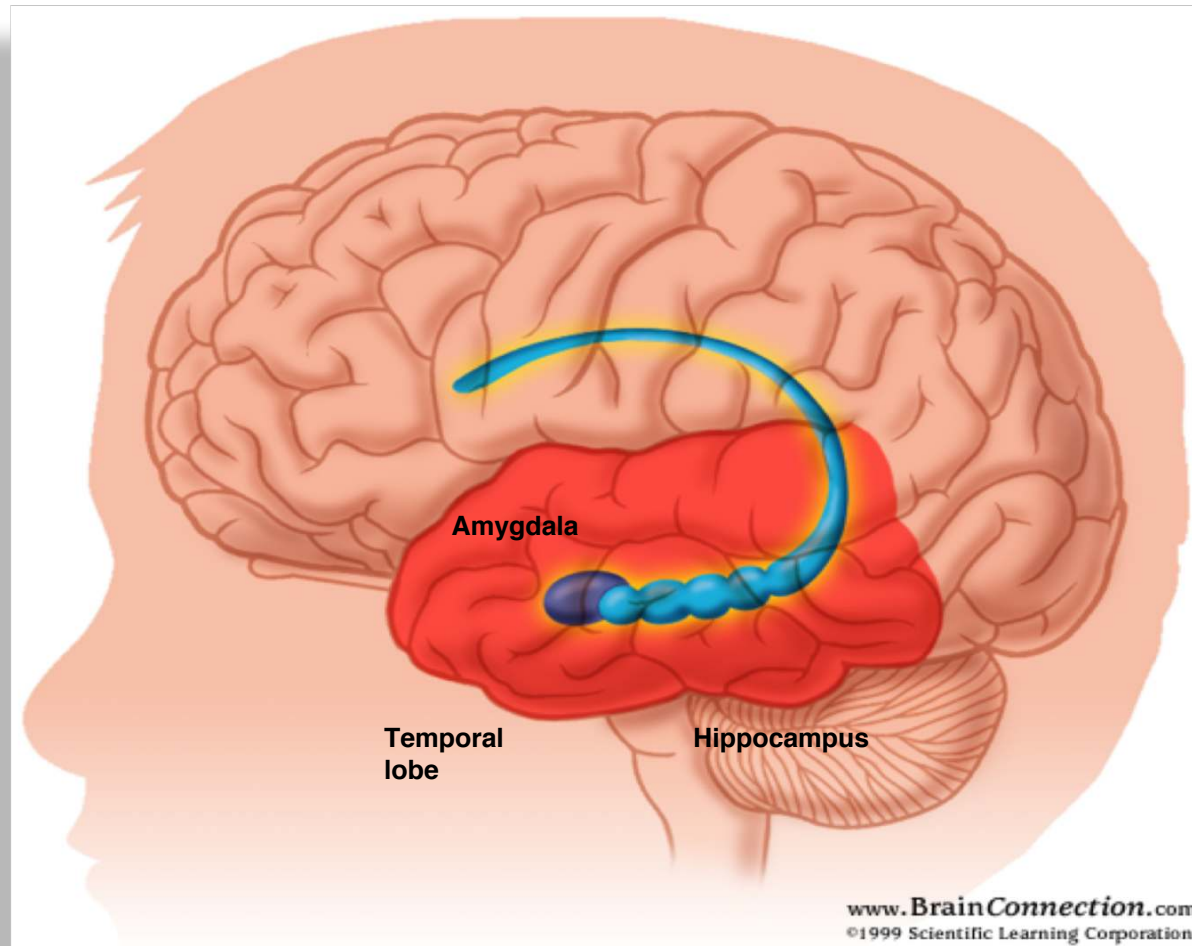


THE LIMBIC SYSTEM COMPRISES THE LIMBIC LOBE, HIPPOCAMPAL FORMATION, AMYGDALOID BODY AND THEIR WIDESPREAD CONNECTIONS. IT IS ASSOCIATED WITH PROCESSES OF LEARNING, MEMORY, EMOTIONS AND REGULATION OF HOMEOSTASIS. DEVELOPMENTALLY, IT ARISES FROM THE TRANSITION ZONE BETWEEN THE DIENCEPHALIC AND TELENCEPHALIC VESICLES

The Limbic System

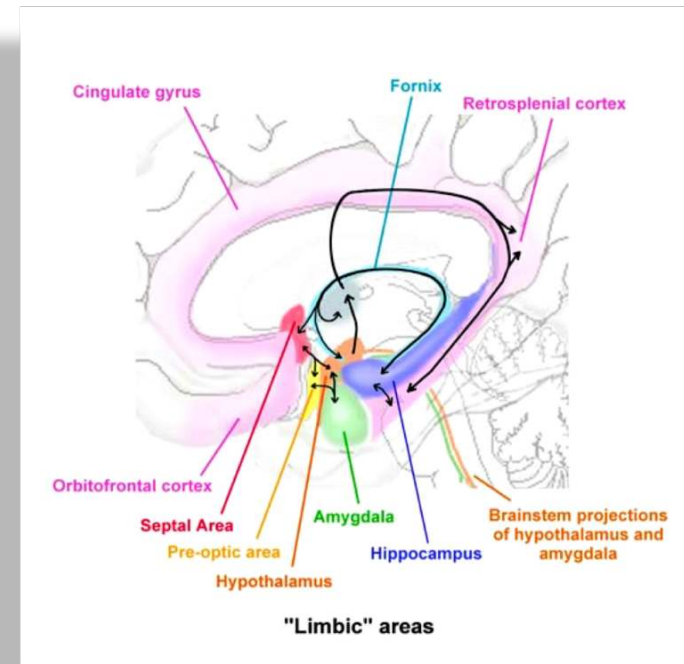
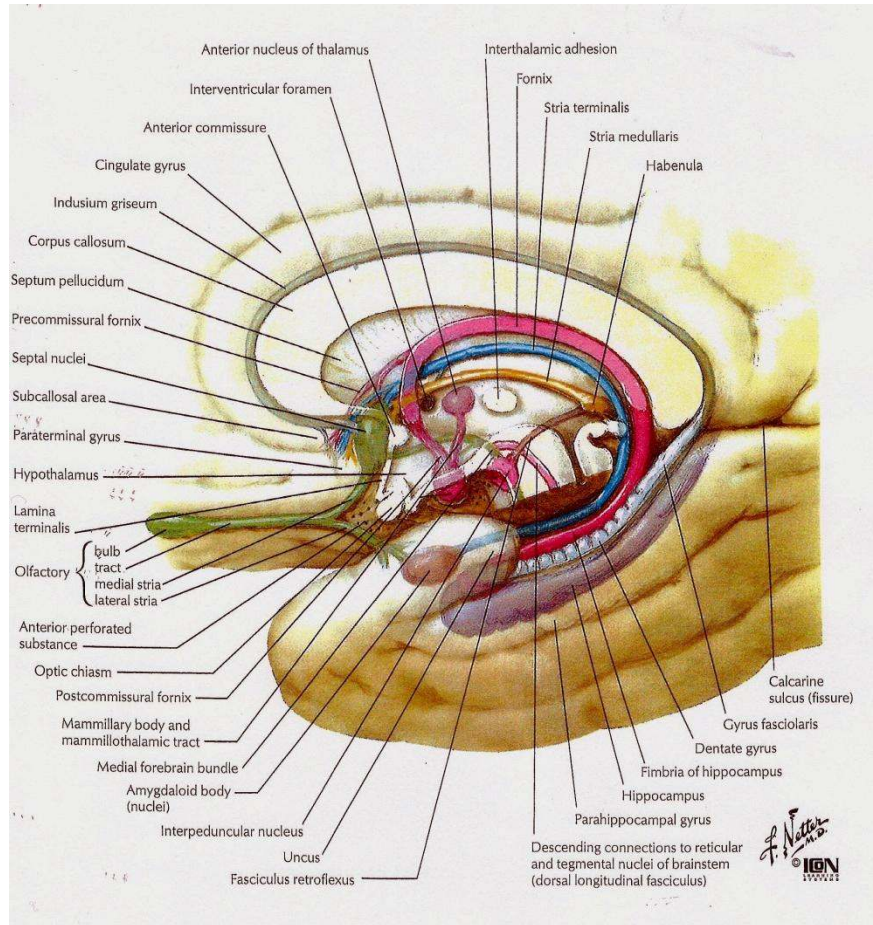


Basics of Neurobiology: Divisions of the telencephalon

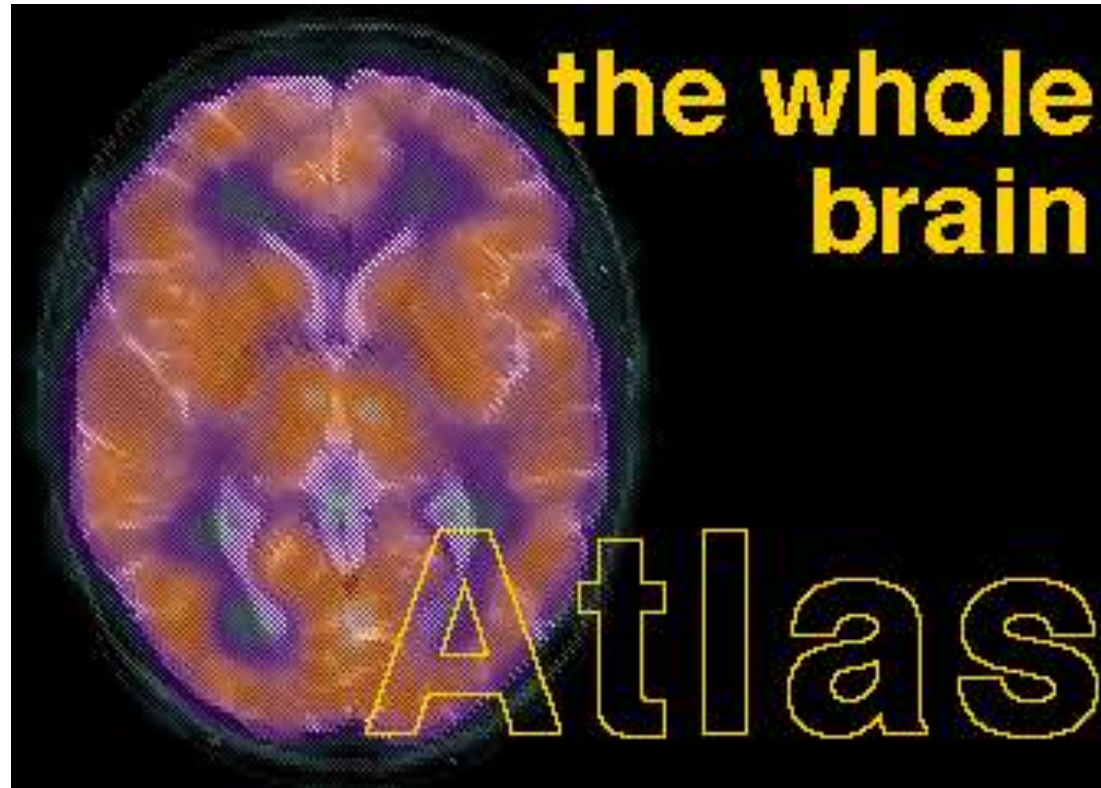


Basics of Neurobiology: Divisions of the telencephalon

LIMBIC SYSTEM



Basics of Neurobiology: Divisions of the telencephalon



<http://www.med.harvard.edu/AANLIB/home.html>