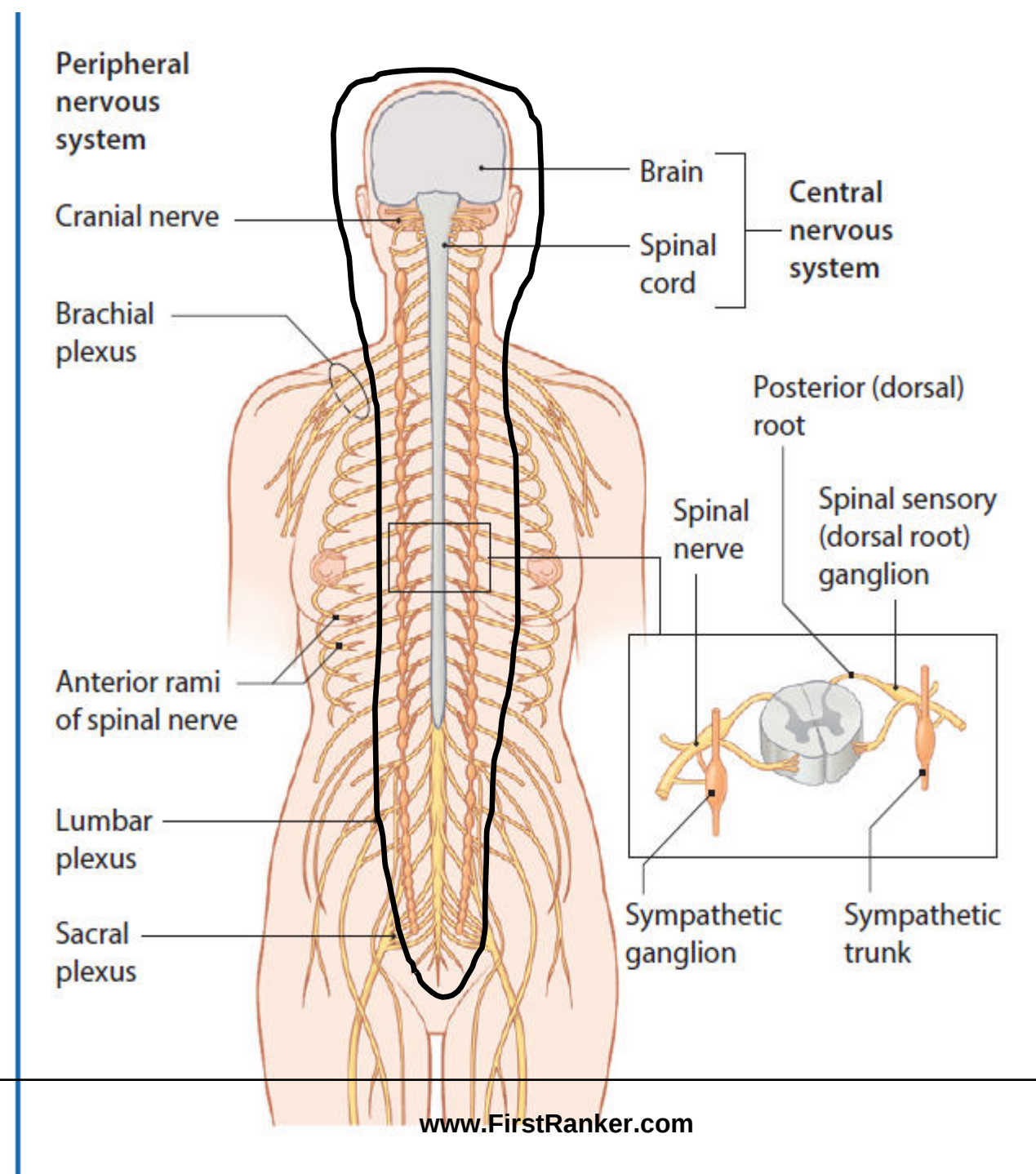


Non-neoplastic diseases of the Central Nervous system

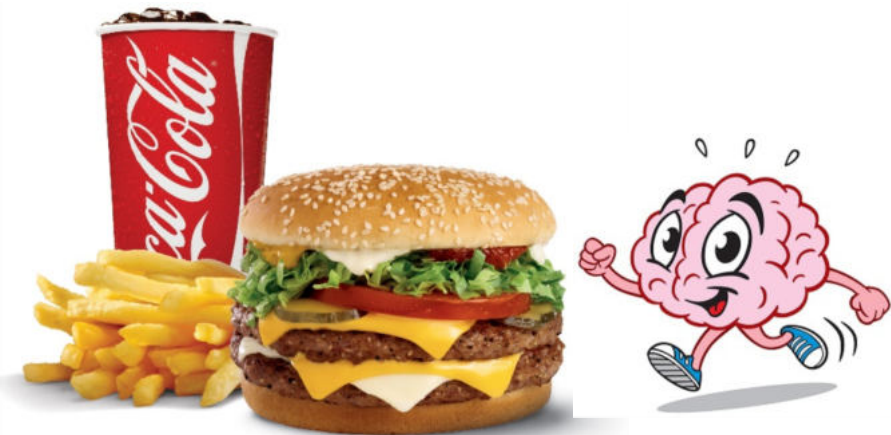


Its special

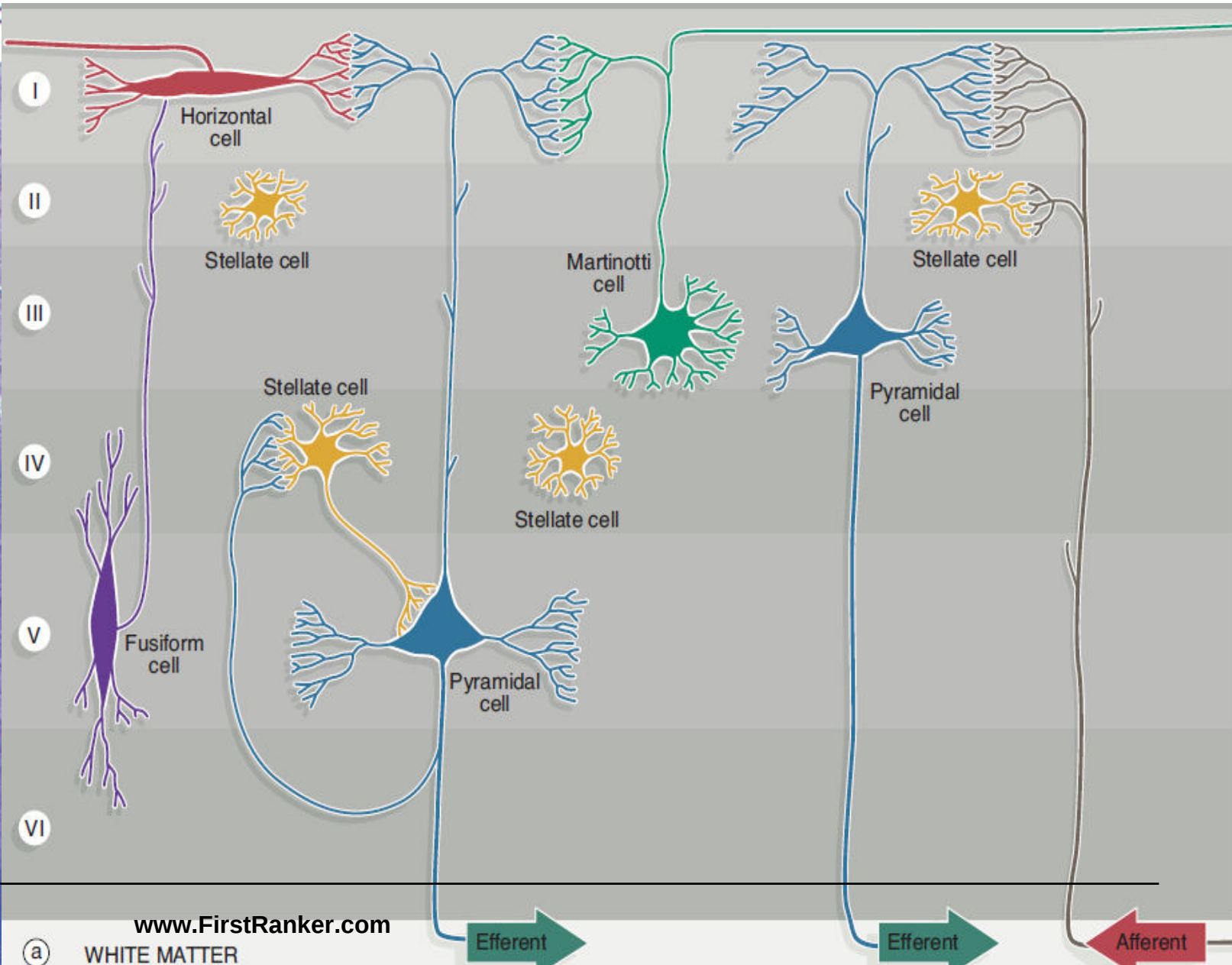
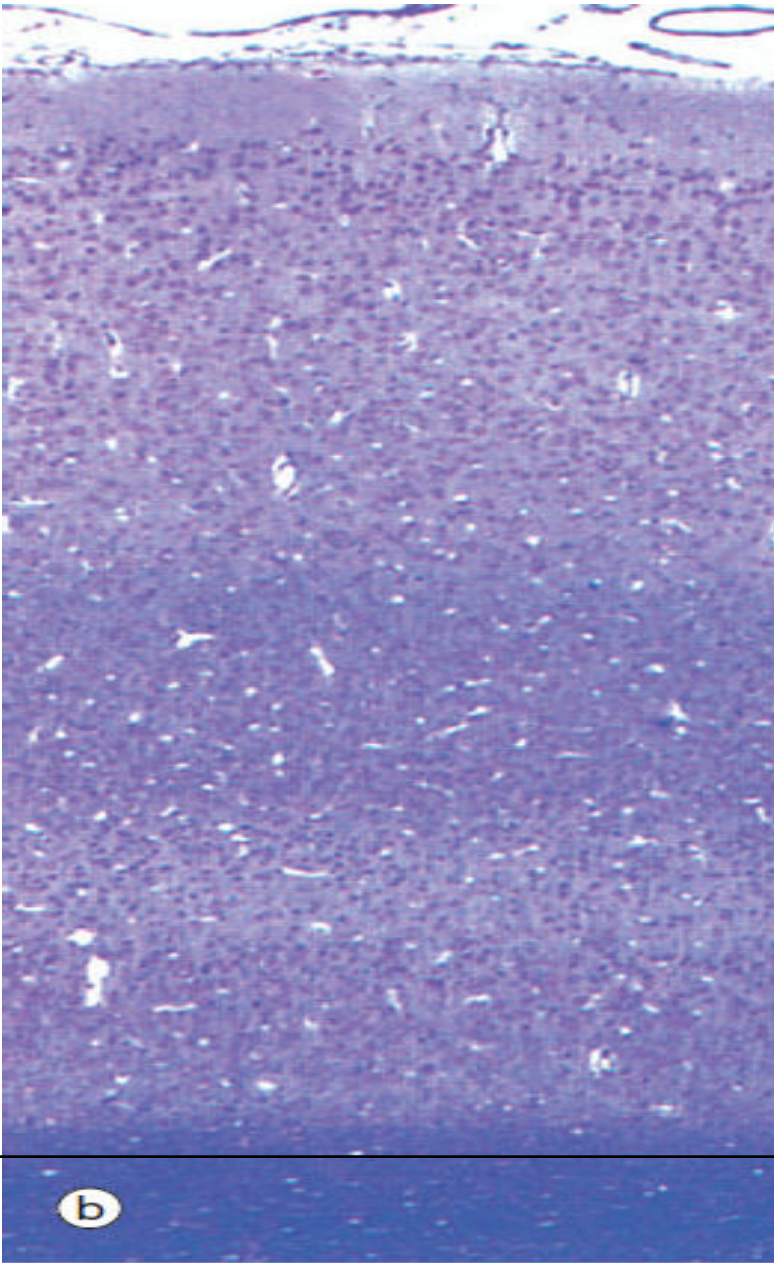
15% Cardiac output
20% O₂ consumption

Physically isolated
Vascular barrier
Circulation priority
Metabolic privilege
Incredibly complex
Even dies uniquely!

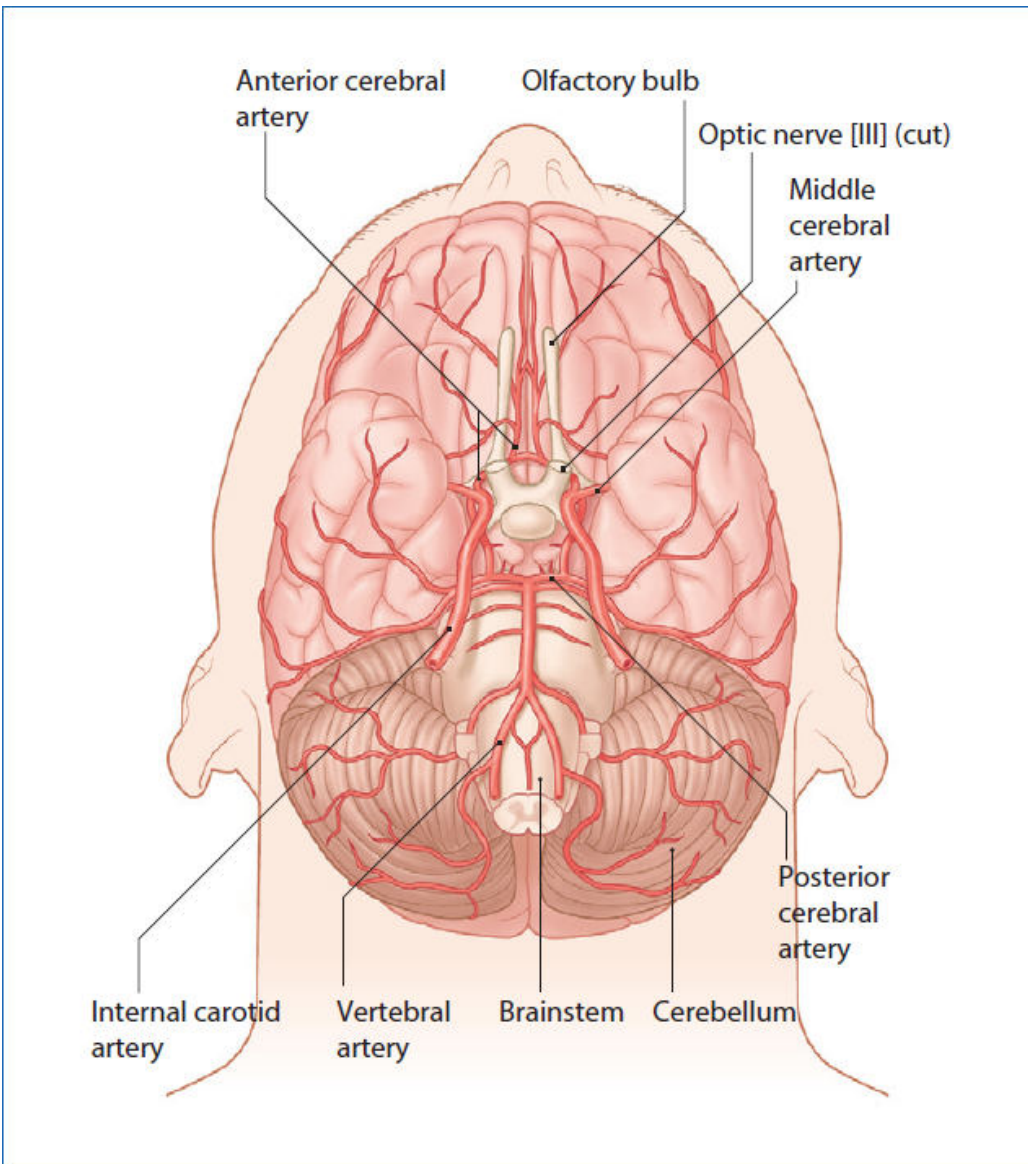
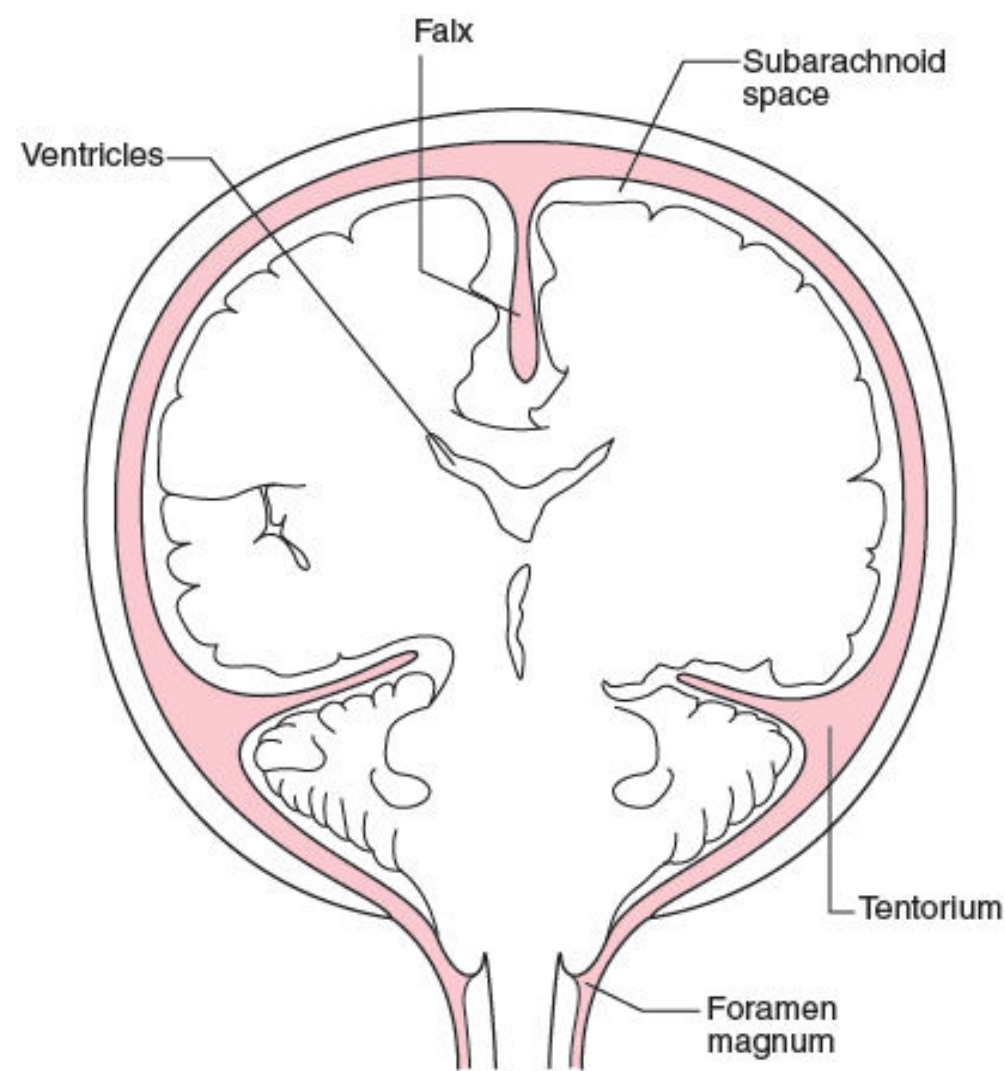
But it deserves all
the attention
because it performs



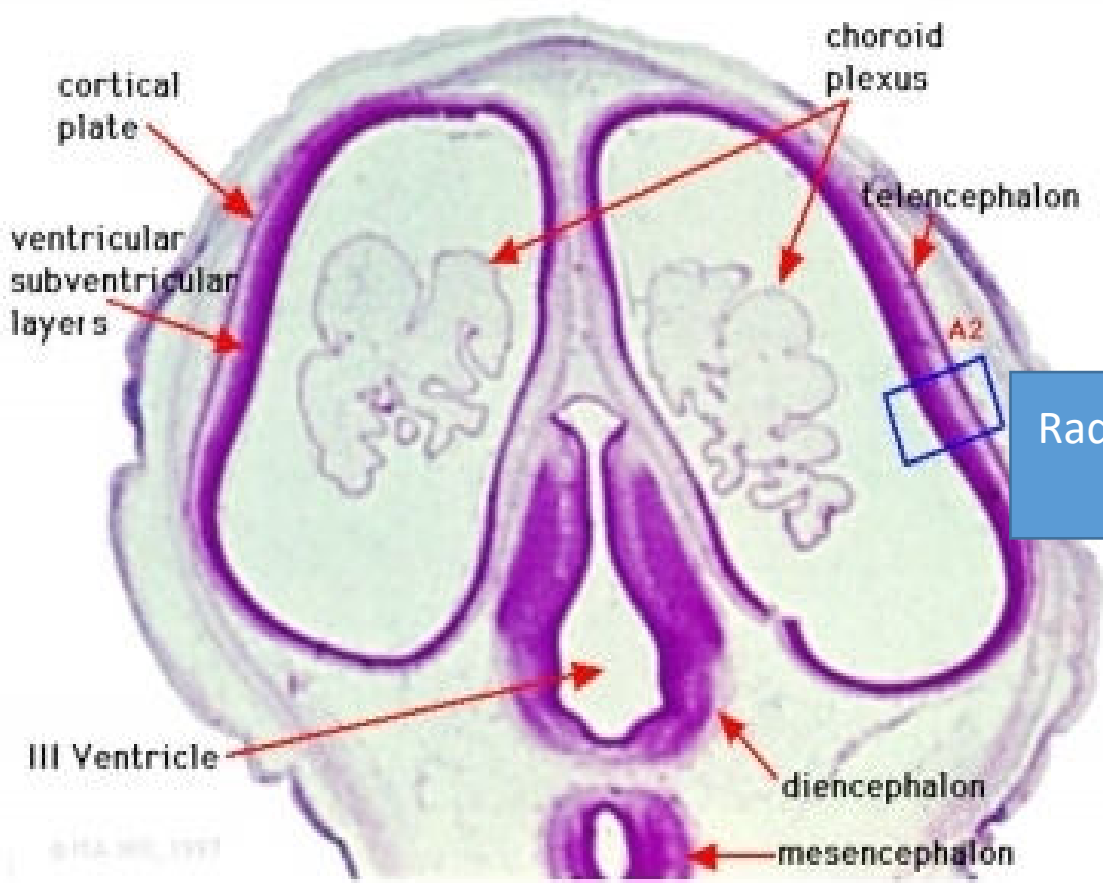
And very intricately organized



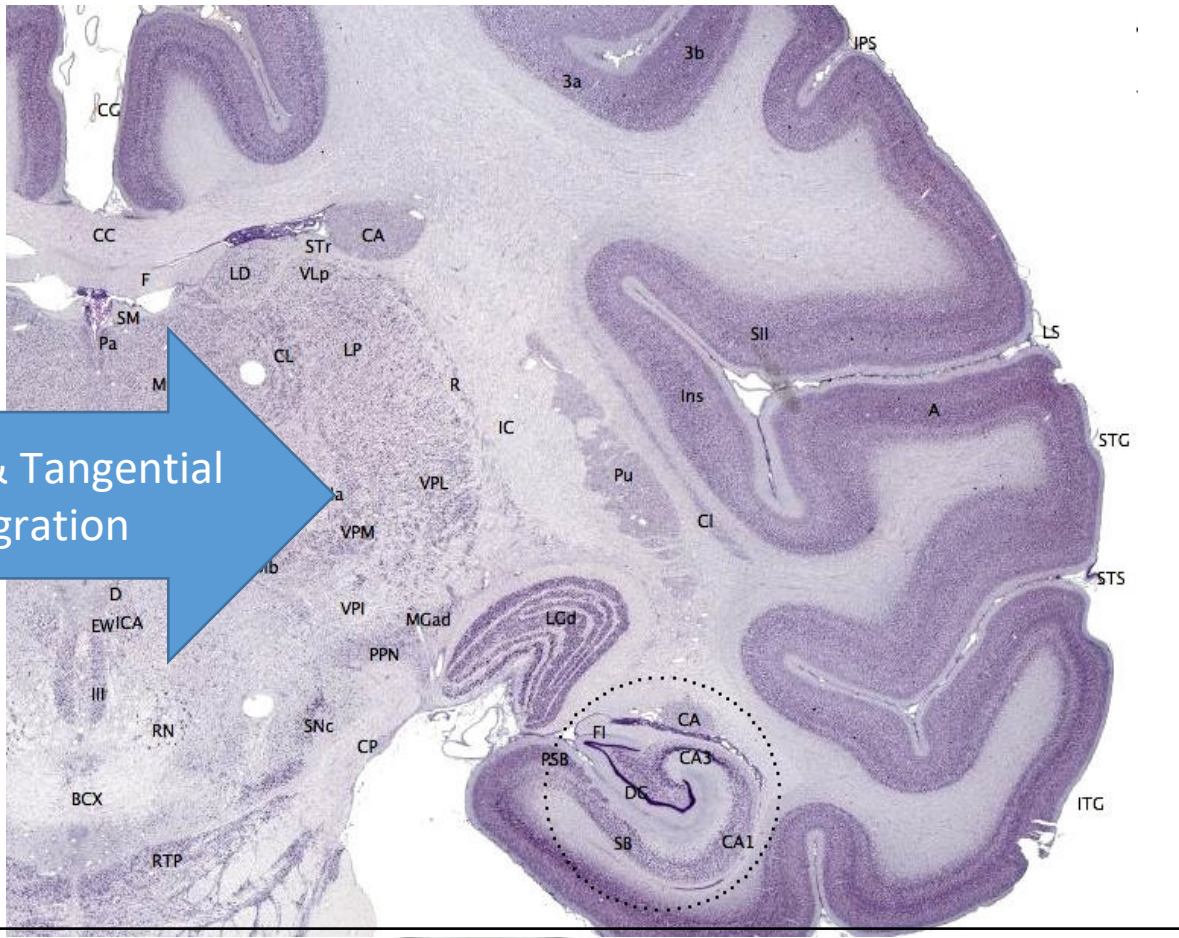
Well cushioned and fed



BUT



Radial & Tangential migration



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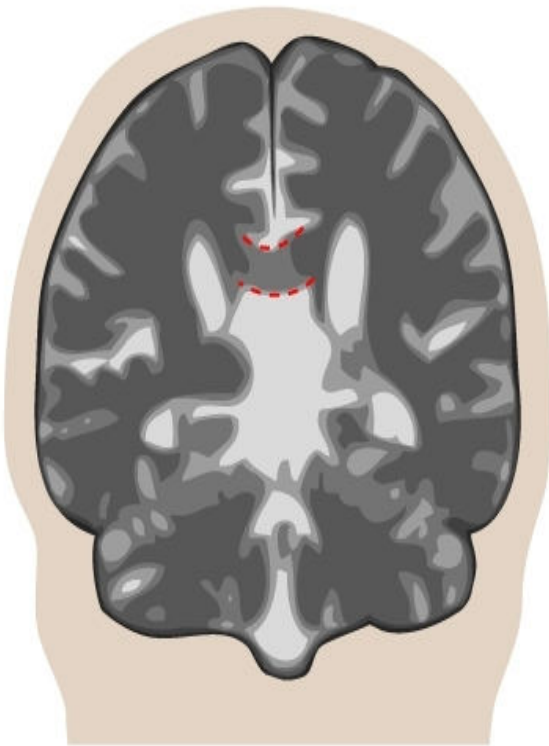
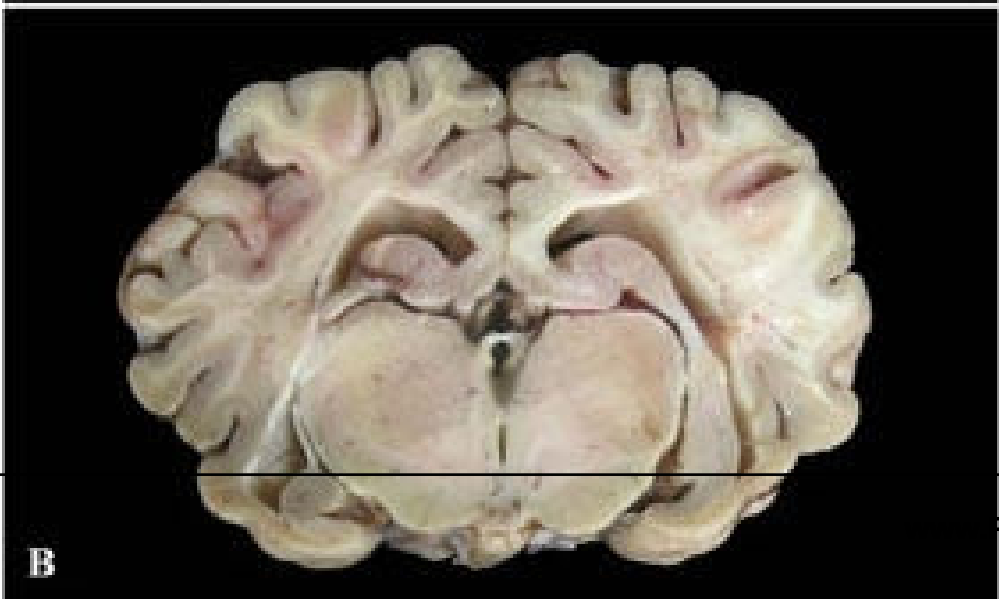
Many things can go wrong



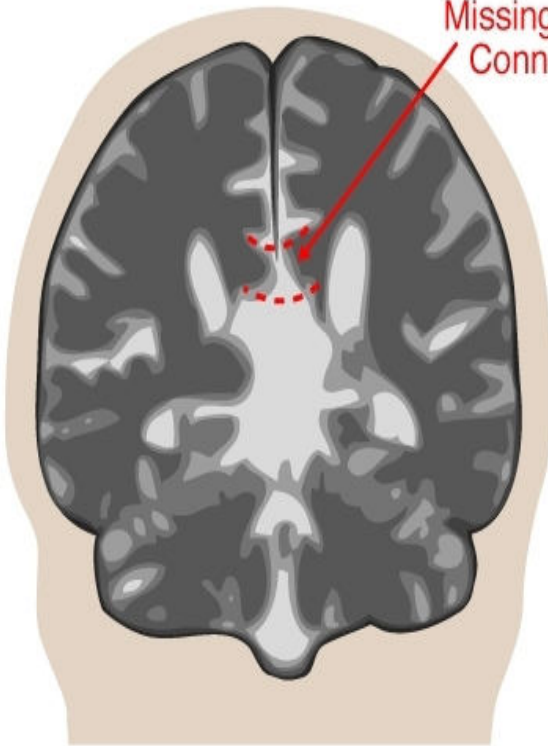
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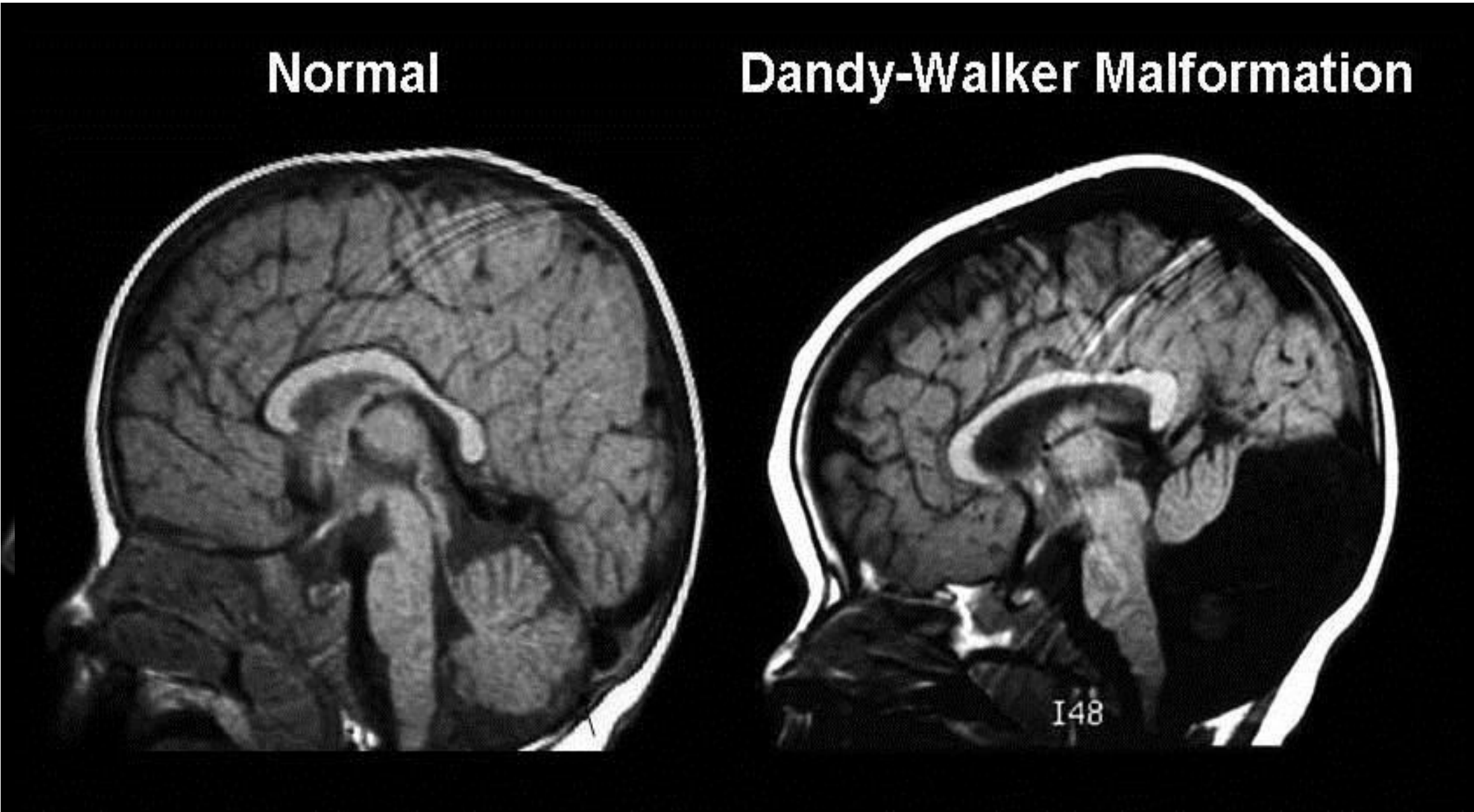
Intact
Corpus Callosum



Agenesis of the
Corpus Callosum

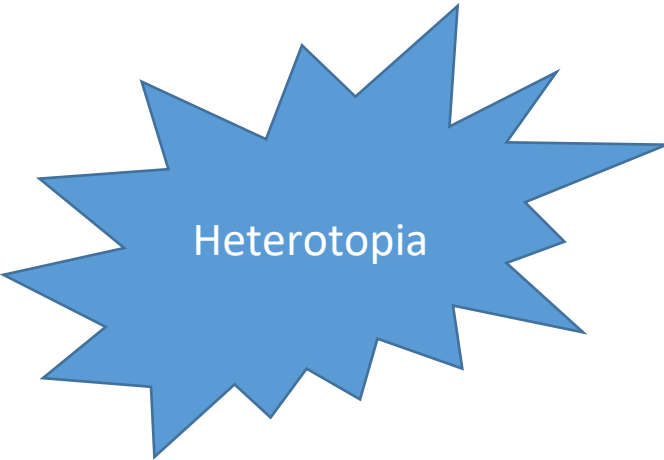
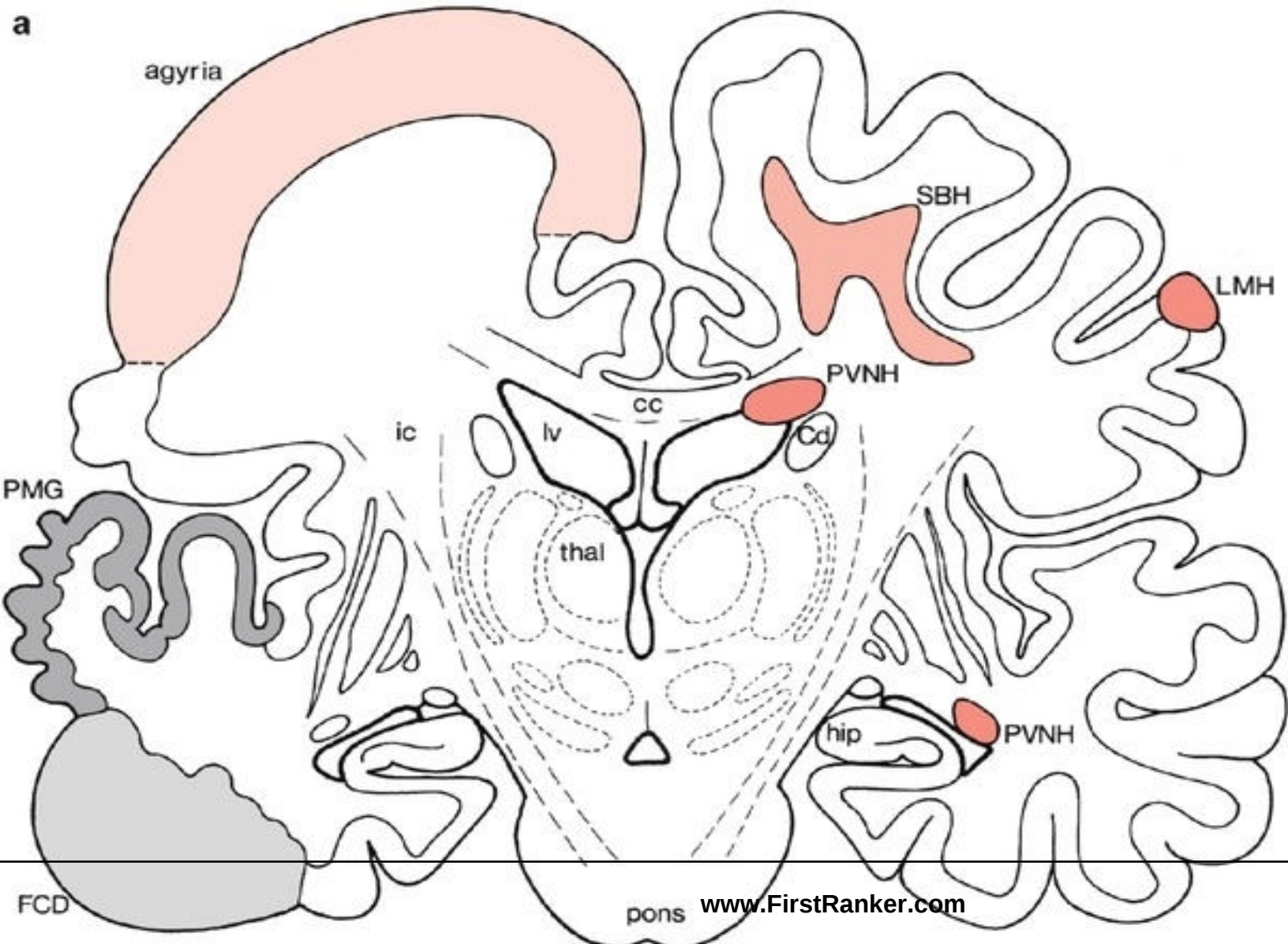
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Many things can go wrong



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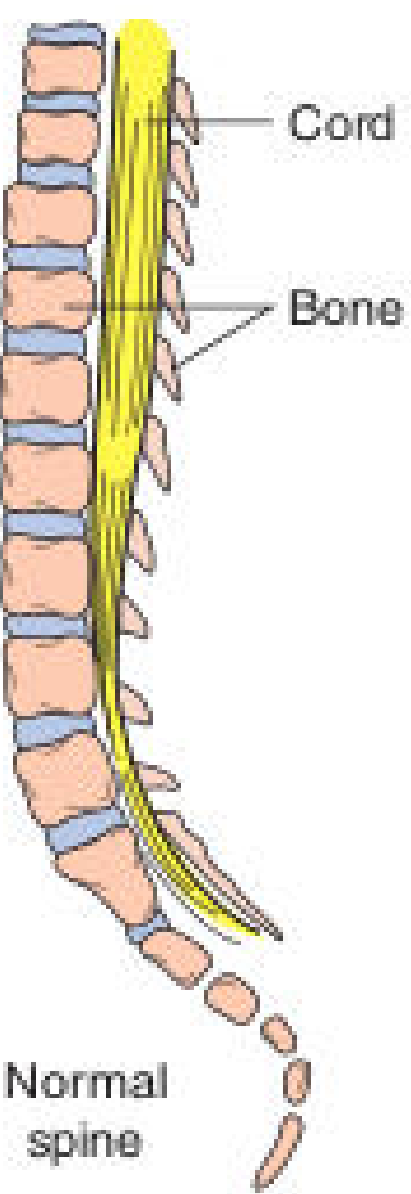
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Spina bifida occulta

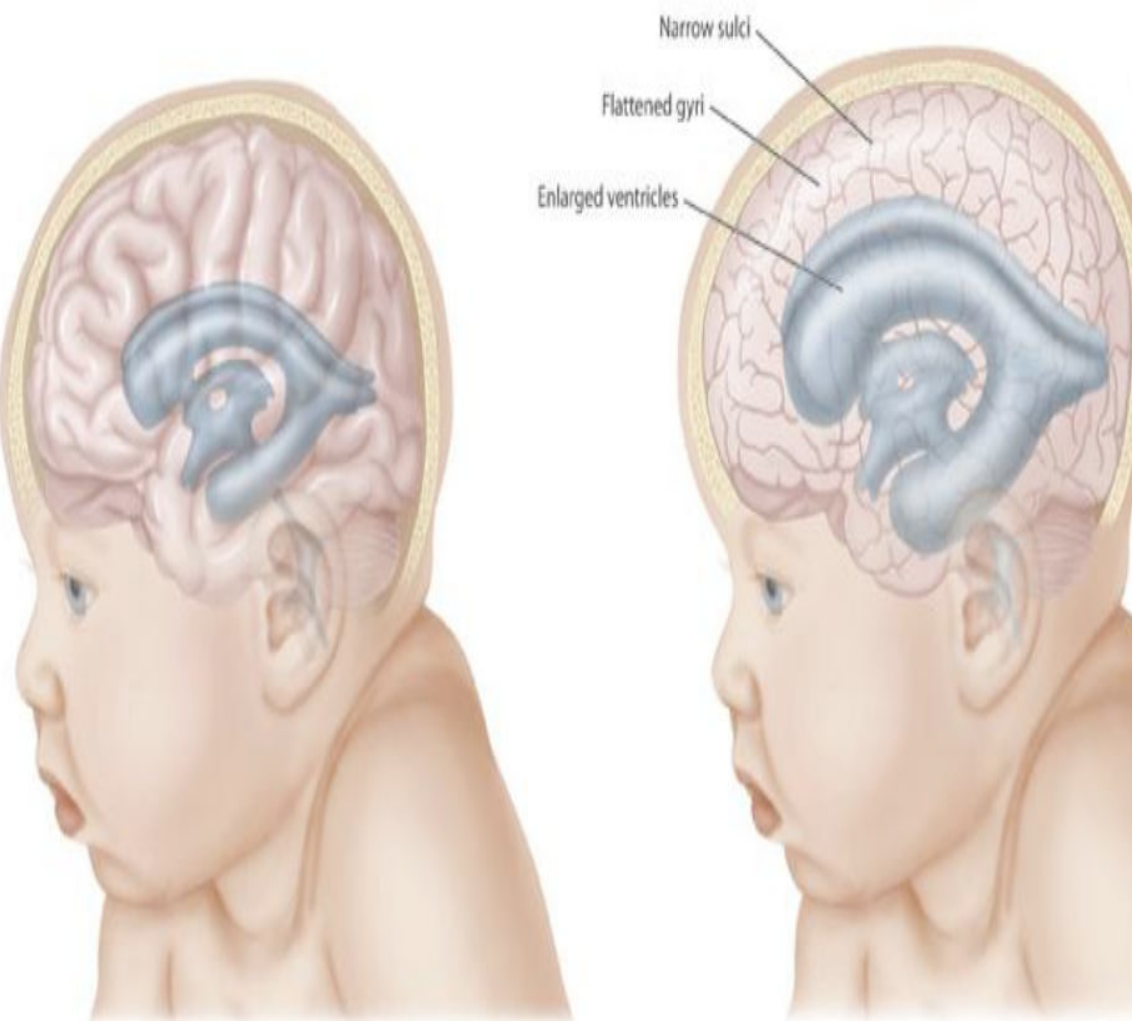
Meningocele

Myelomeningocele

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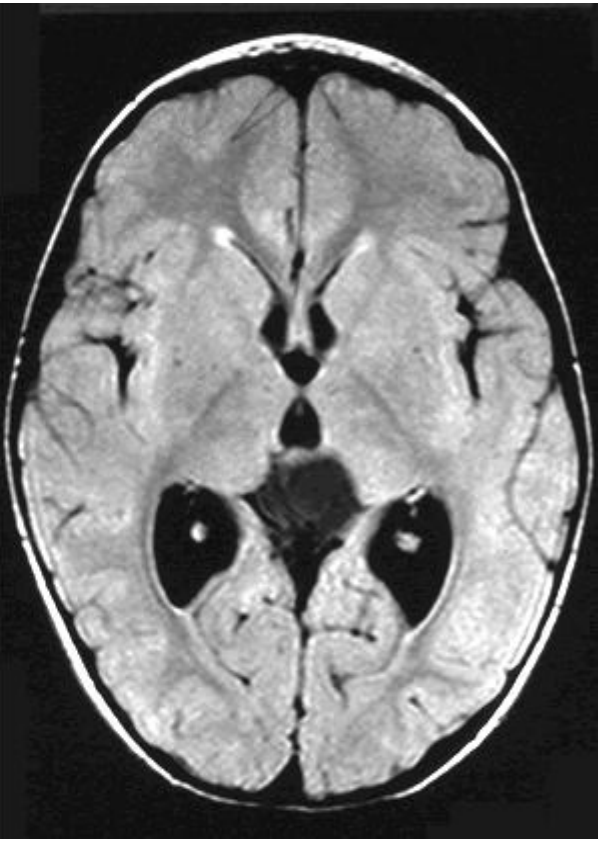
Many things can go wrong

Communicating Vs Non-communicating
Primary Vs Secondary



No Hydrocephalus

Hydrocephalus

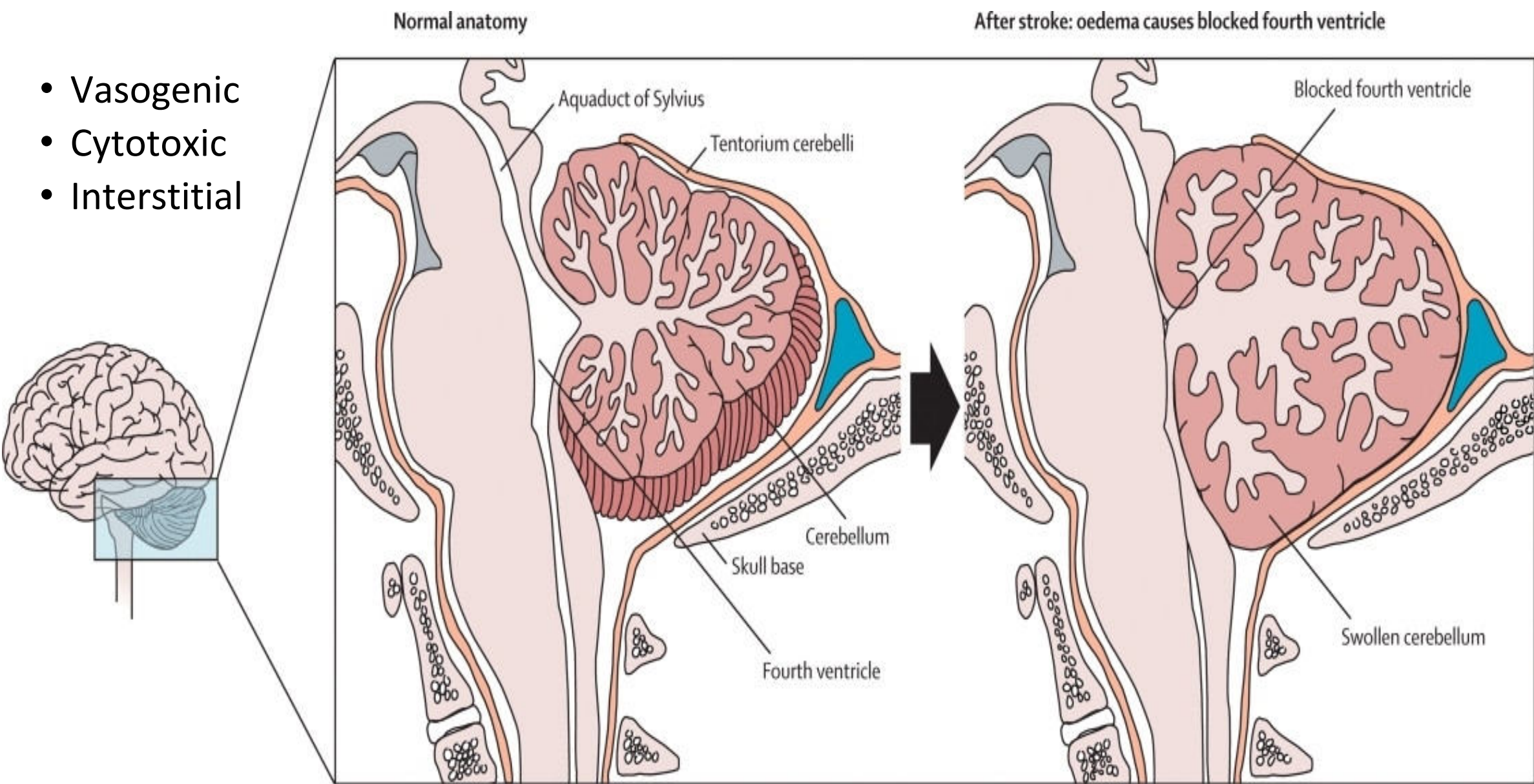


Many things can go wrong

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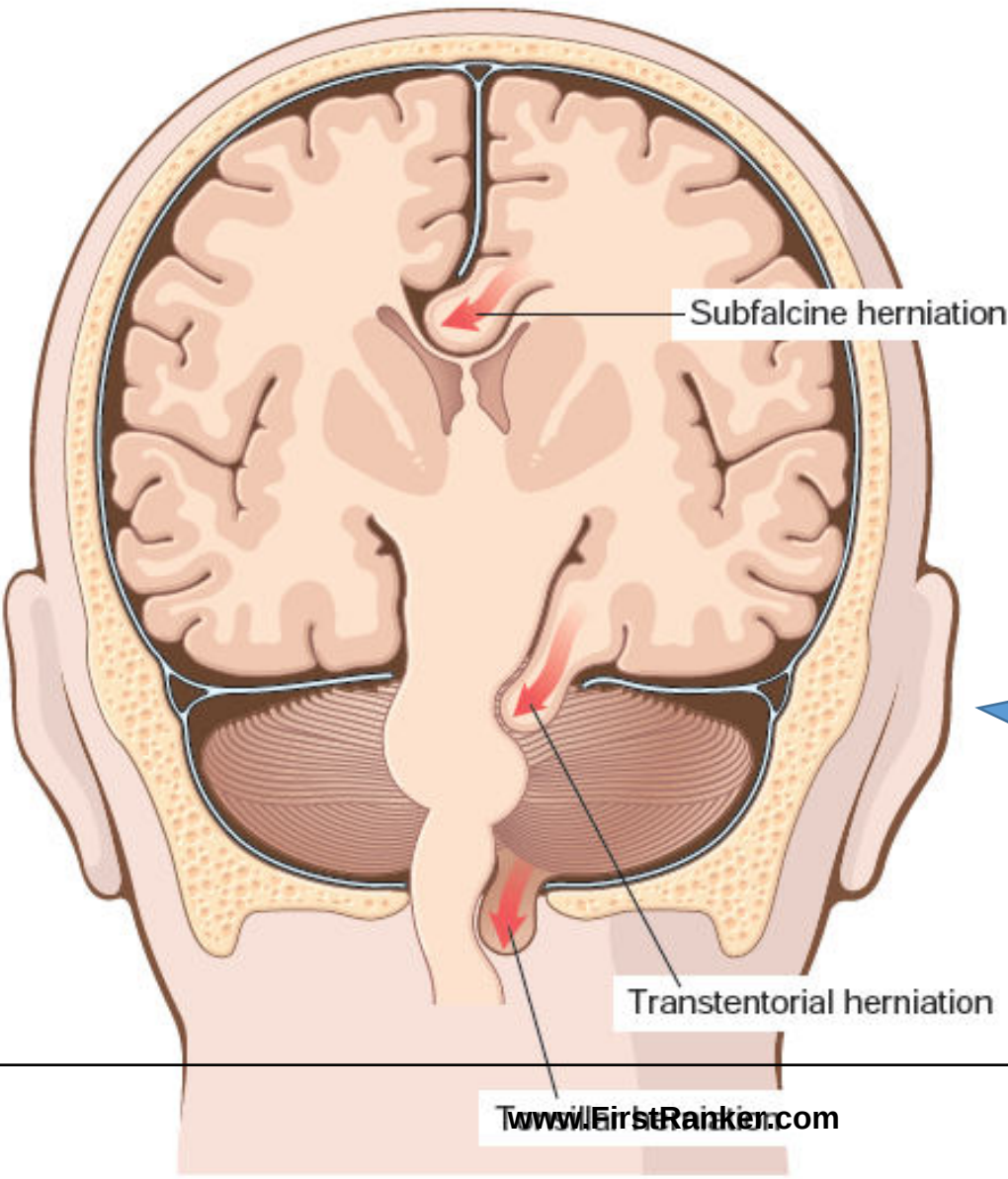
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- Vasogenic
- Cytotoxic
- Interstitial



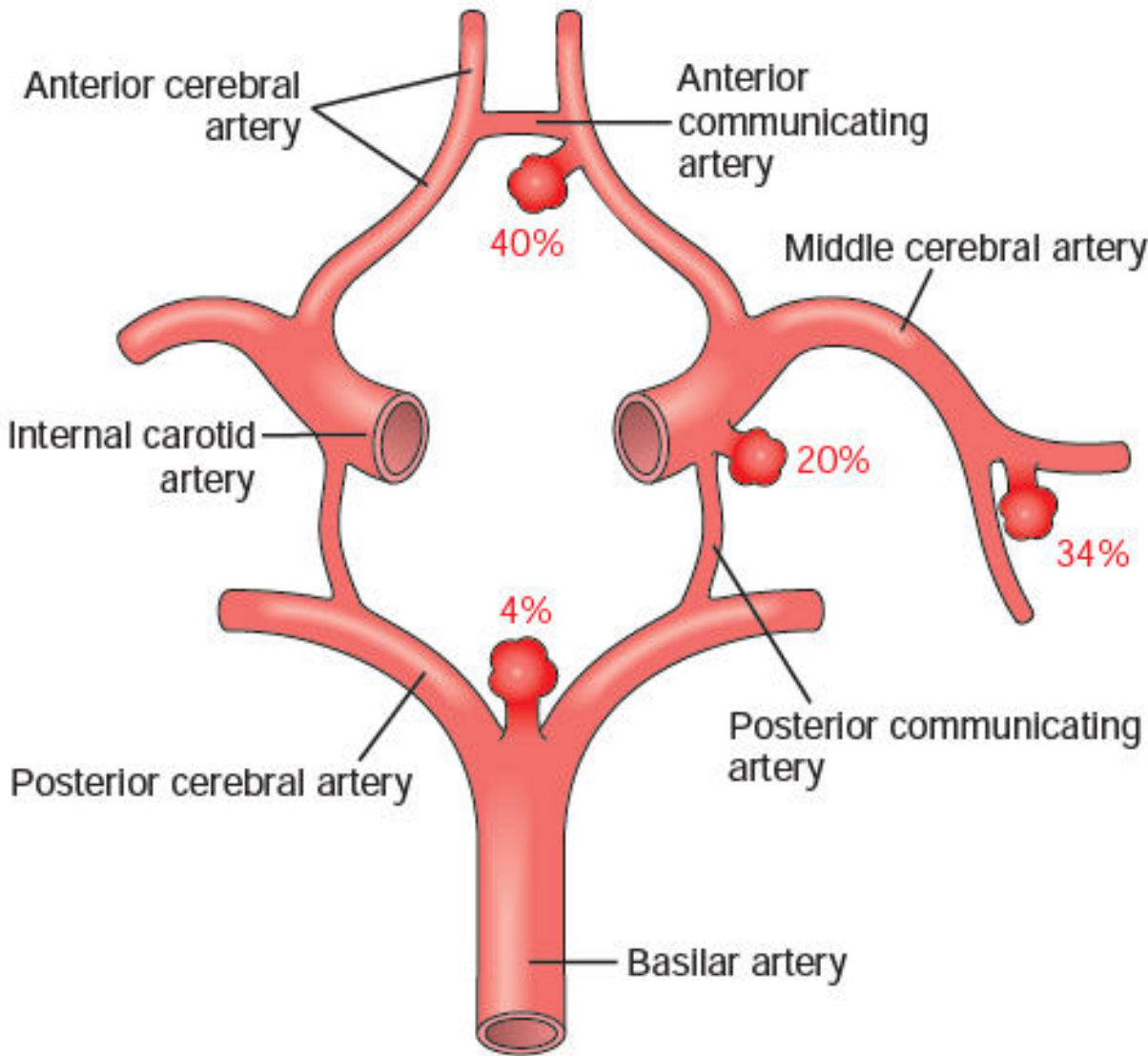
Many things can go wrong

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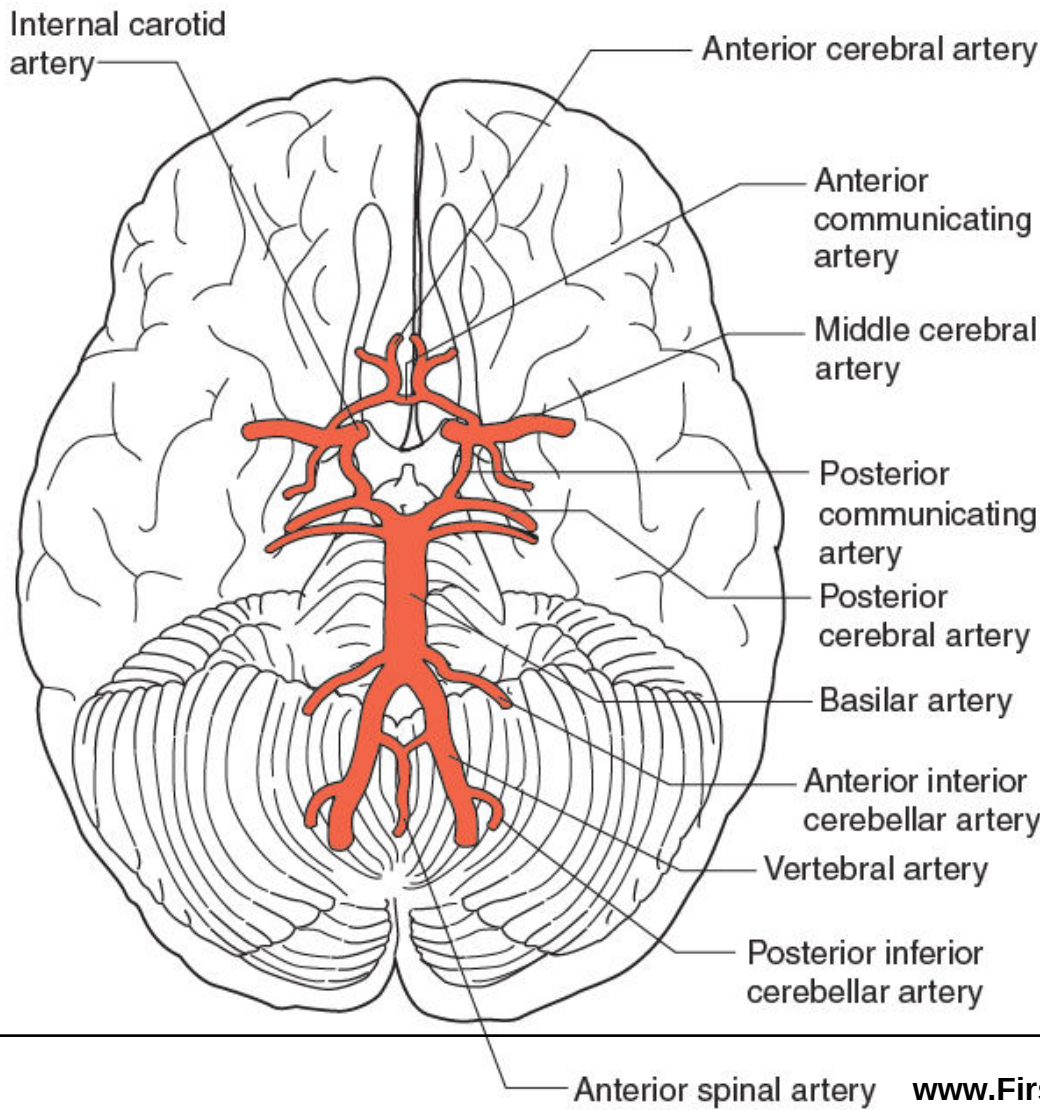
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Lesion	Mechanism	Clinical manifestations
Extradural haematoma	Skull fracture with arterial rupture, e.g. middle meningeal artery	Lucid interval followed by a rapid increase in intracranial pressure
Subdural haematoma	Rupture of venous sinuses or small bridging veins due to torsion forces	Acute presentation with a rapid increase in intracranial pressure Chronic presentation with personality change, memory loss and confusion, particularly in the elderly
Subarachnoid haemorrhage	Arterial rupture	Meningeal irritation with a rapid increase in intracranial pressure
Intracerebral haemorrhage	Cortical contusions Rupture of small intrinsic vessels with intracerebral haematoma 'Burst lobe' with intracerebral haematoma contusions and subdural haematoma	May cause seizures Increased intracranial pressure with focal deficits; usually fatal Profound coma, usually rapidly fatal

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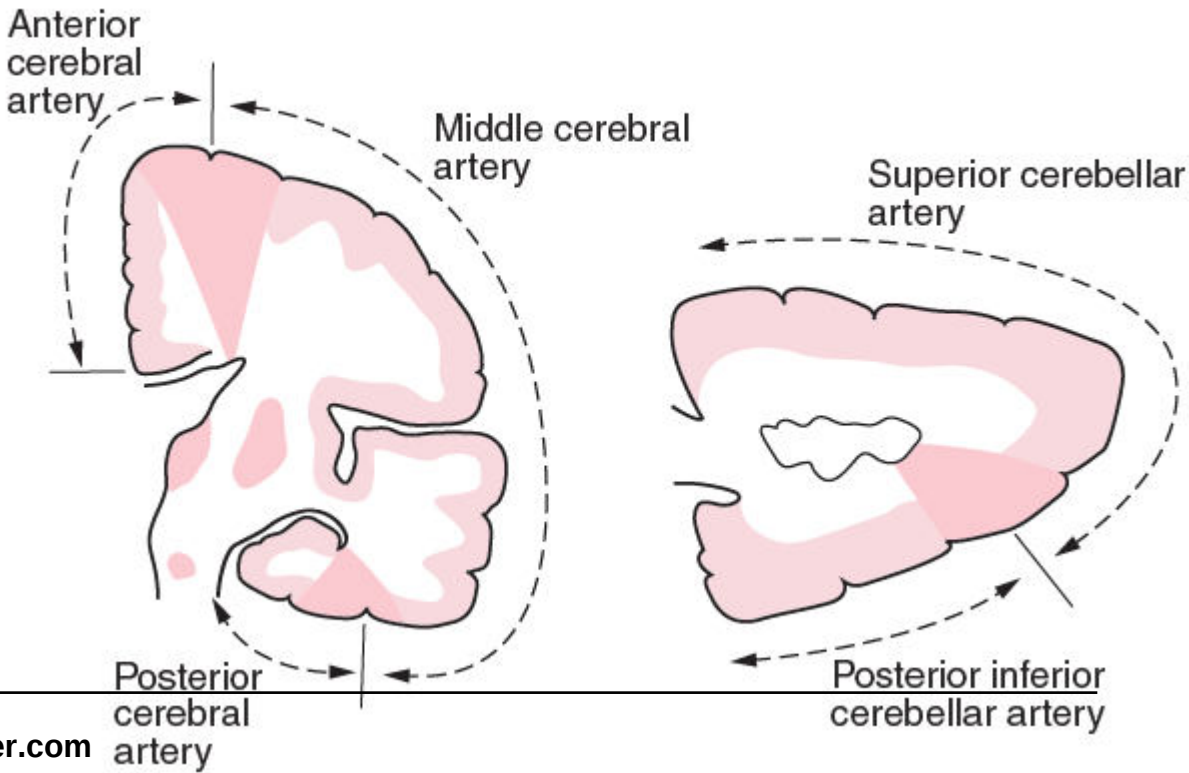
Many things can go wrong



Hypoxia
Ischemia
Infarct

Non-hemorrhagic

Hemorrhagic



Many things can go wrong

Cardiac arrest
Shock
Hypotension

Does it affect all areas equally?

Does it affect all cells equally?

Very severe ischemia: Diffuse neuronal damage

Hippocampus
Cerebellum (Purkinje)
Cerebral cortex (Pyramidal)

Neurons>> Glial cells

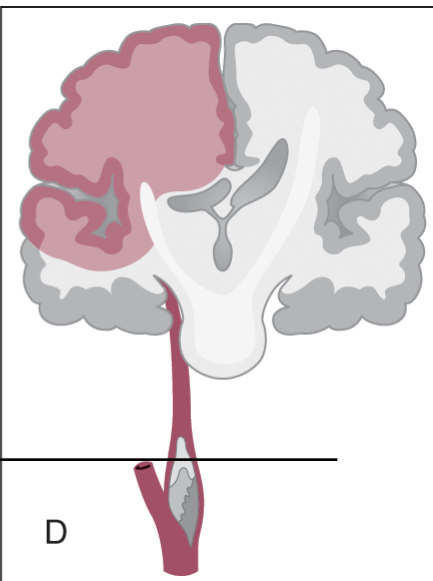
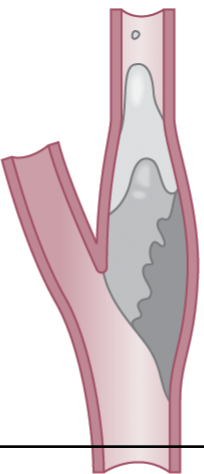
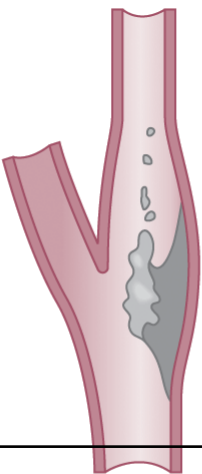
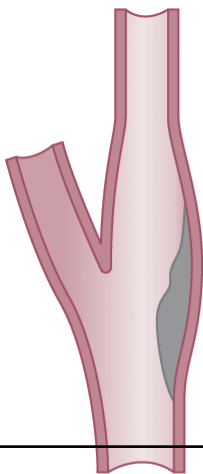
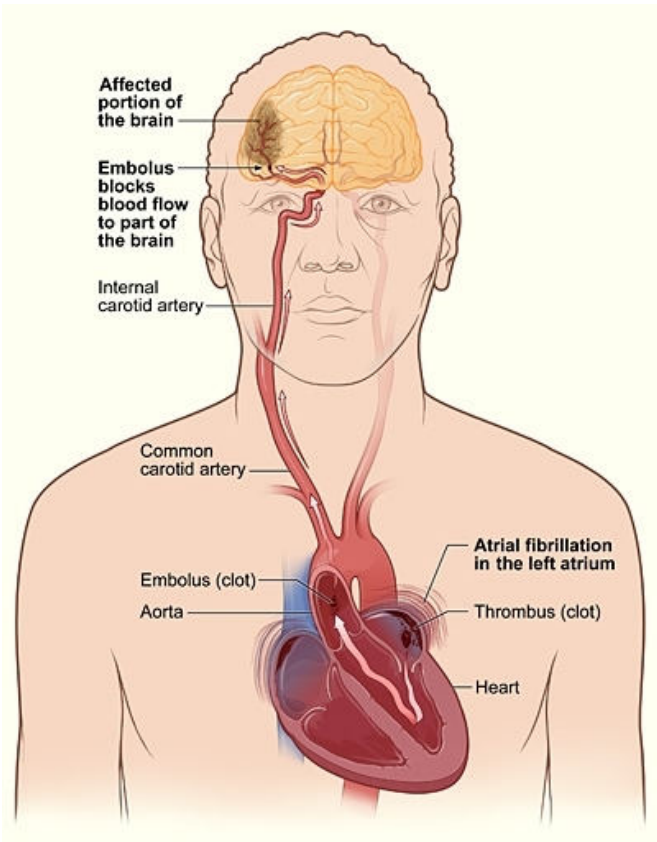
COMA

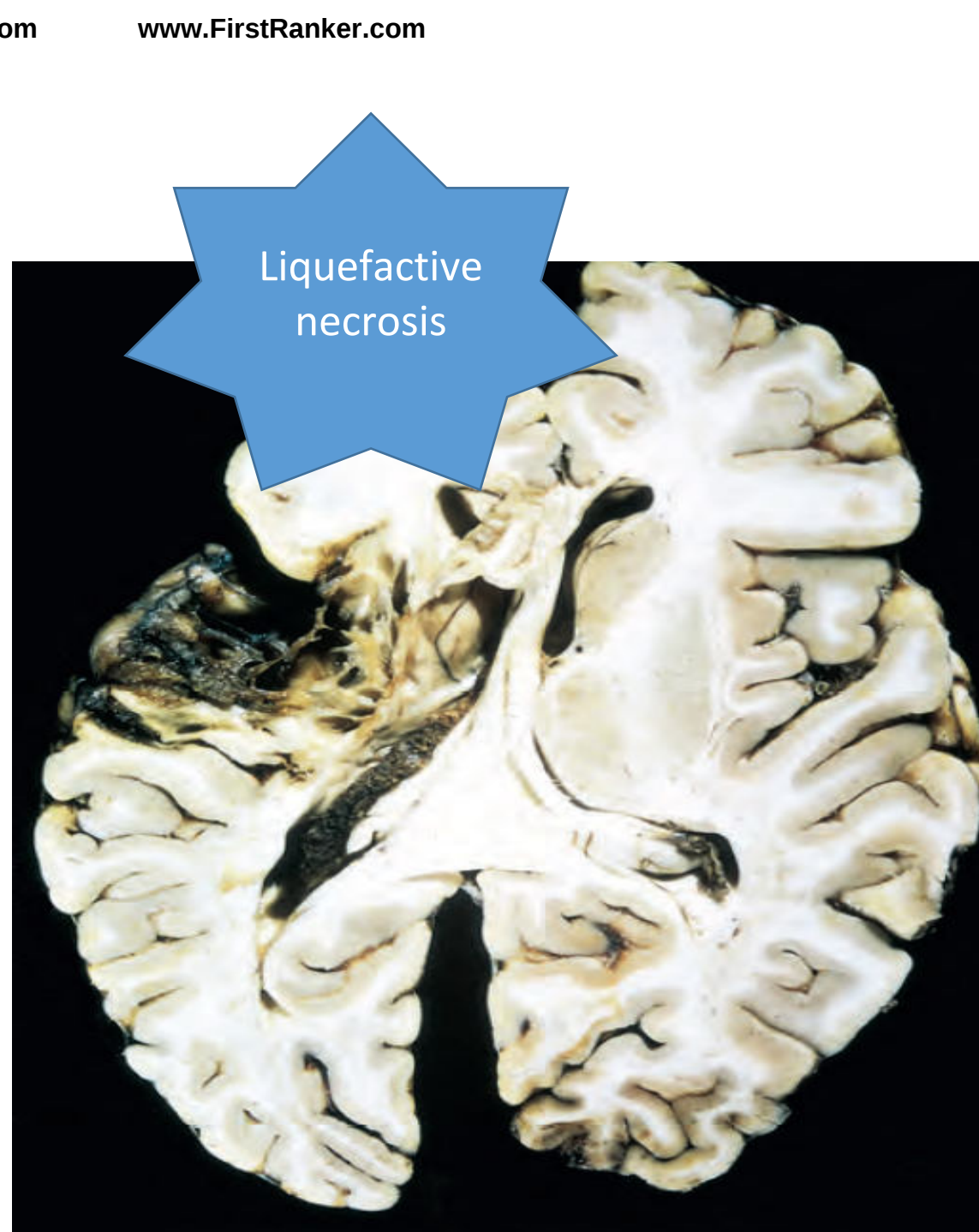
Many things can go wrong

Embolism

Thrombus

Vasculitis



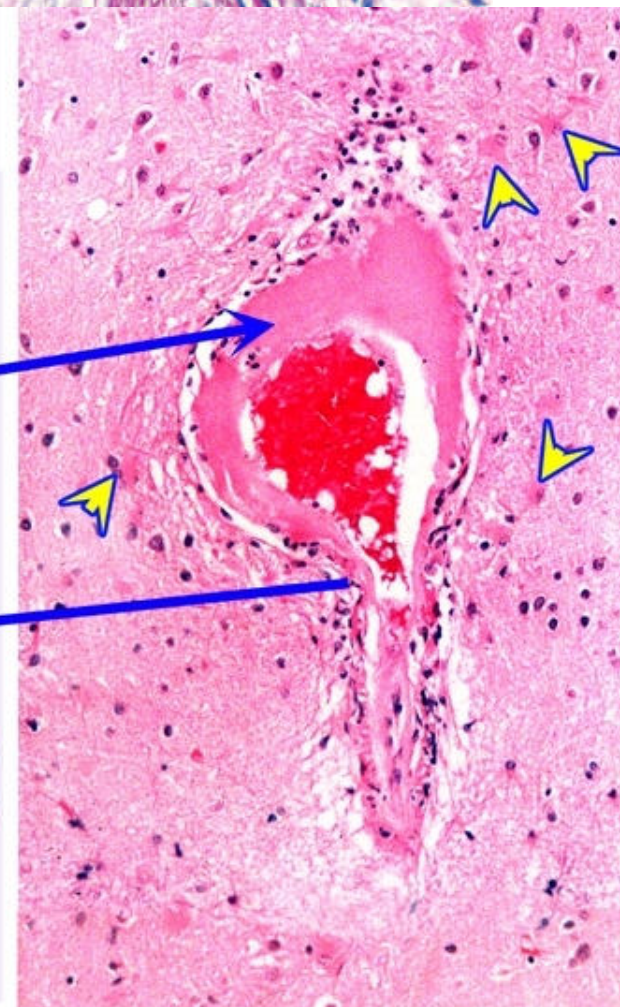
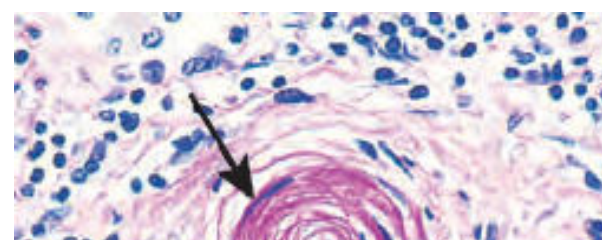
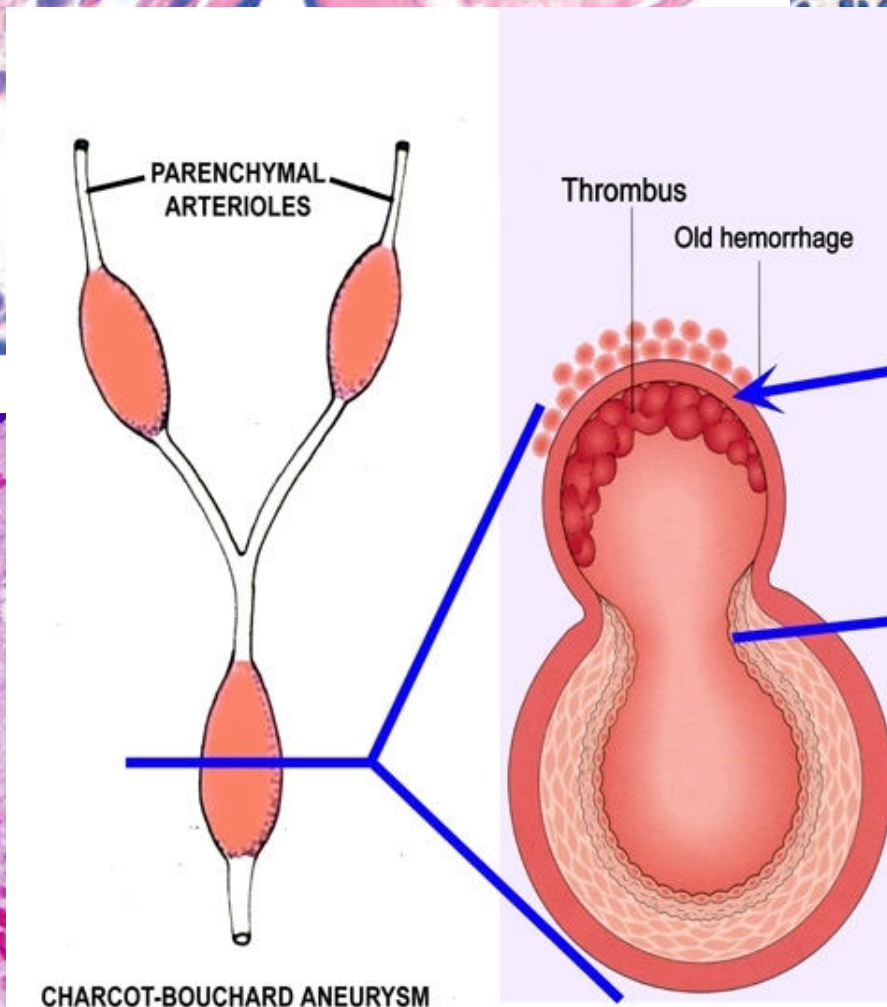
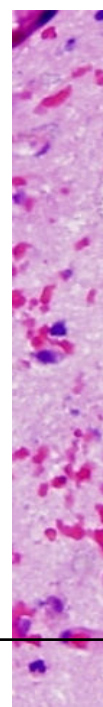
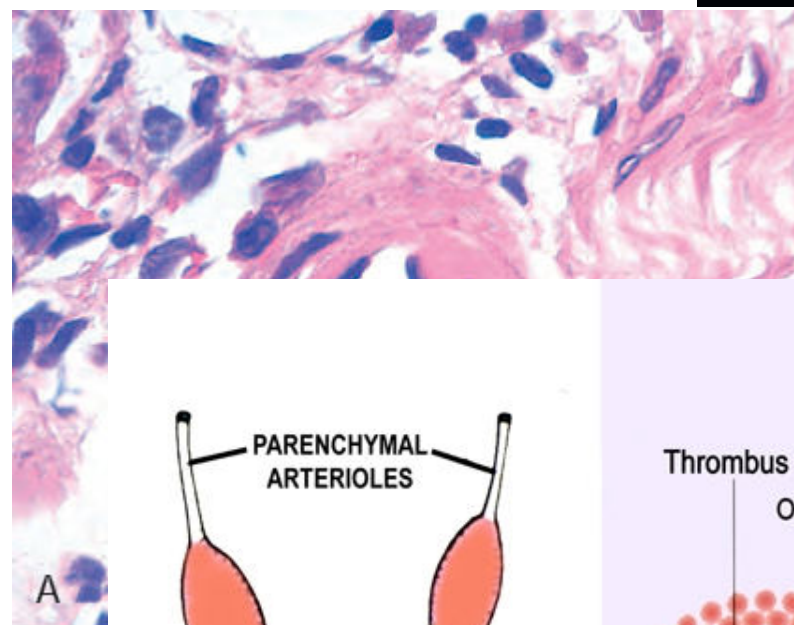


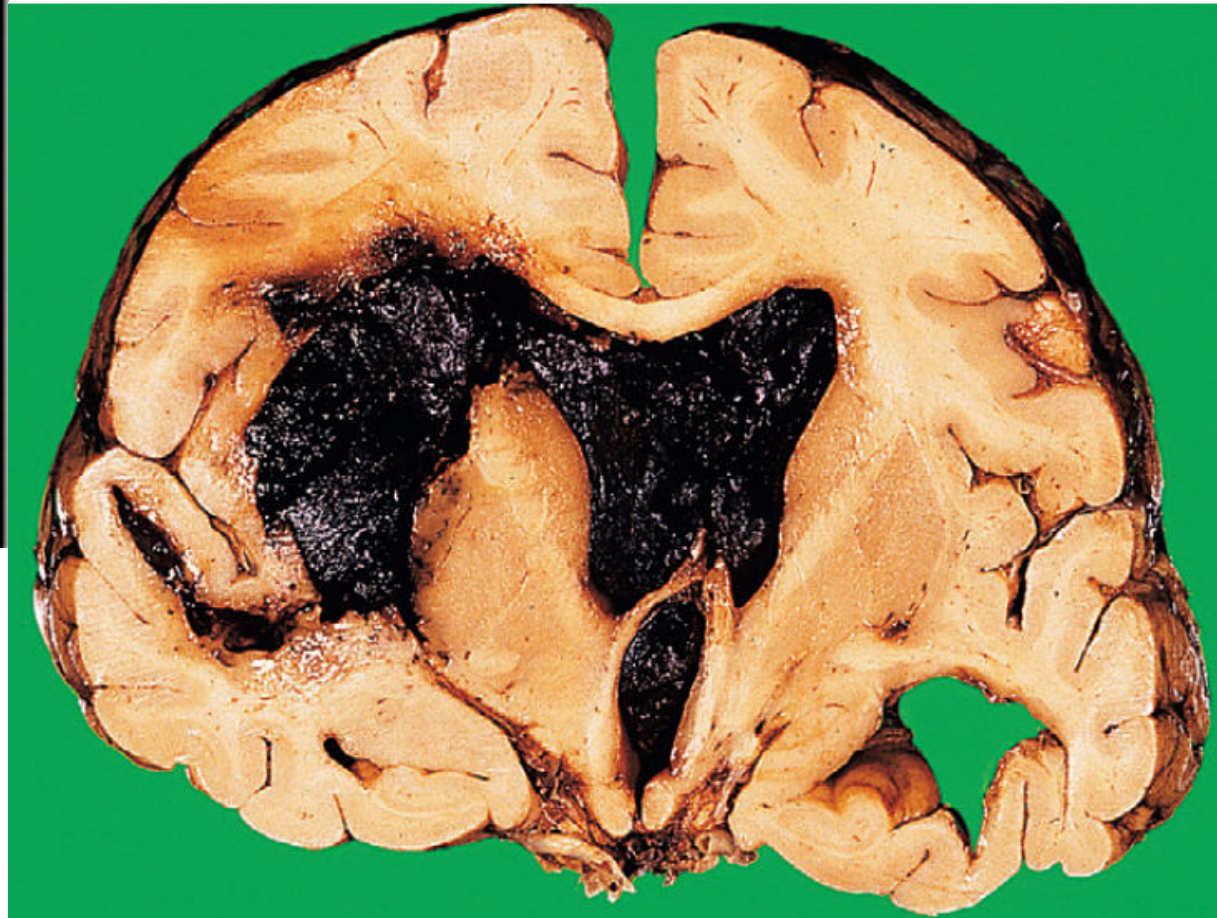
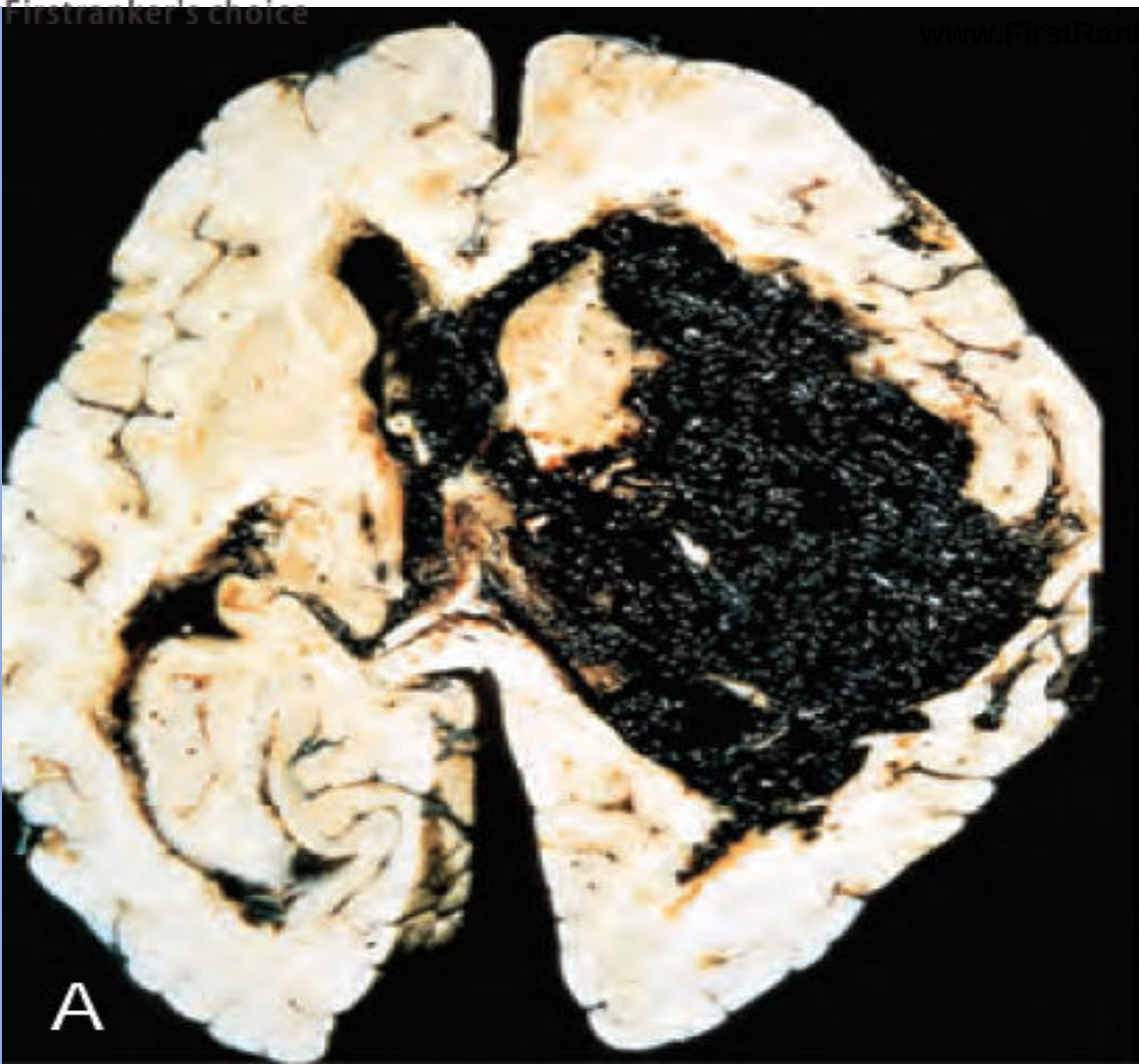
Lacunar infarcts

Slit haemorrhages

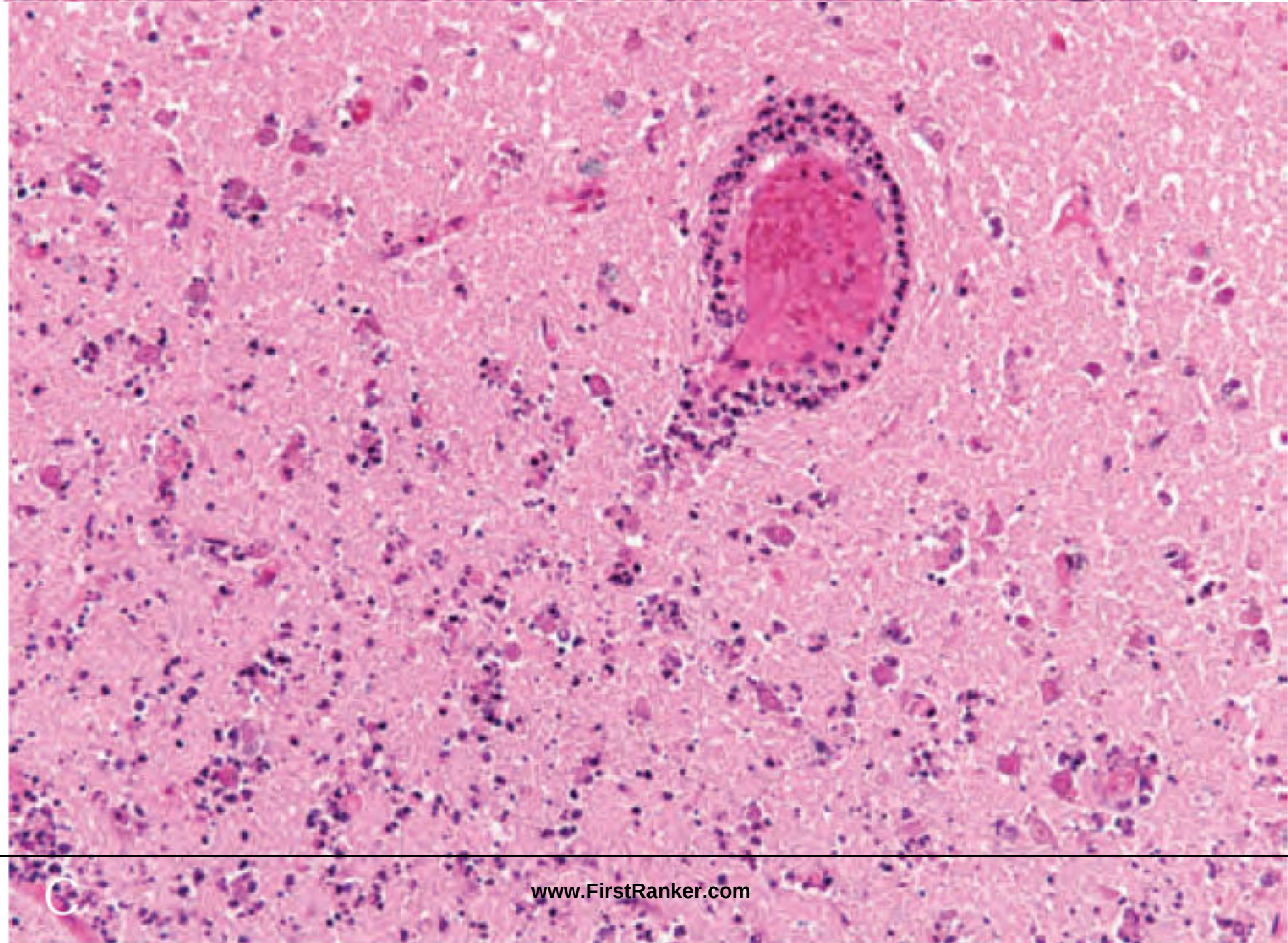
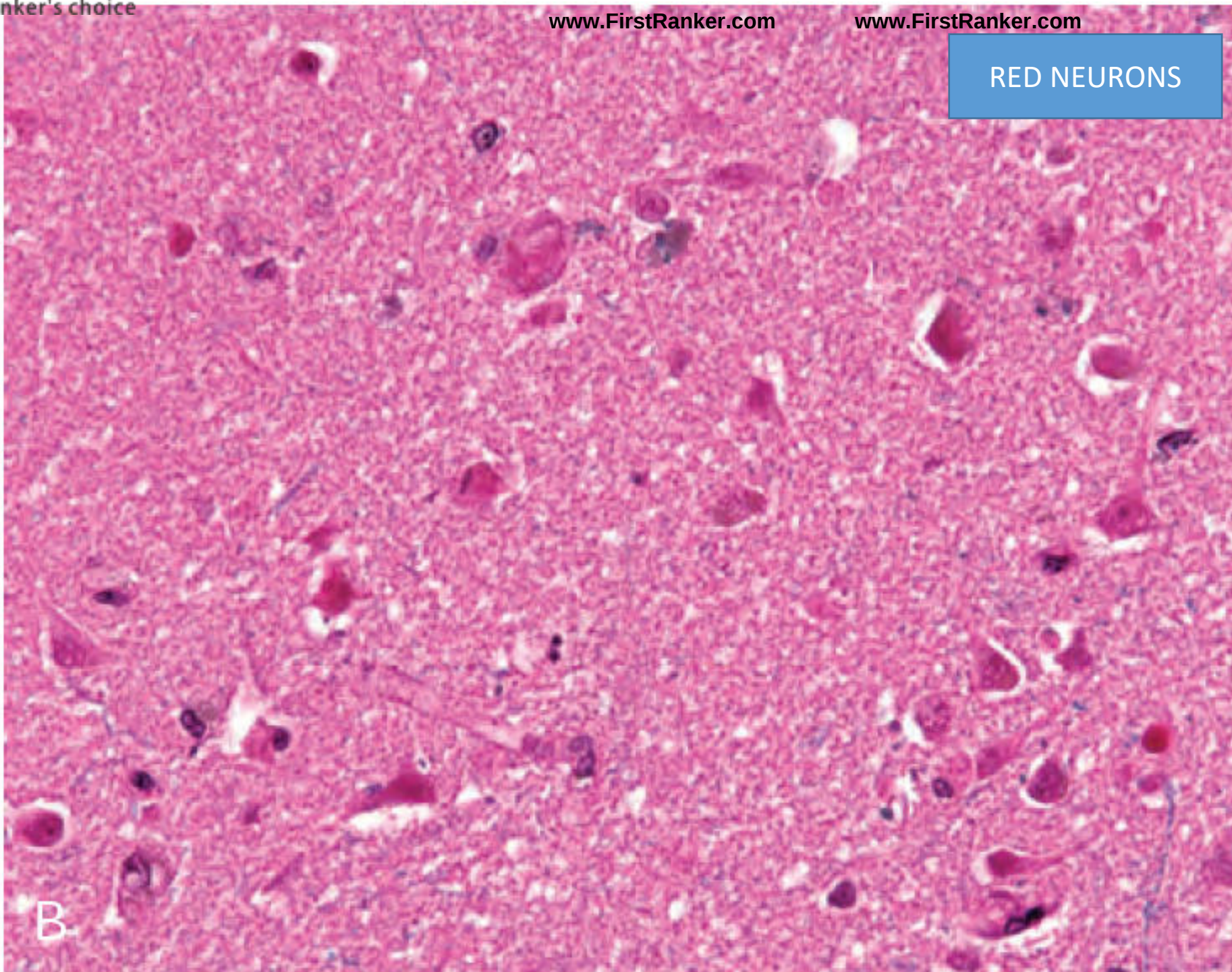
Hypertensive encephalopathy

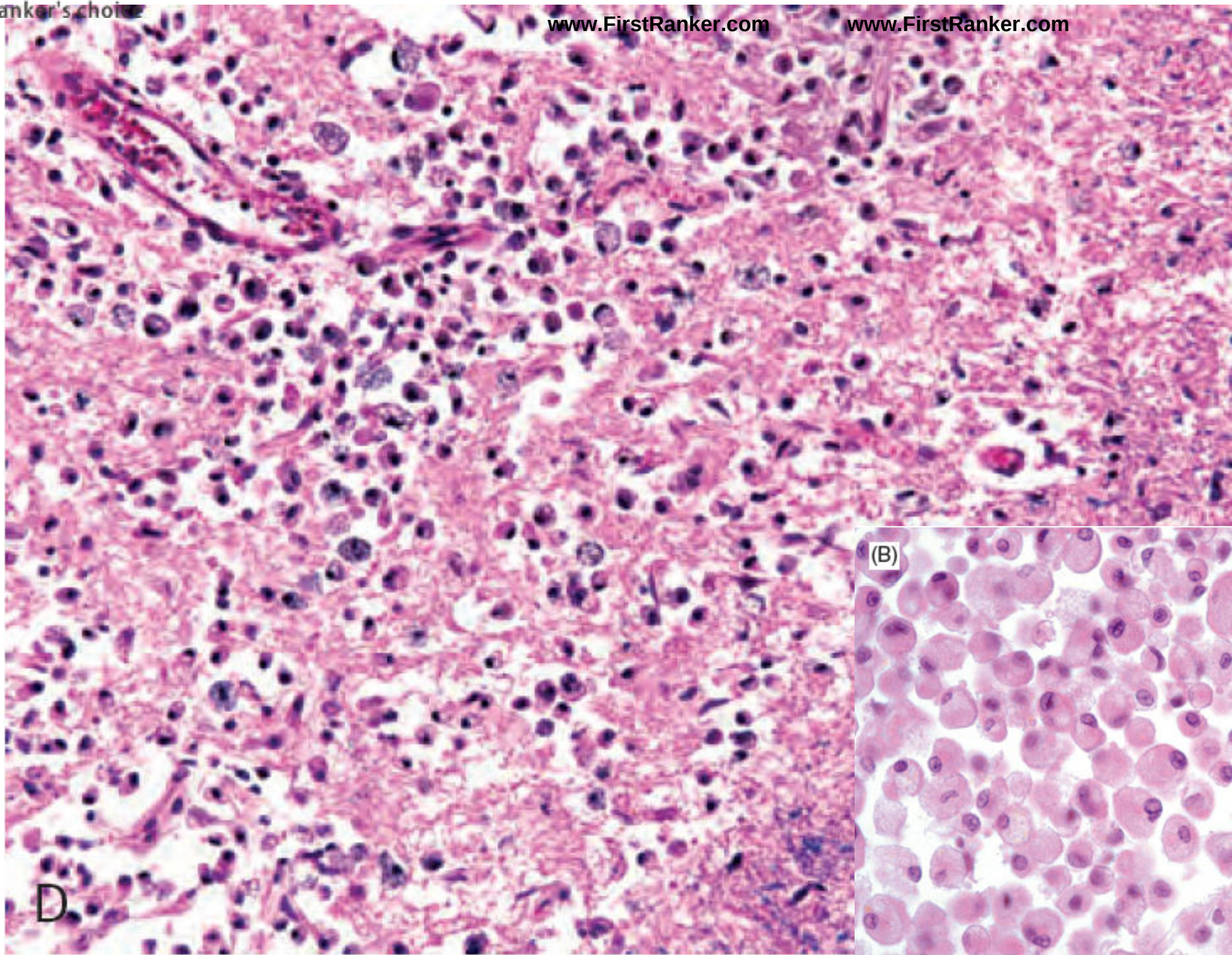
Intraparenchymal haemorrhage



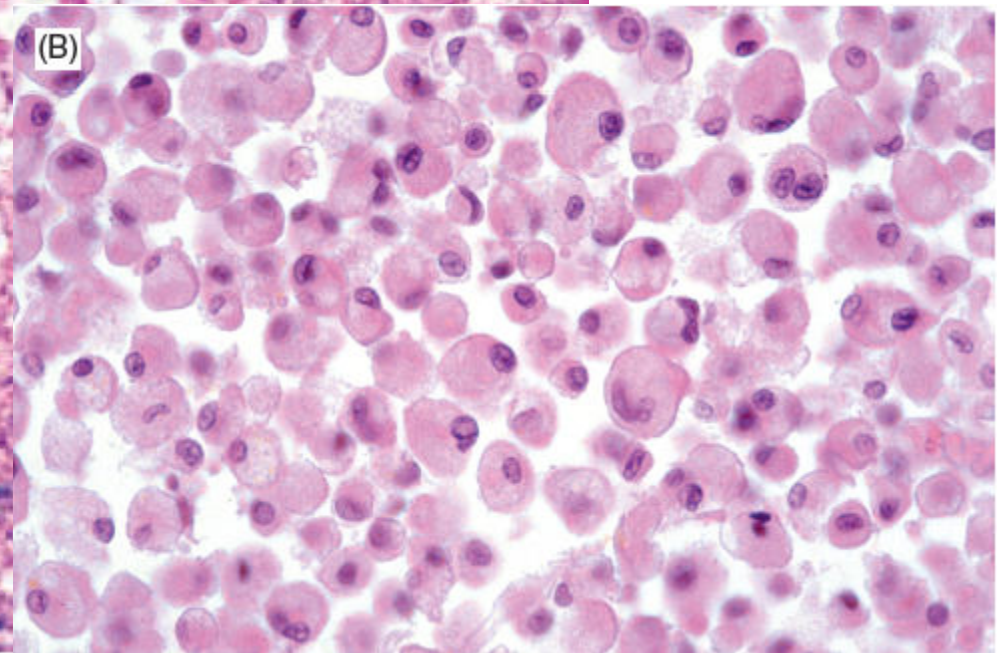


RED NEURONS





GITTER CELLS



Many things can go wrong

- How

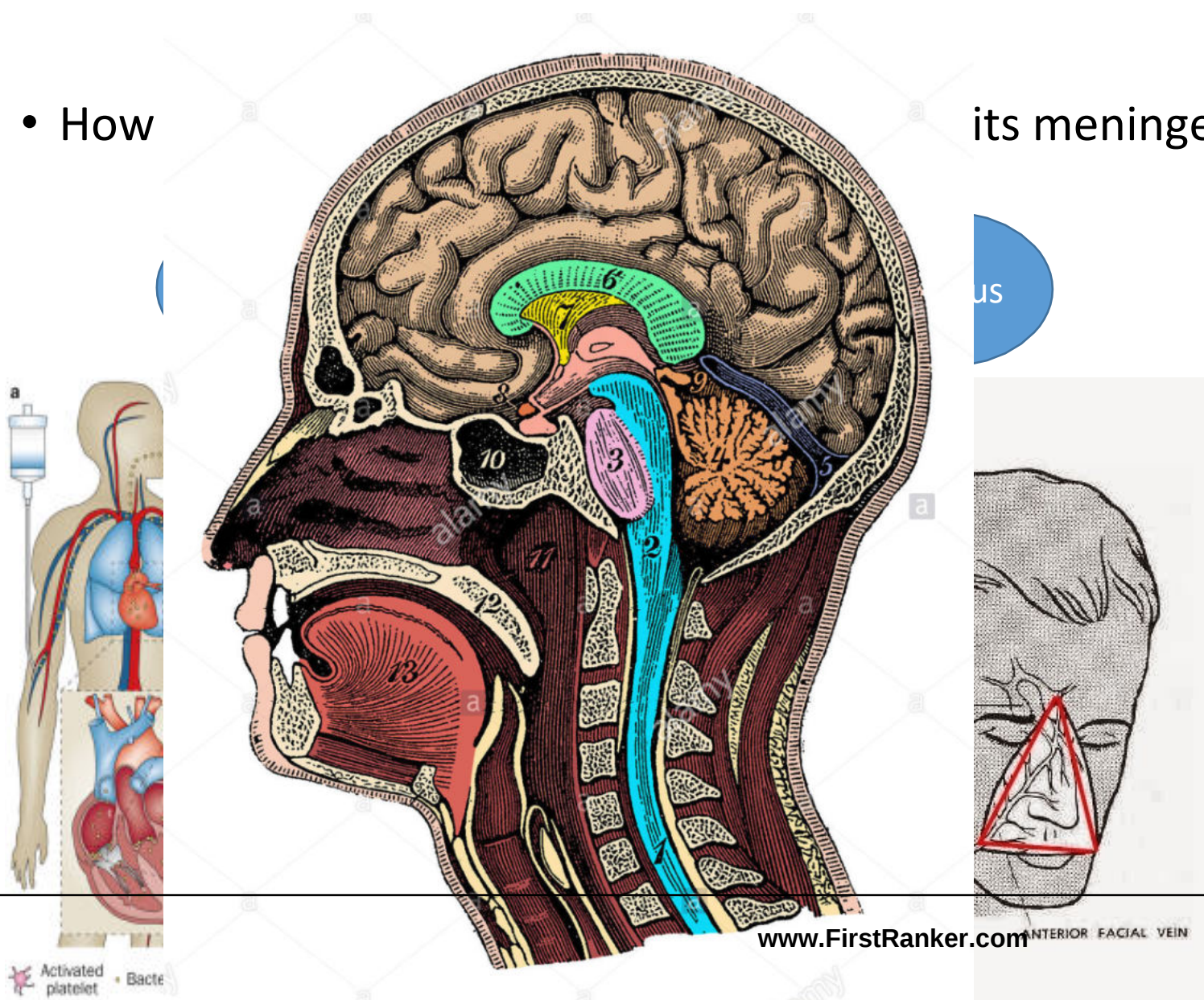
its meninges??

Hematogenous spread

Local extension

Direct implantation

Through nerves



Terminology

- Acute Vs Subacute Vs Chronic
- Causative organism
 - Bacterial
 - Viral
 - Fungal
 - protozoal
- Compartment affected
 - Meningitis
 - Encephalitis
 - Meningo-encephalitis
- Nature of involvement
 - Focal
 - Diffuse

Acute bacterial/pyogenic meningitis

Chronic bacterial meningitis

Chronic bacterial meningitis

Acute aseptic meningitis

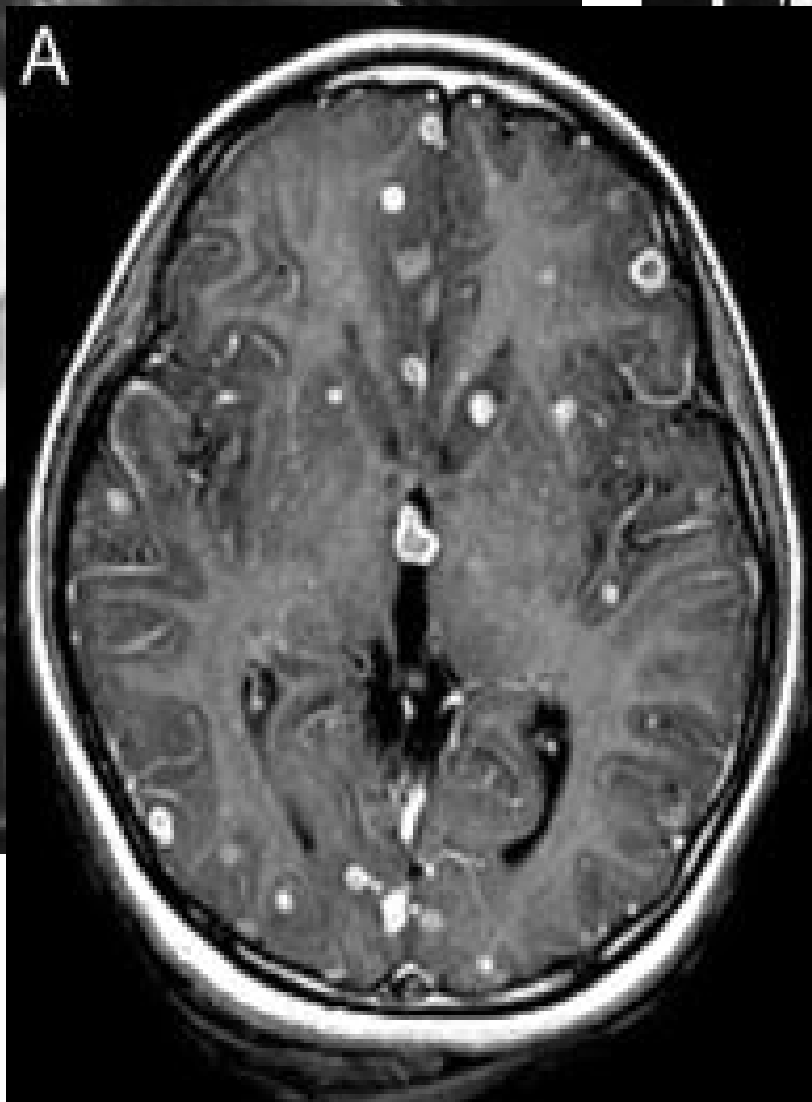
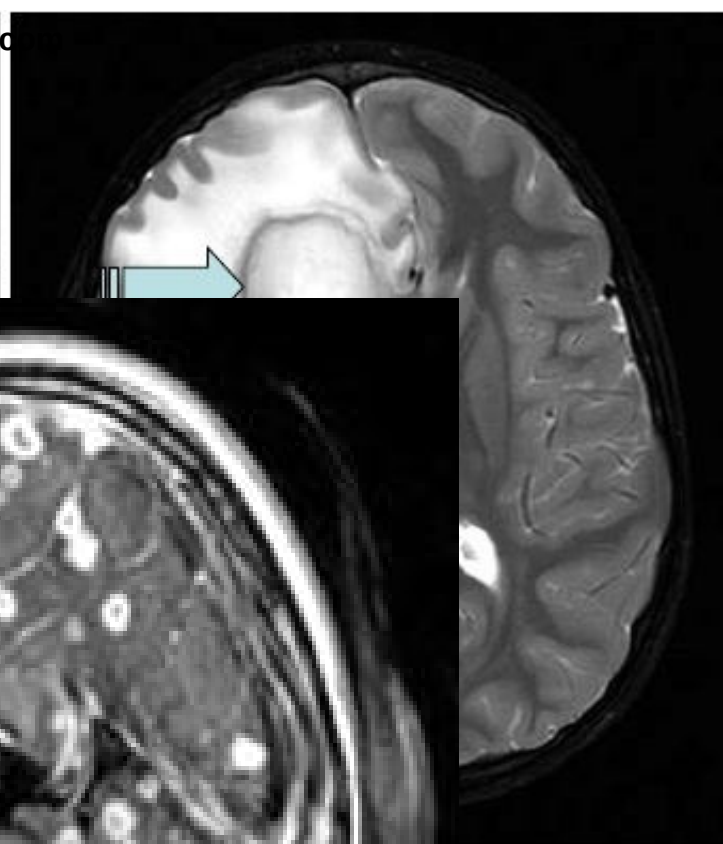
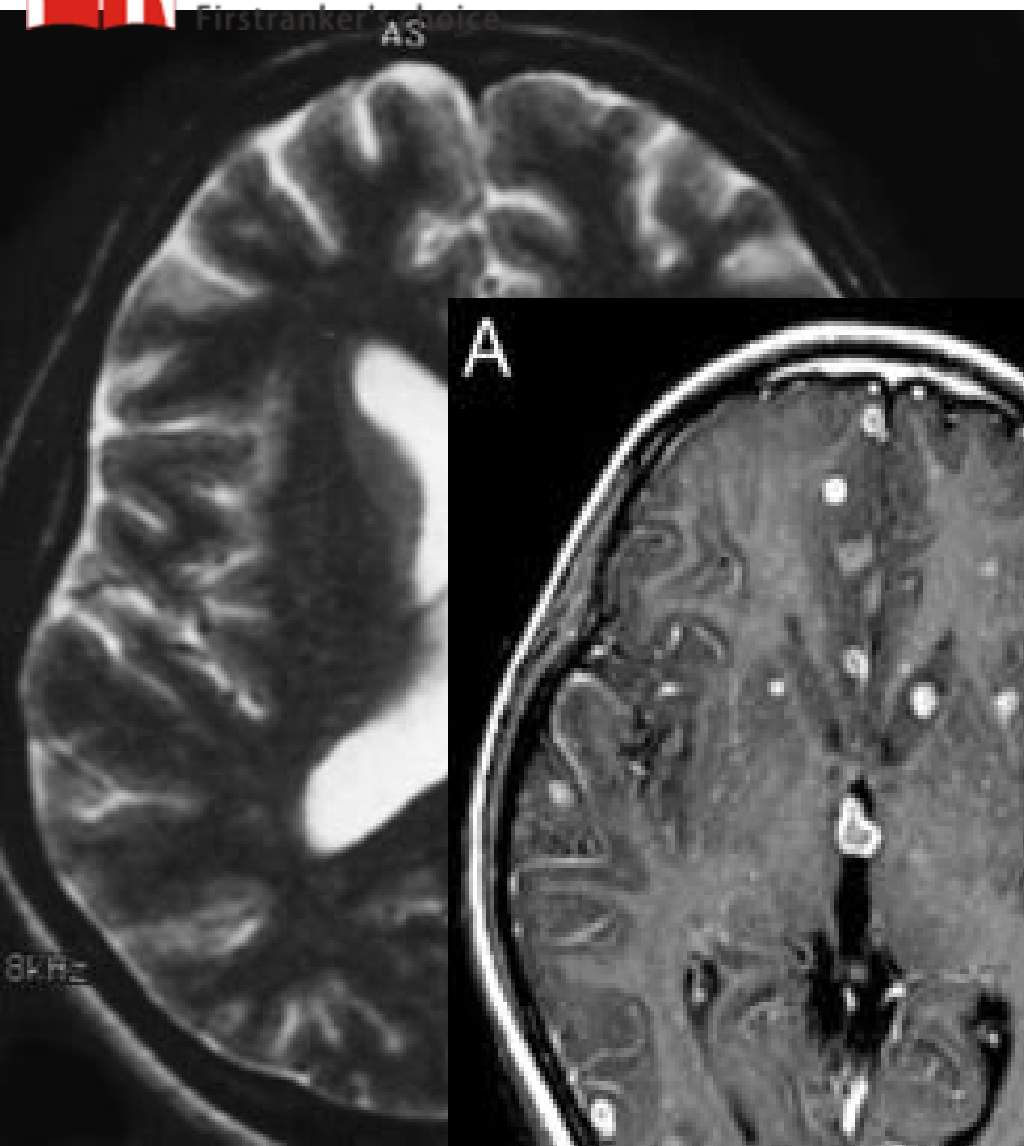
Viral encephalitis

Clinical presentation

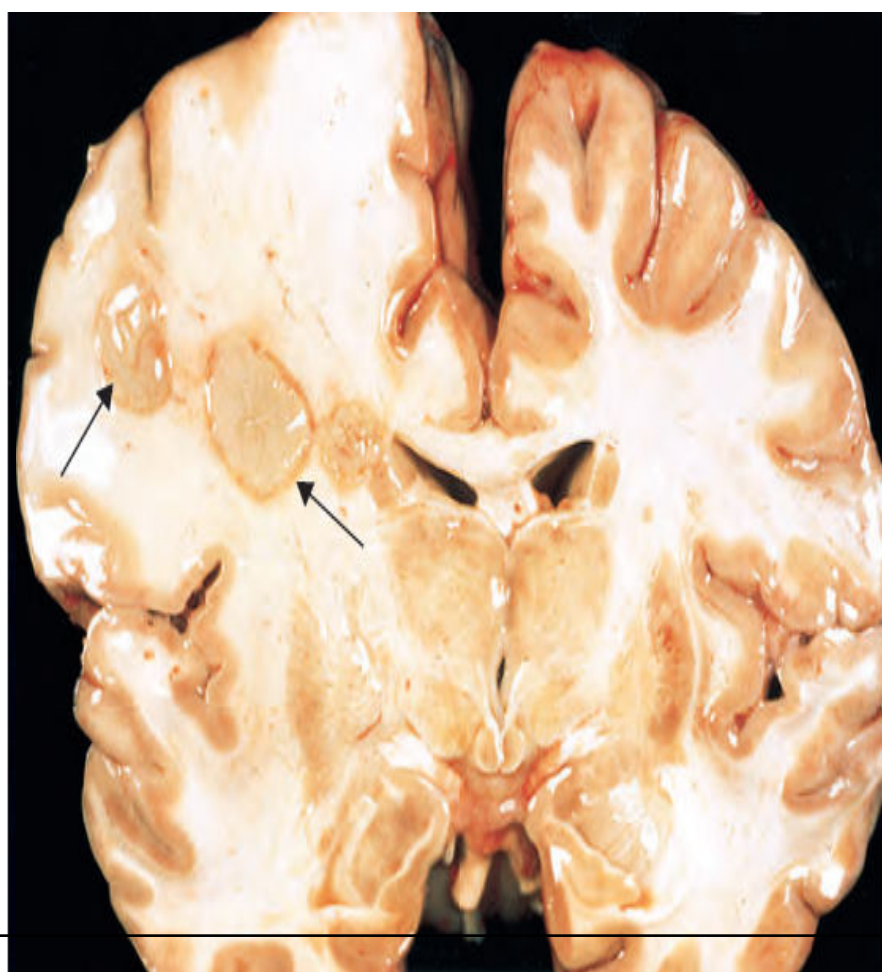
- Systemic signs of infection with
 - Meningeal irritation
 - Neurological impairment
 - Headache
 - **Photophobia**
 - Irritability
 - Clouding of consciousness
 - **Neck stiffness**

Waterhouse Friderichsen syndrome:
Meningitis
Septicemia
Adrenal gland hemorrhagic infarction

Meningococcal meningitis
Pneumococcal meningitis

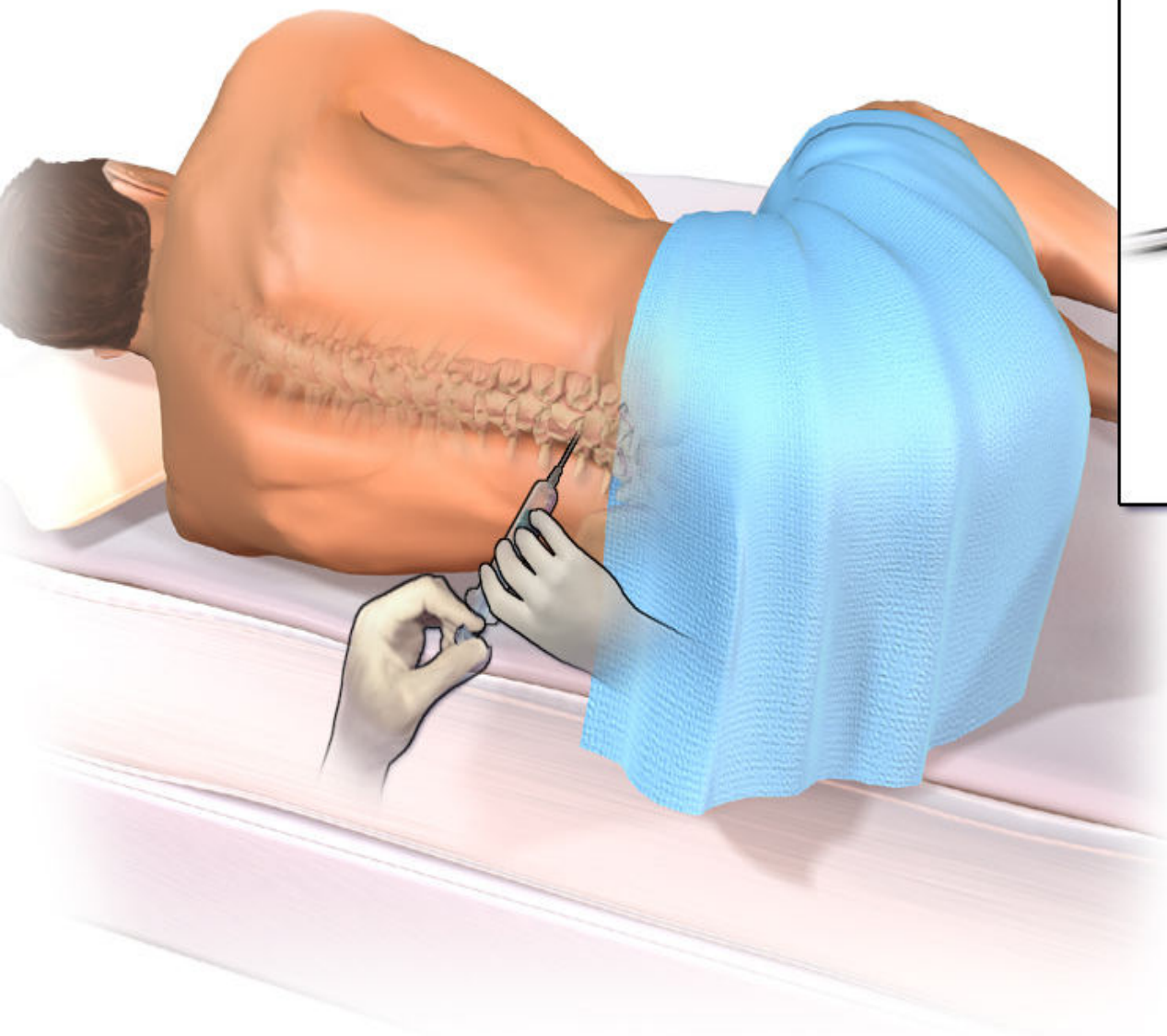


Acute pyogenic meningitis



Type of Infection	Clinical Syndrome	Common Causative Organisms
Bacterial Infections		
Meningitis	Acute pyogenic meningitis	<i>Escherichia coli</i> or group B streptococci (infants) <i>Neisseria meningitidis</i> (young adults) <i>Streptococcus pneumoniae</i> or <i>Listeria monocytogenes</i> (older adults)
	Chronic meningitis	<i>Mycobacterium tuberculosis</i>
Localized infections	Abscess Empyema	Streptococci and staphylococci Polymicrobial (staphylococci, anaerobic gram-negative)

Lumbar Puncture



Lying Position



Sitting Position

◆ **TABLE 30.1: CSF Findings in Health and Various Types of Meningitis.**

Feature	Normal	Acute Pyogenic (Bacterial) Meningitis	Acute Lymphocytic (Viral) Meningitis	Chronic (Tuberculous) Meningitis
1. <i>Naked eye appearance</i>	Clear and colourless	Cloudy or frankly purulent	Clear or slightly turbid	Clear or slightly turbid, forms fibrin coagulum on standing
2. <i>CSF pressure</i>	60-150 mm water	Elevated (above 180 mm water)	Elevated (above 250 mm water)	Elevated (above 300 mm water)
3. <i>Cells</i>	0-4 lymphocytes/ μ l	10-10,000 neutrophils/ μ l	10-100 lymphocytes/ μ l	100-1000 lymphocytes/ μ l
4. <i>Proteins</i>	15-45 mg/dl	Markedly raised	Raised	Raised
5. <i>Glucose</i>	50-80 mg/dl	Markedly reduced	Normal	Reduced
6. <i>Bacteriology</i>	Sterile	Causative organisms present	Sterile	Tubercle bacilli present

Meningitis	Acute aseptic meningitis	Enteroviruses Measles (subacute sclerosing panencephalitis) Influenza species Lymphocytic choriomeningitis virus
Encephalitis	Encephalitic syndromes	Herpes simplex (HSV-1, HSV-2) Cytomegalovirus Human immunodeficiency virus JC polyomavirus (progressive multifocal leukoencephalopathy)
	Arthropod-borne encephalitis	West Nile virus Eastern equine encephalitis virus Western equine encephalitis virus St. Louis encephalitis virus La Crosse encephalitis virus Venezuelan equine encephalitis virus Japanese encephalitis virus Tick-borne encephalitis virus
Brainstem and spinal cord syndromes	Rhombencephalitis Spinal poliomyelitis	Rabies Polio West Nile virus

LESS SEVERE
BUT LONG TERM SEQUELAE

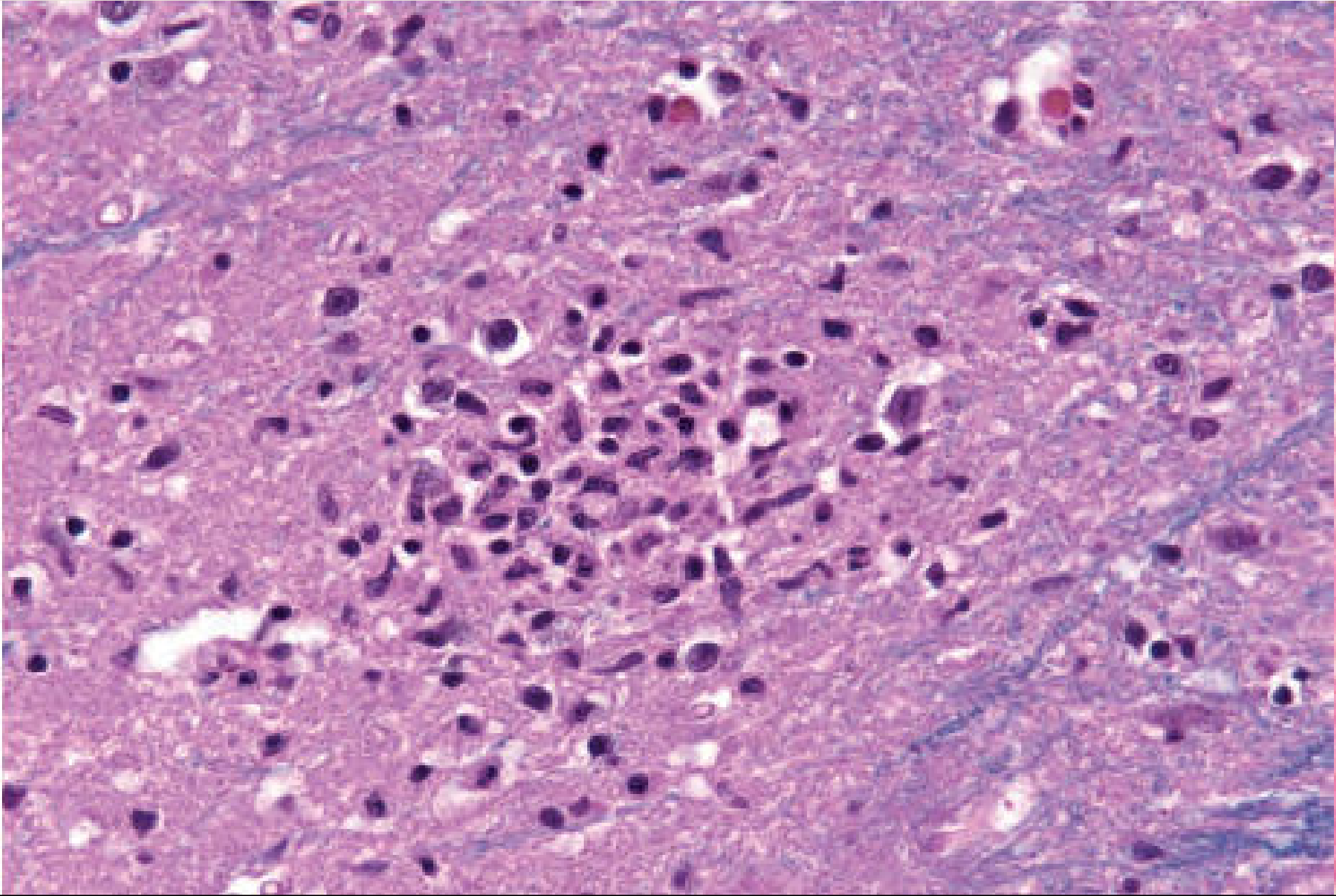
Rickettsia, Spirochetes, and Fungi

Meningitic syndromes	Rocky Mountain spotted fever	<i>Rickettsia rickettsii</i>
	Neurosyphilis	<i>Treponema pallidum</i>
	Lyme disease (neuroborreliosis)	<i>Borrelia. burgdorferi</i>
	Fungal meningitis	<i>Cryptococcus neoformans</i> <i>Candida albicans</i>

Protozoa and Metazoa

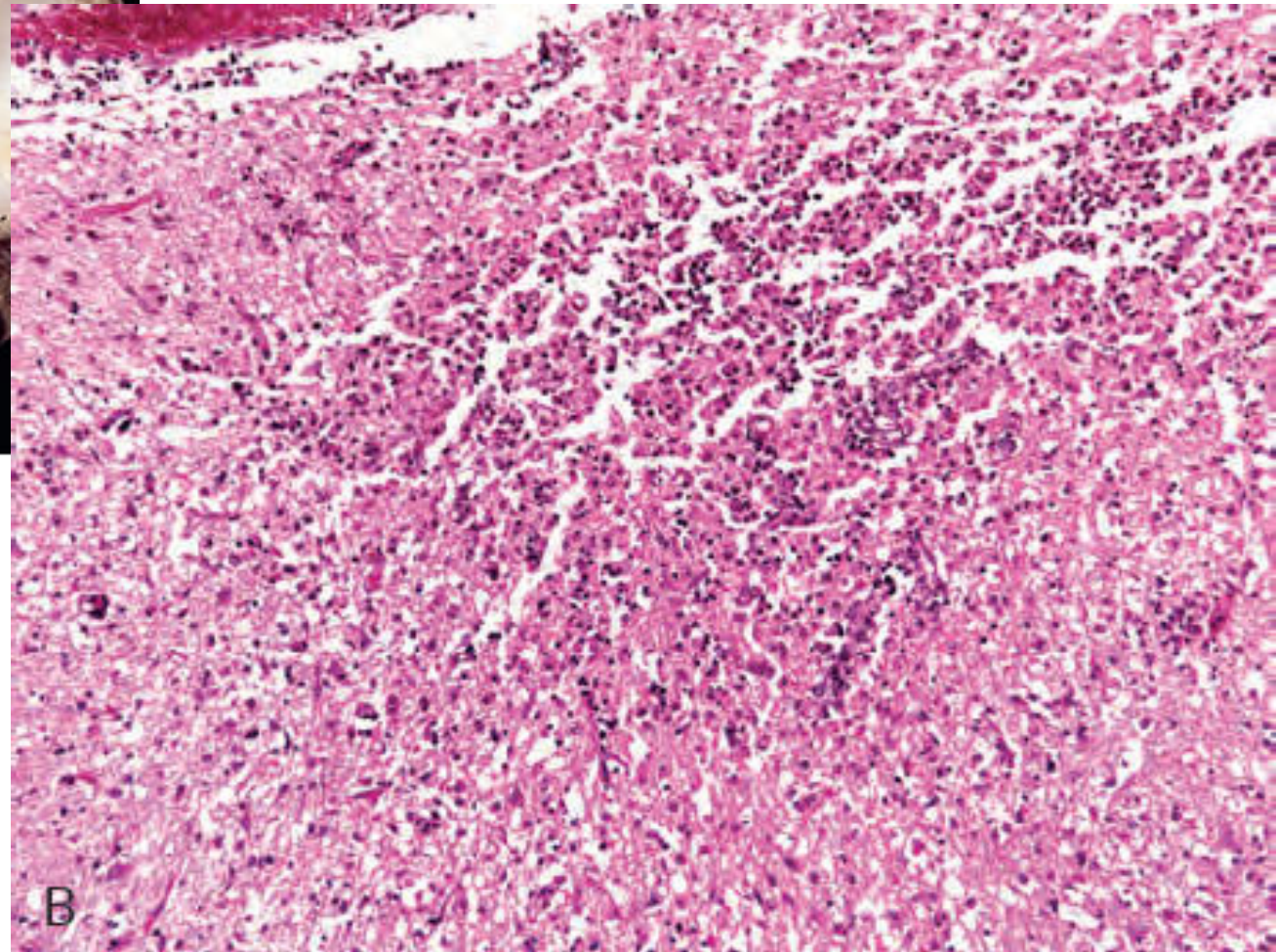
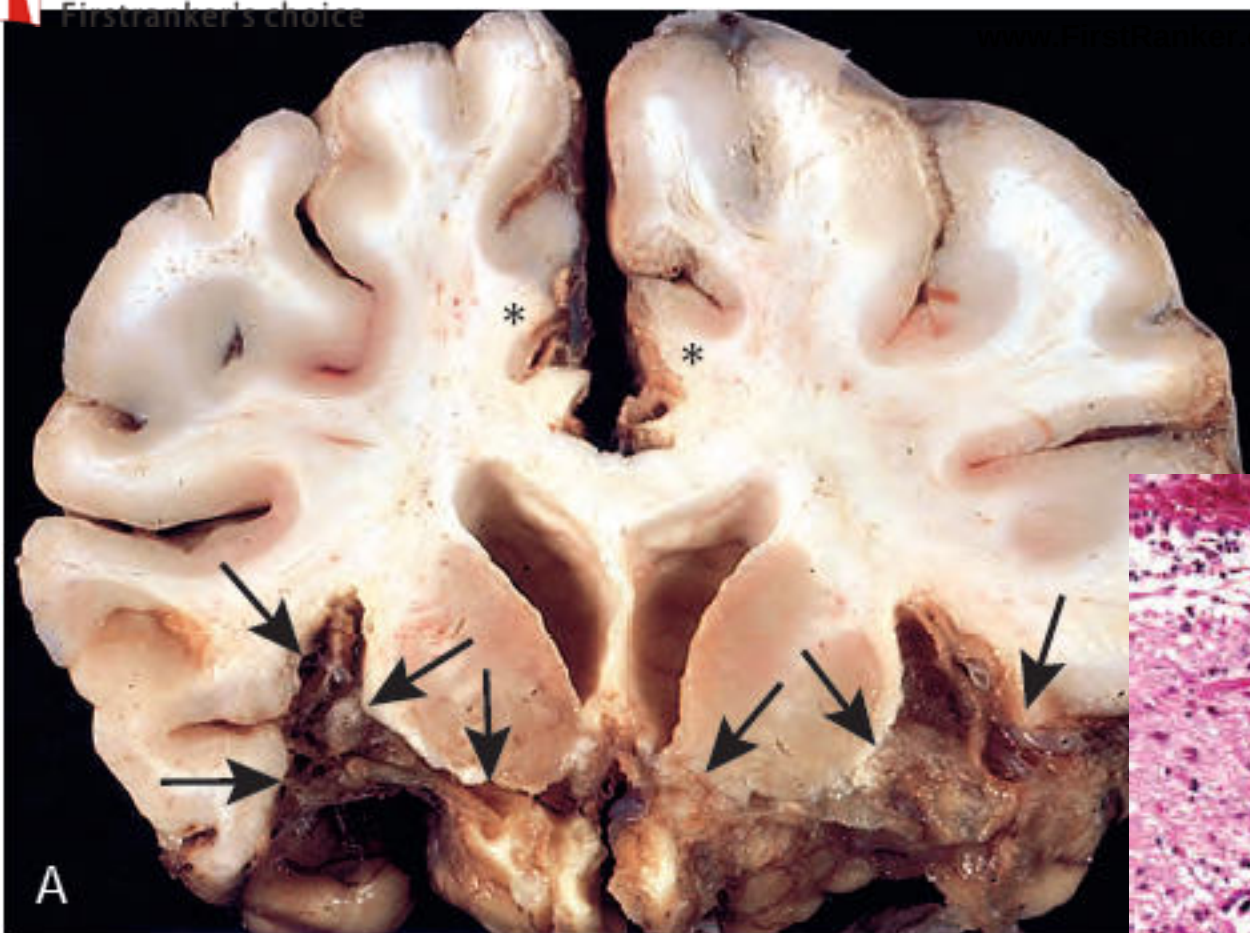
Meningitic syndromes	Cerebral malaria	<i>Plasmodium falciparum</i>
	Amebic encephalitis	<i>Naegleria species</i>
Localized infections	Toxoplasmosis	<i>Toxoplasma gondii</i>
	Cysticercosis	<i>Taenia solium</i>

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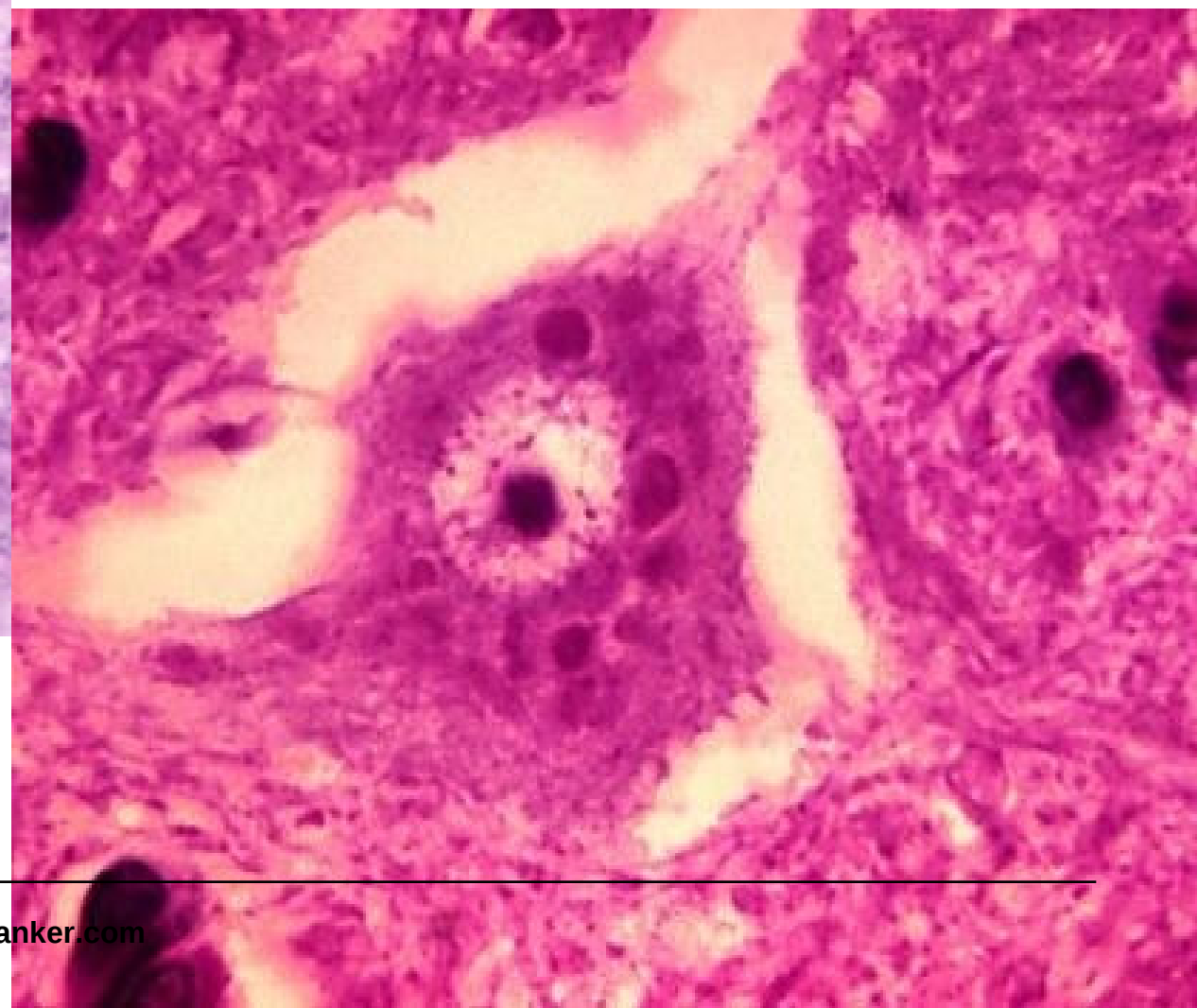
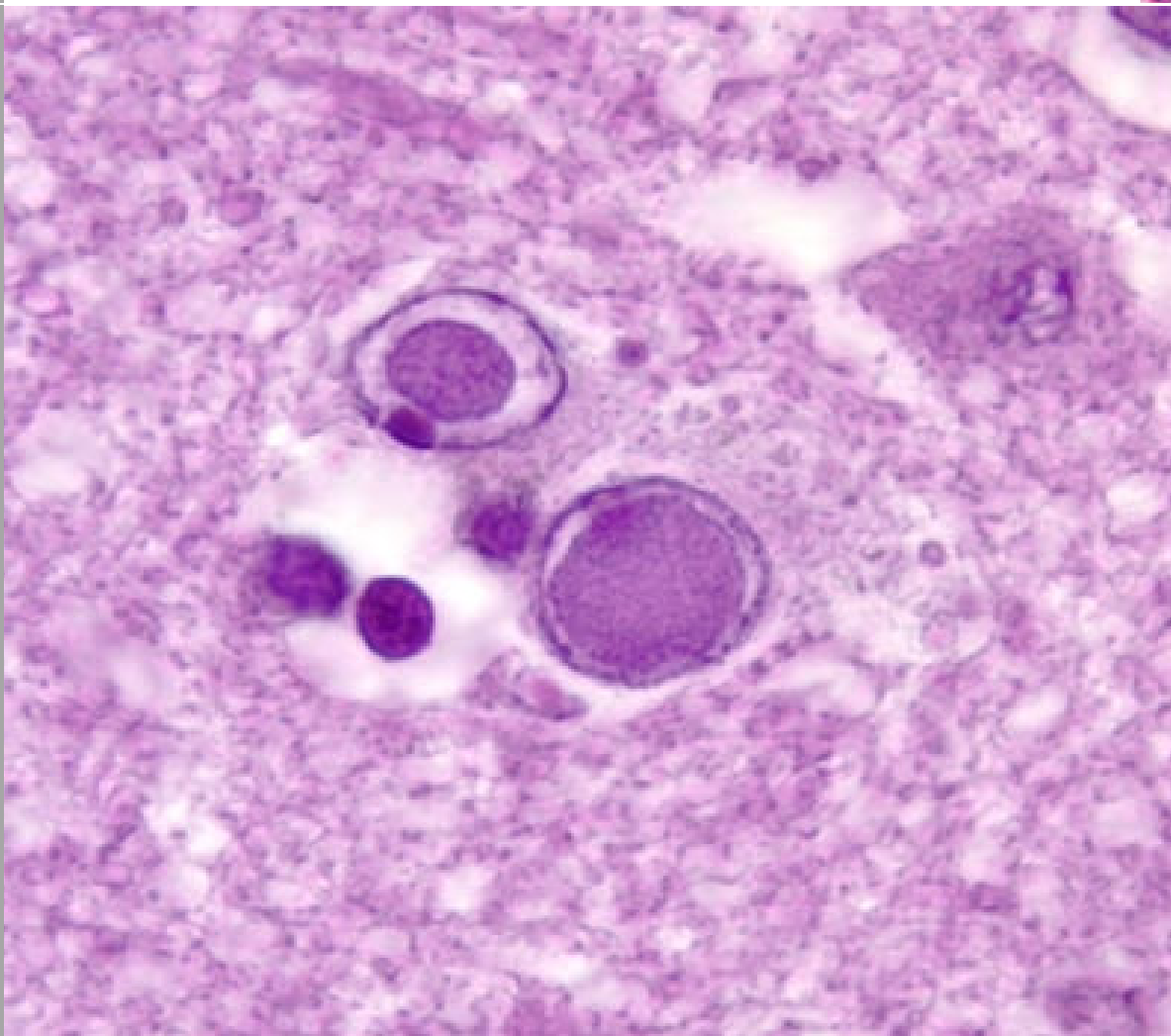


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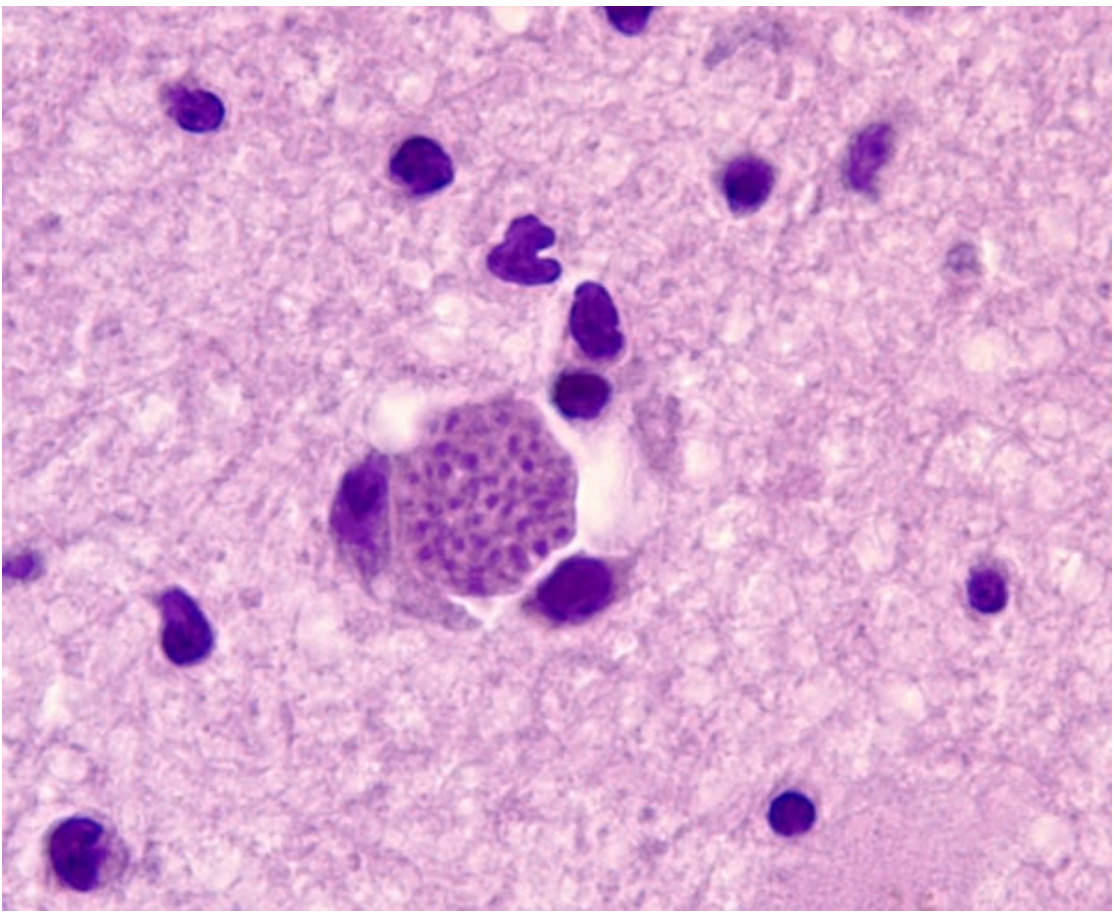
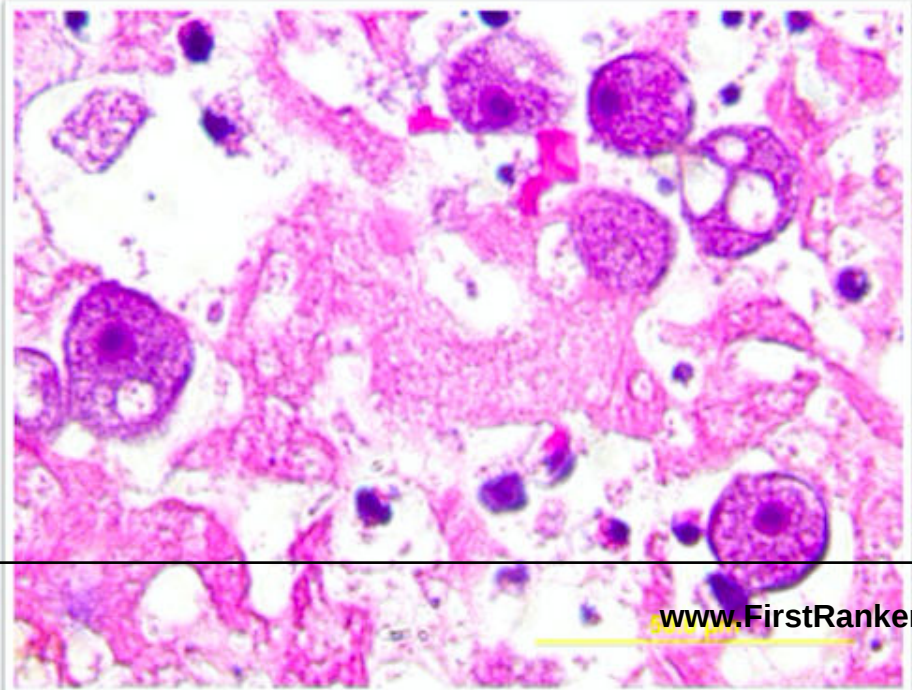
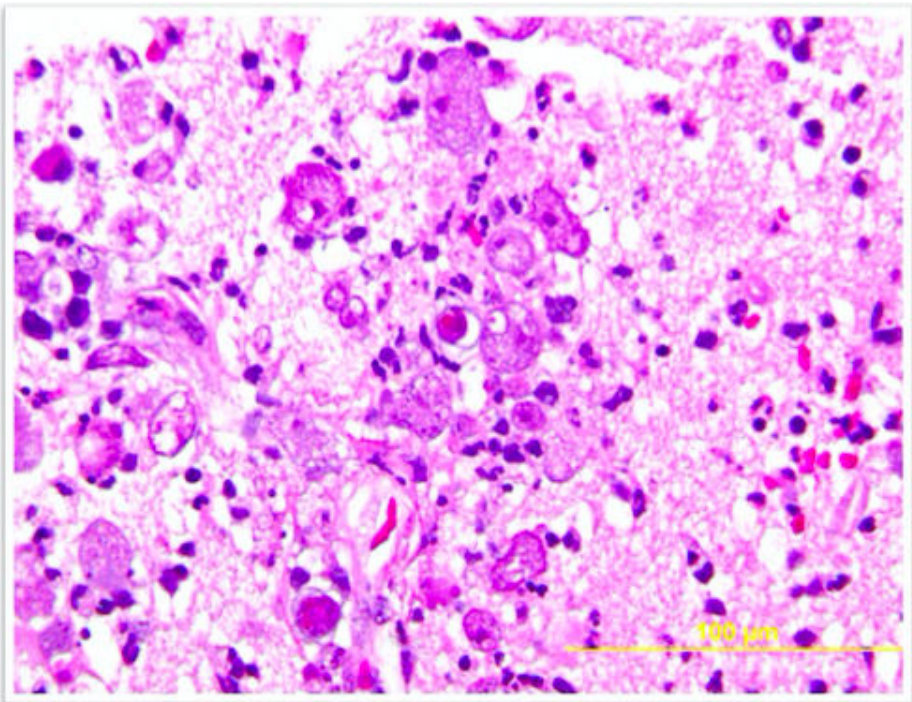
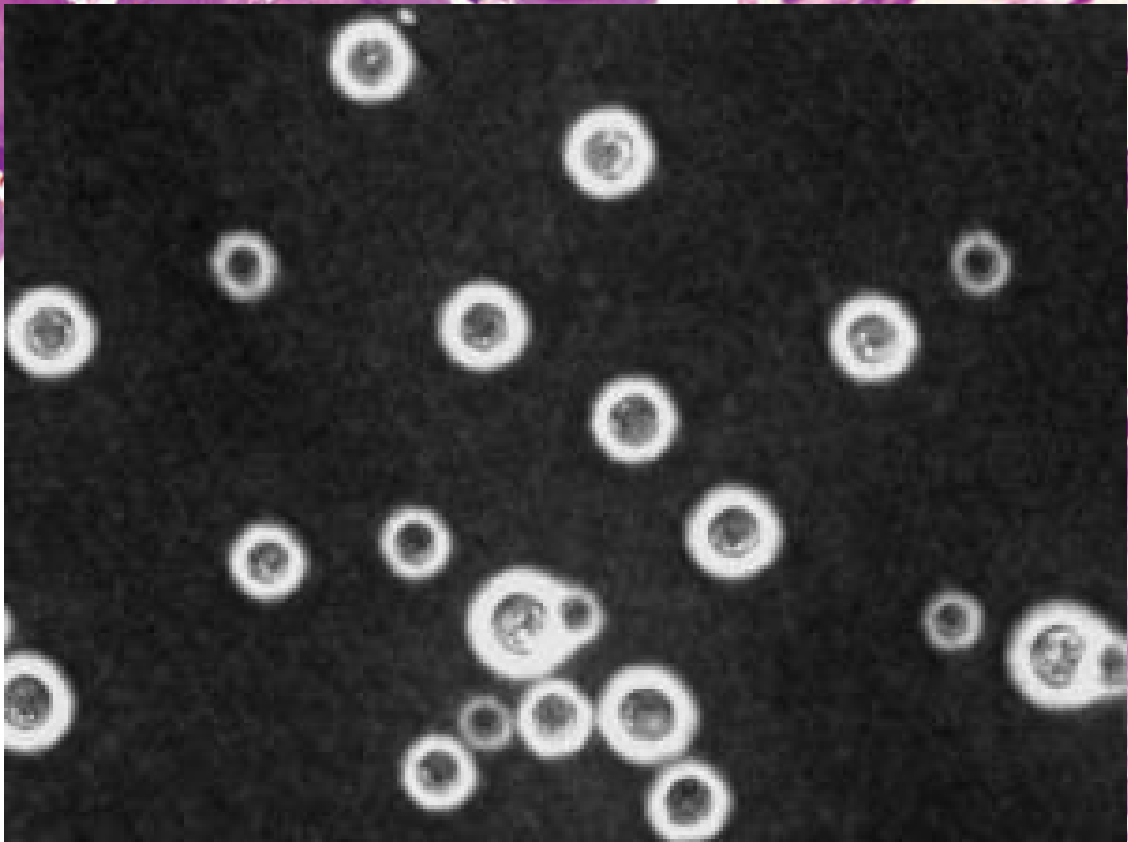
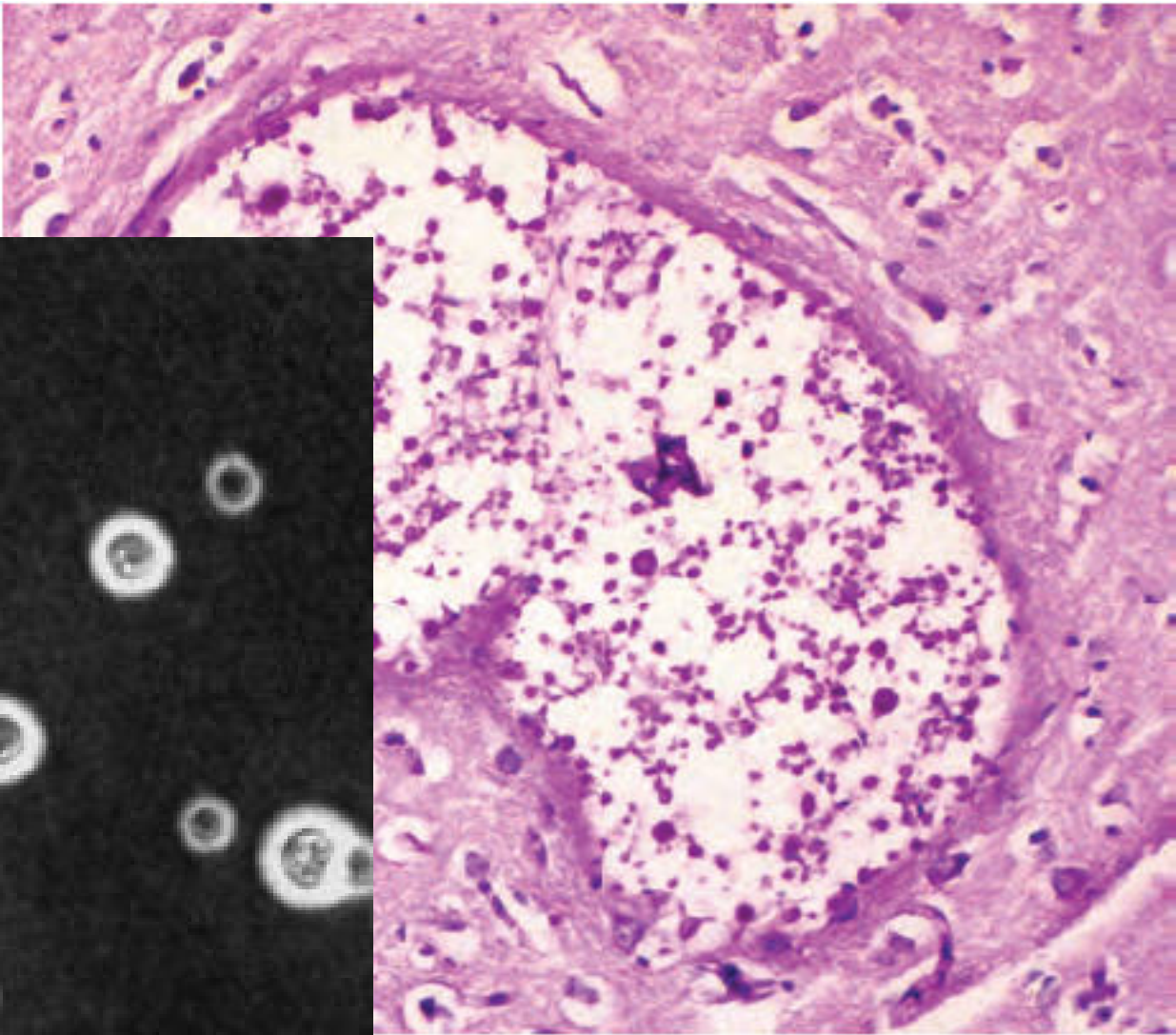
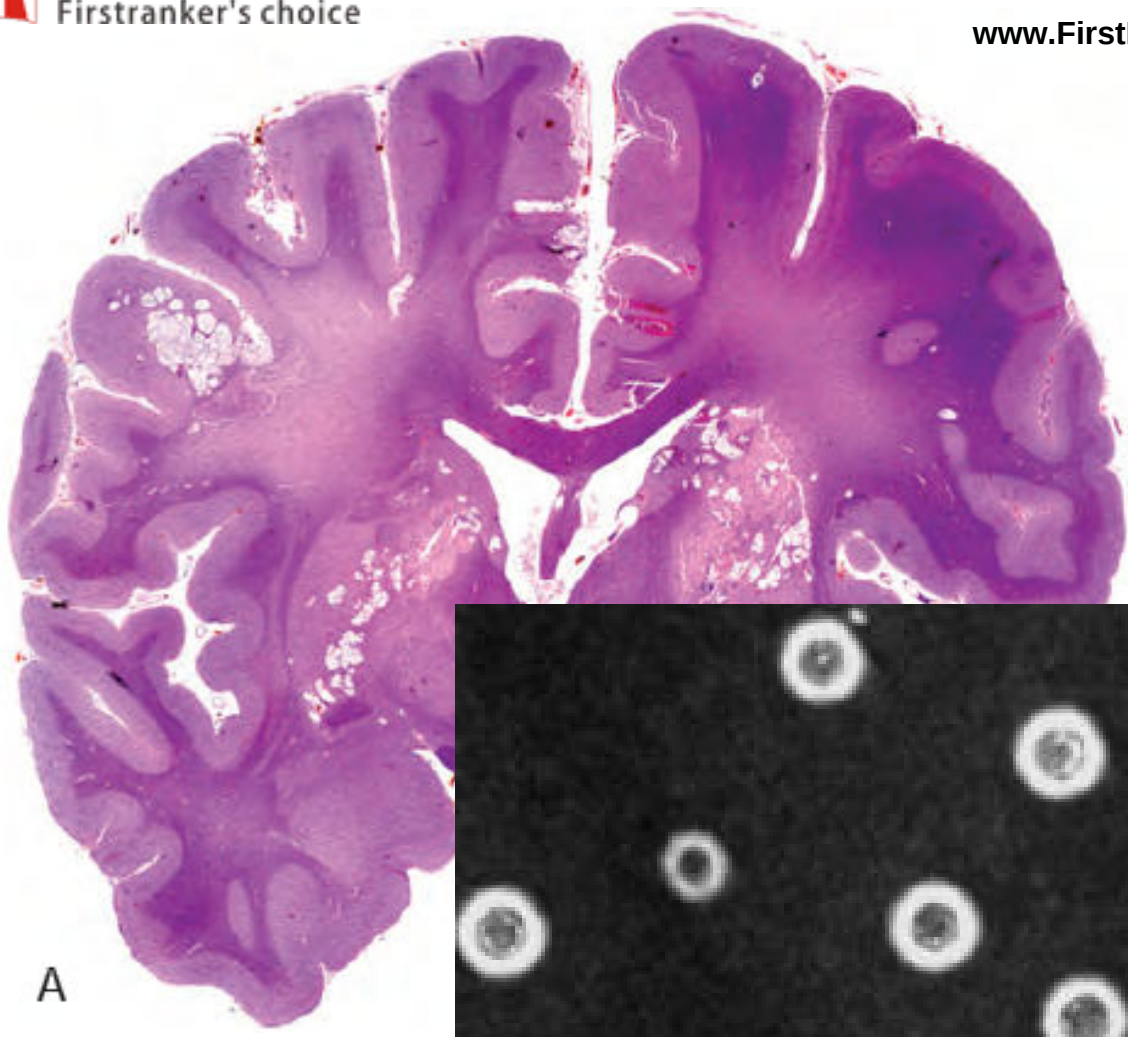
HERPES SIMPLEX VIRUS ENCEPHALITIS



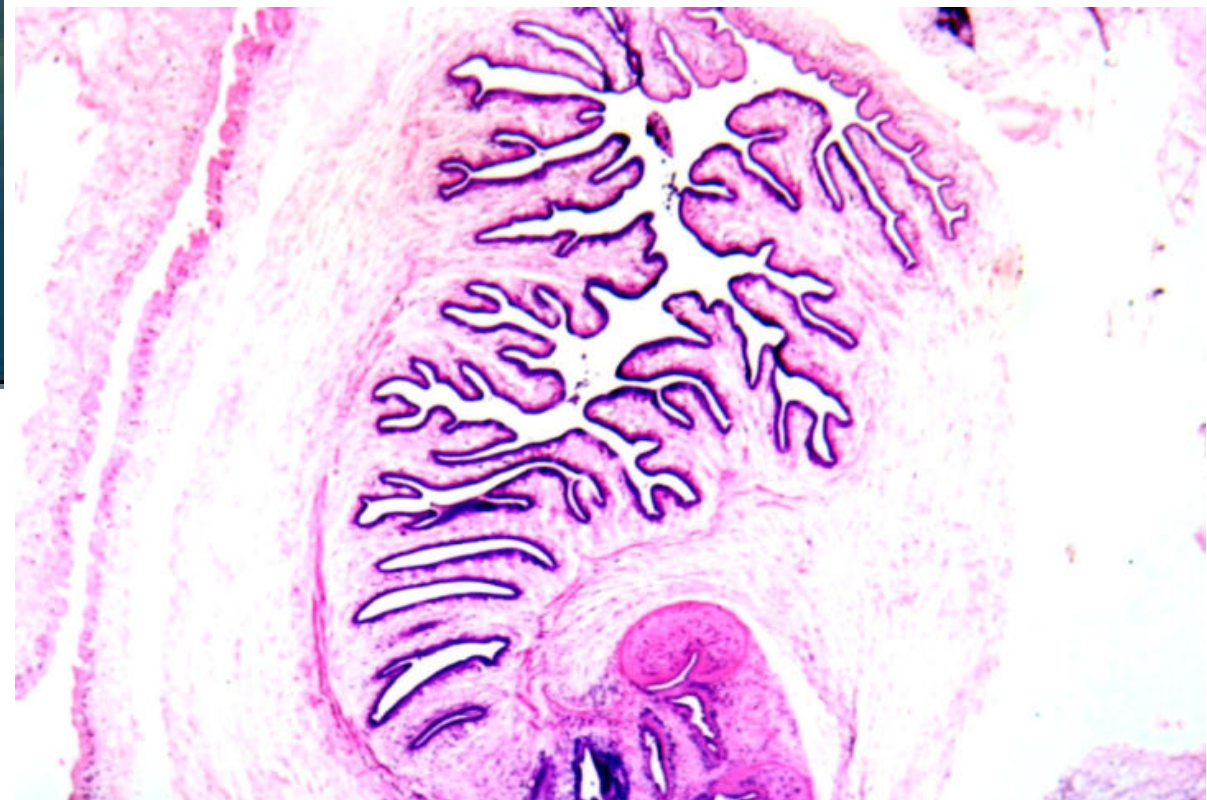
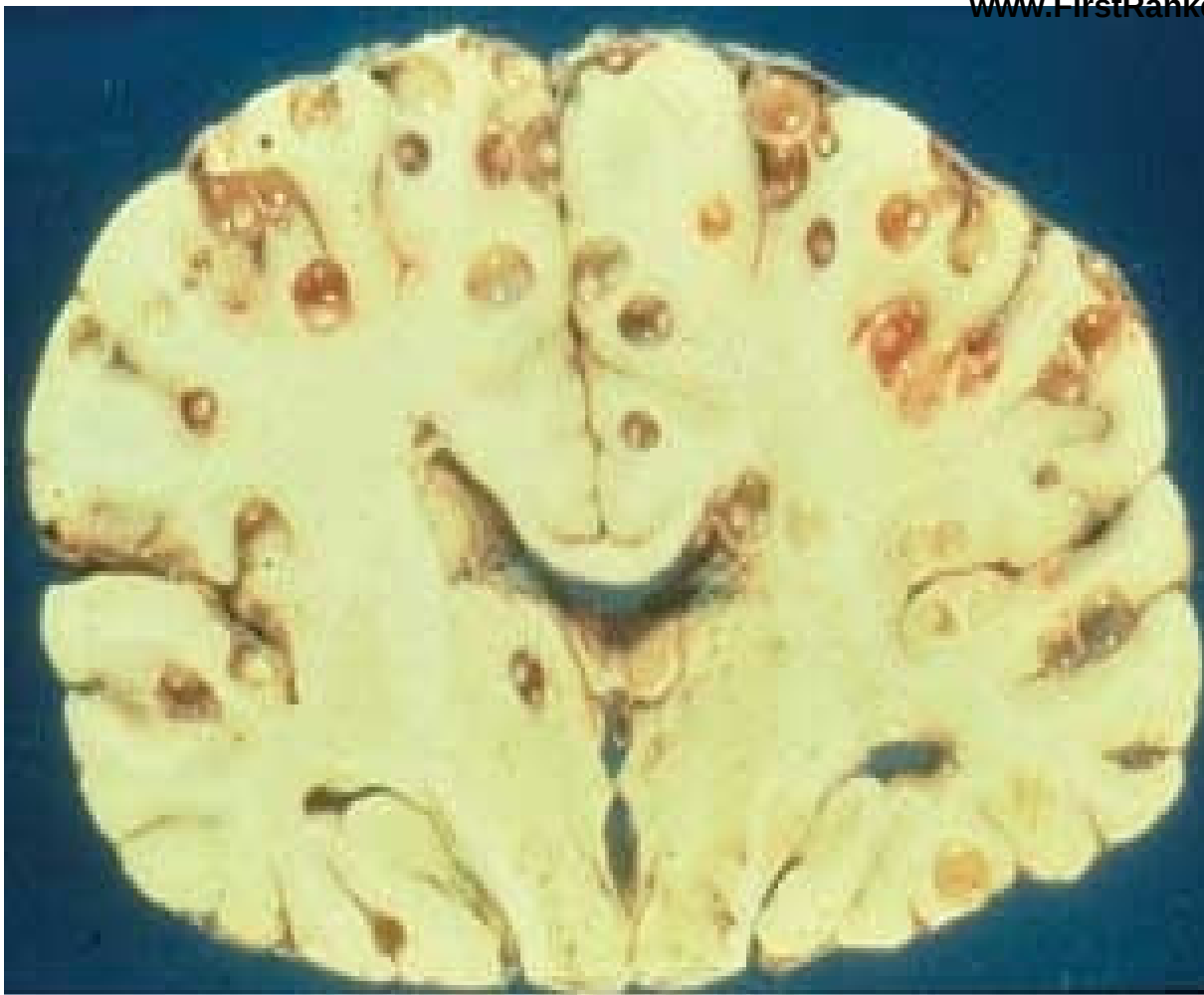
VIRAL INCLUSIONS



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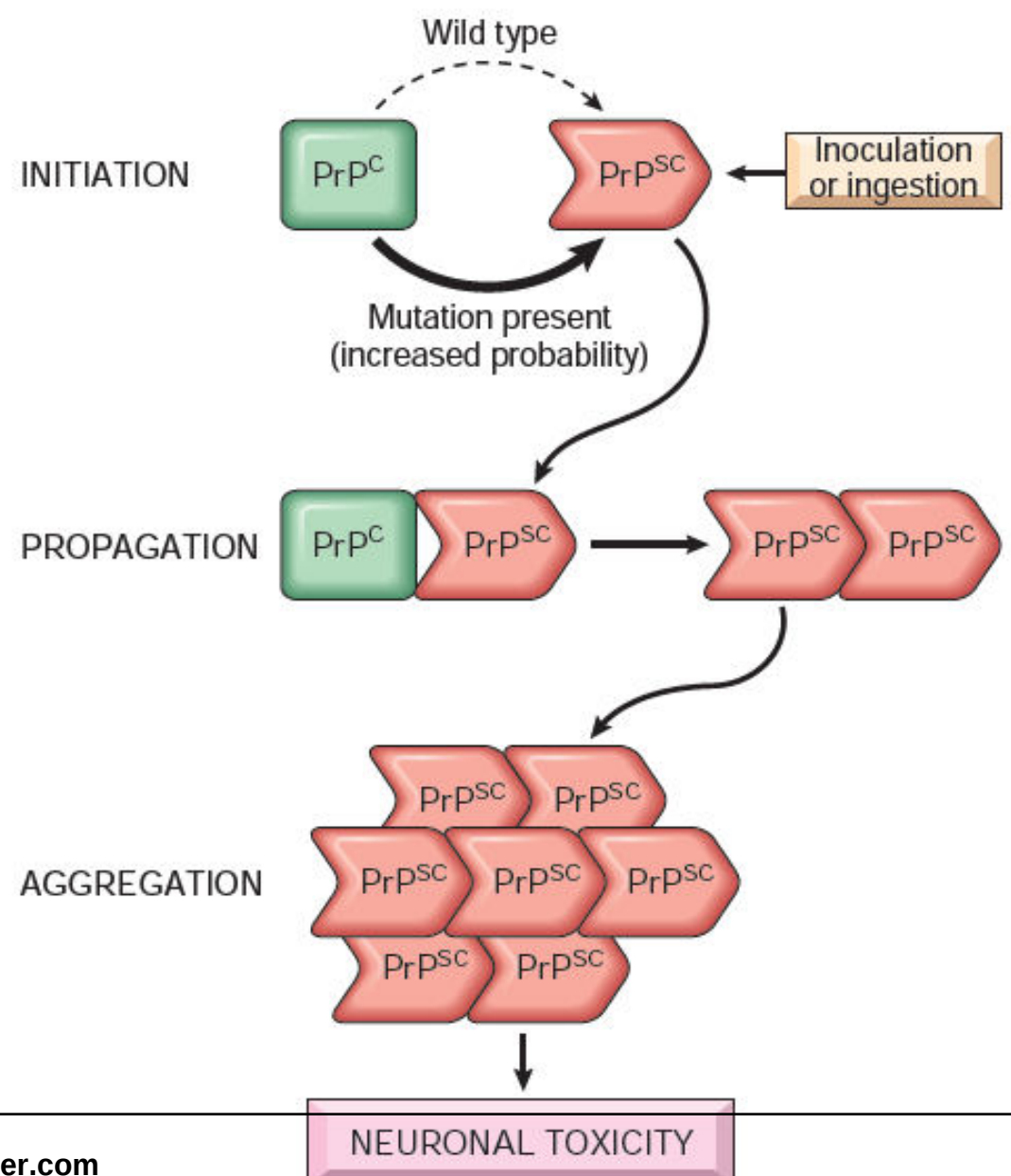


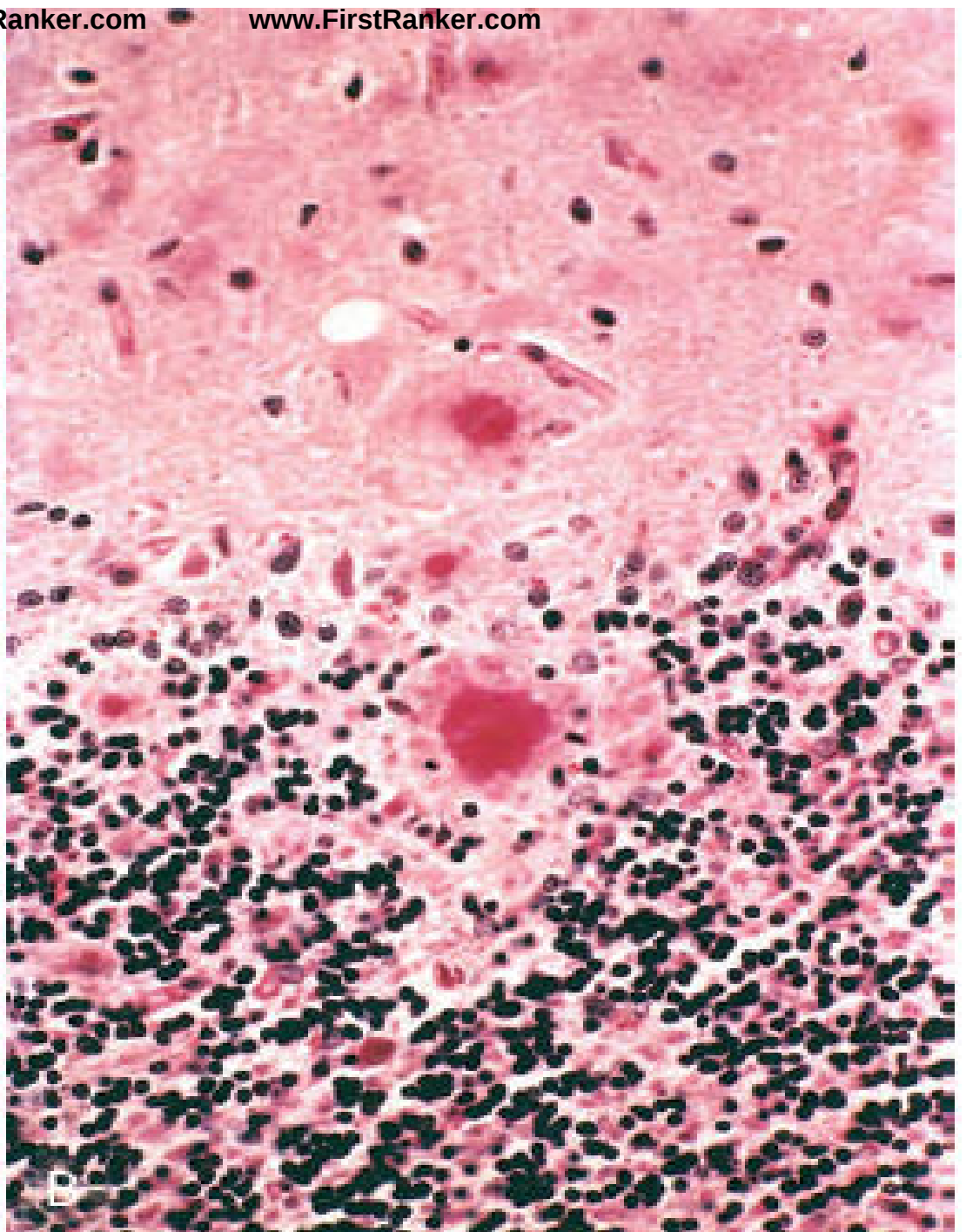
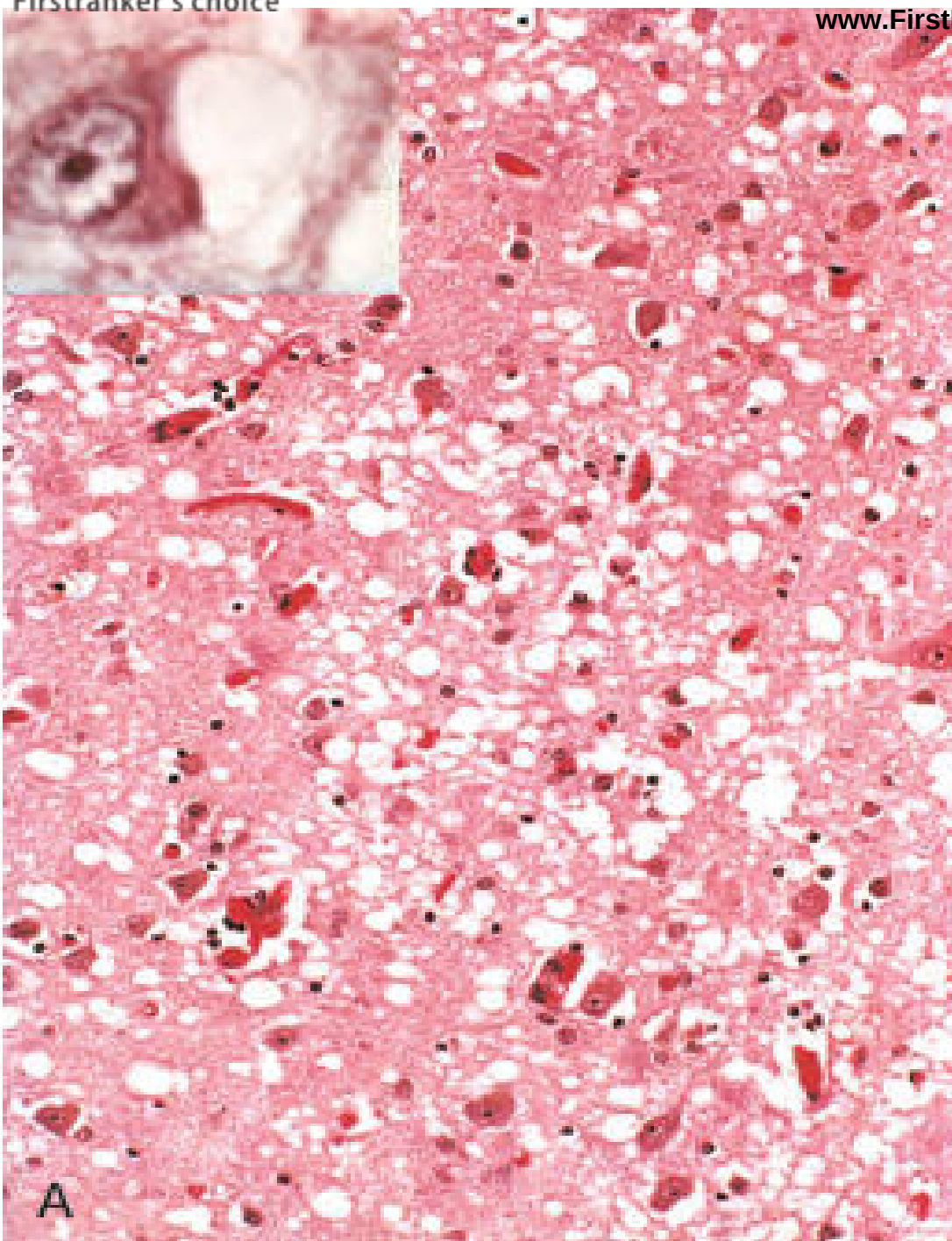
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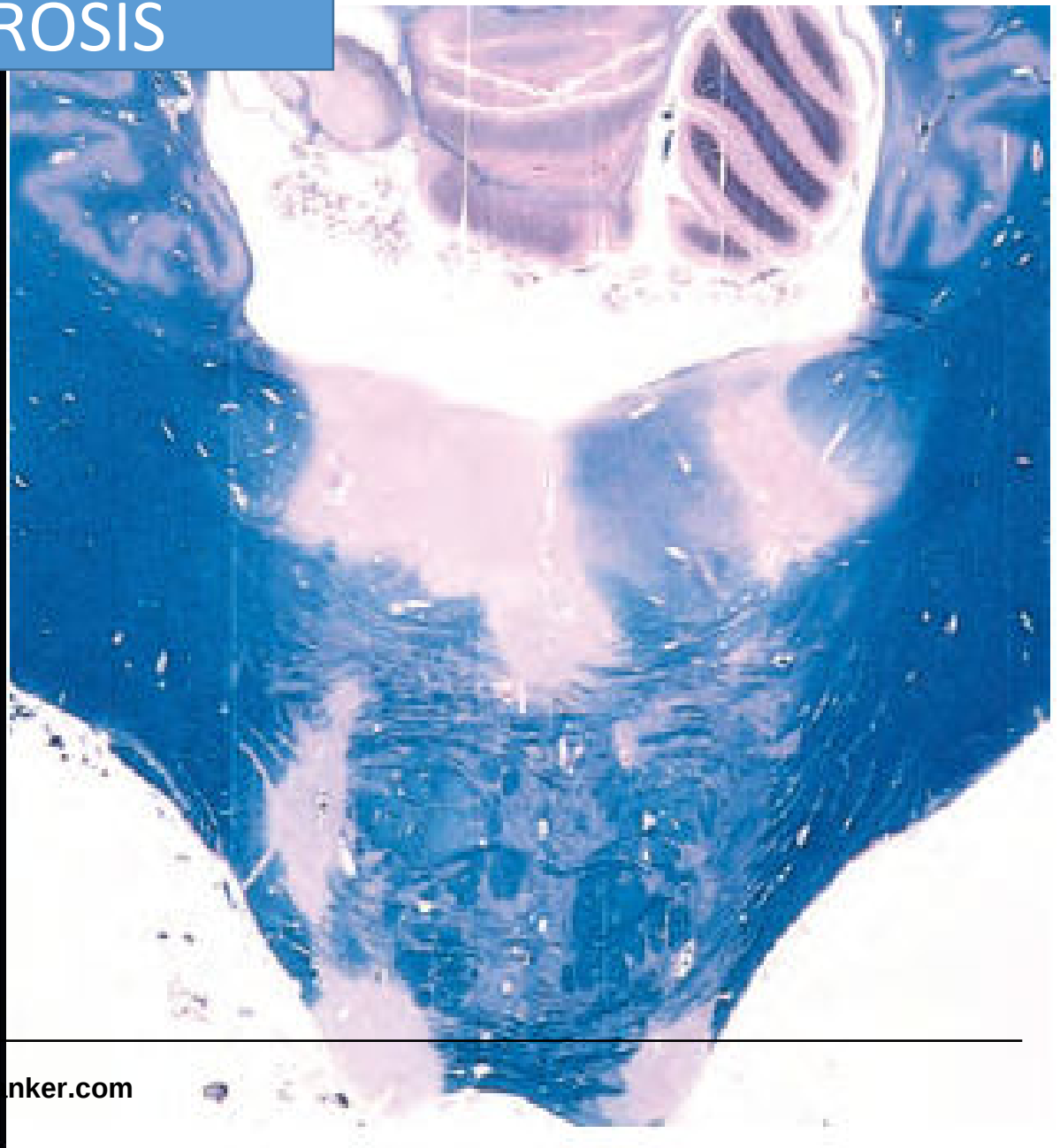
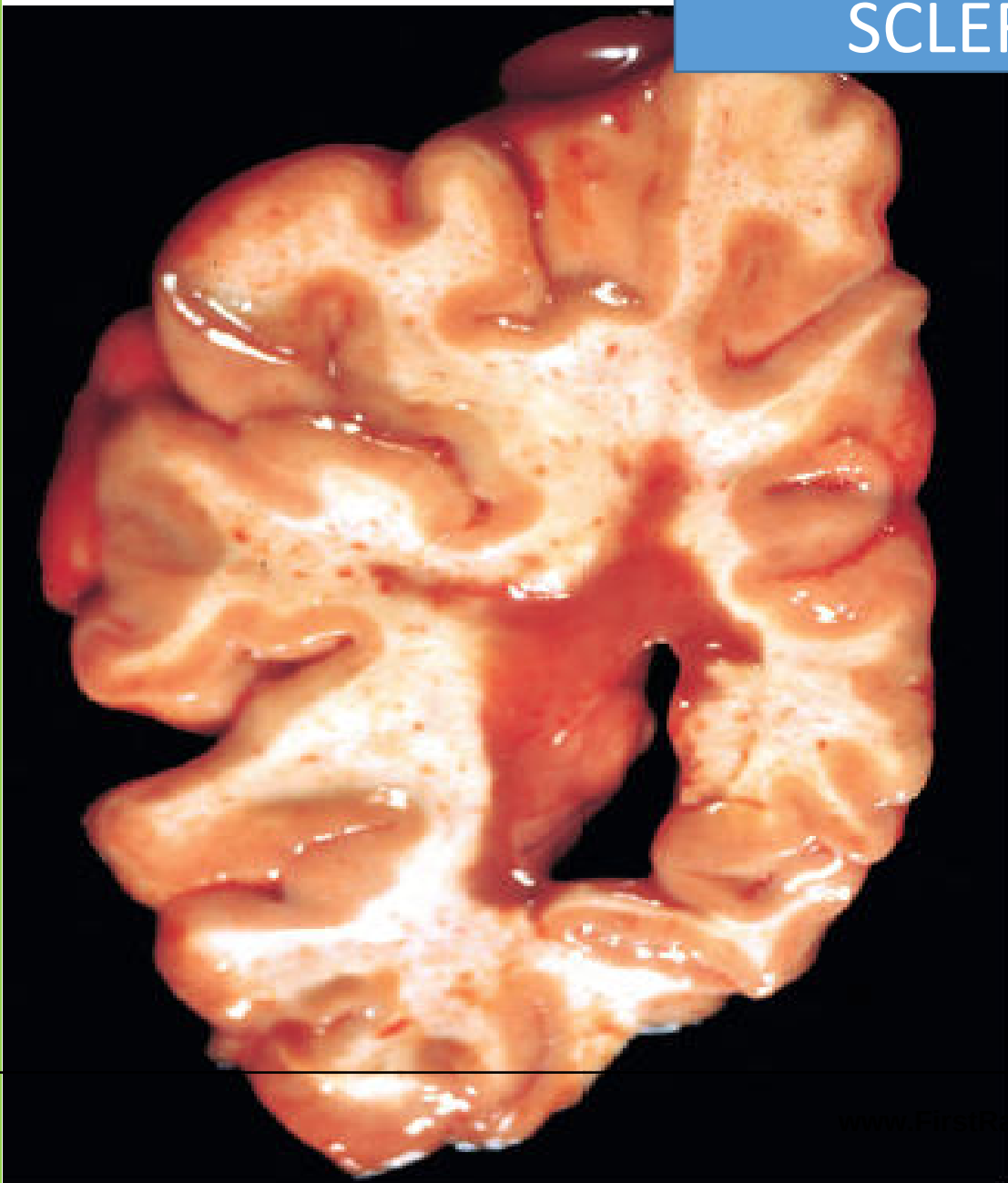
Prion disease

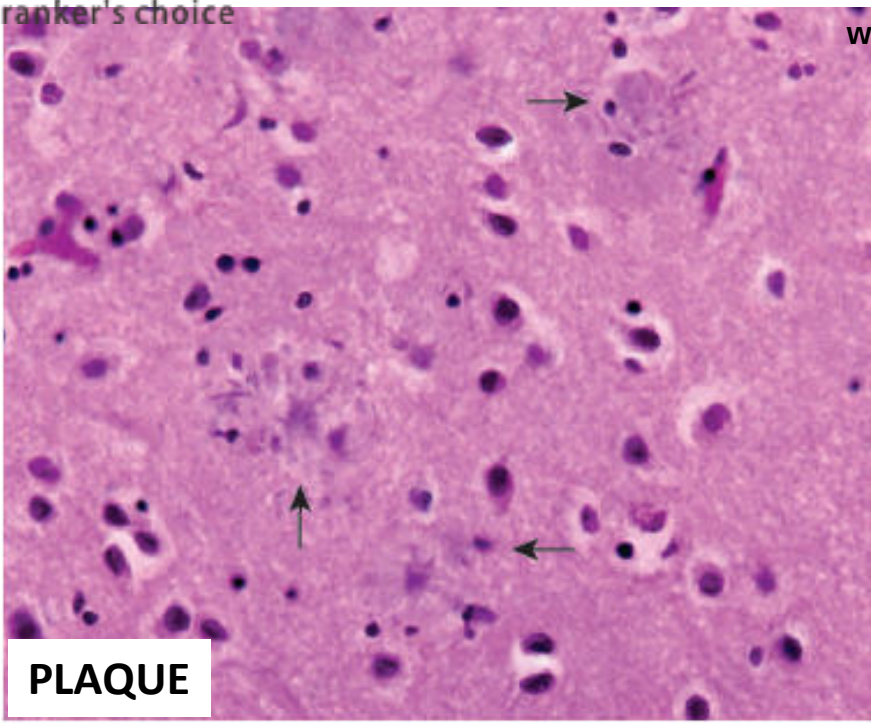
- Proteinaceous infectious particle
- Spongiform encephalopathy
- Creutzfeldt Jacob disease
- Fatal Familial Insomnia
- Bovine Spongiform encephalopathy
- Kuru



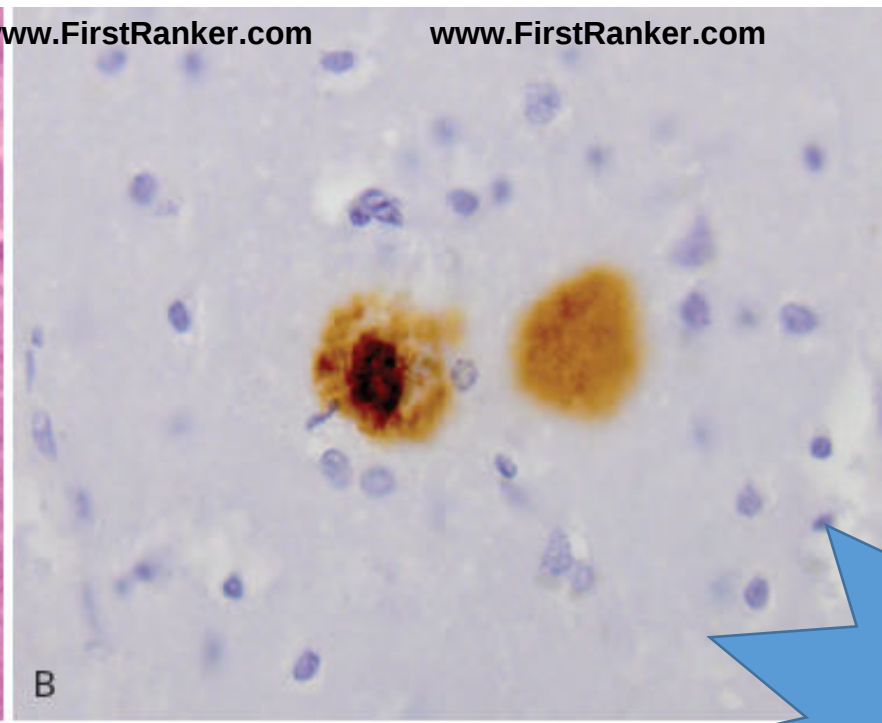


MULTIPLE SCLEROSIS

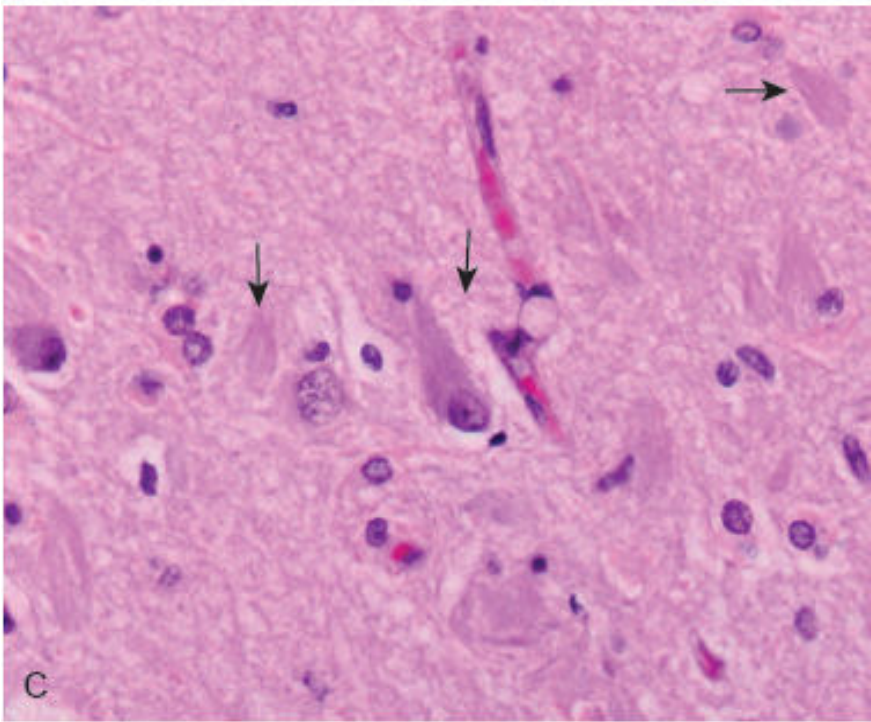




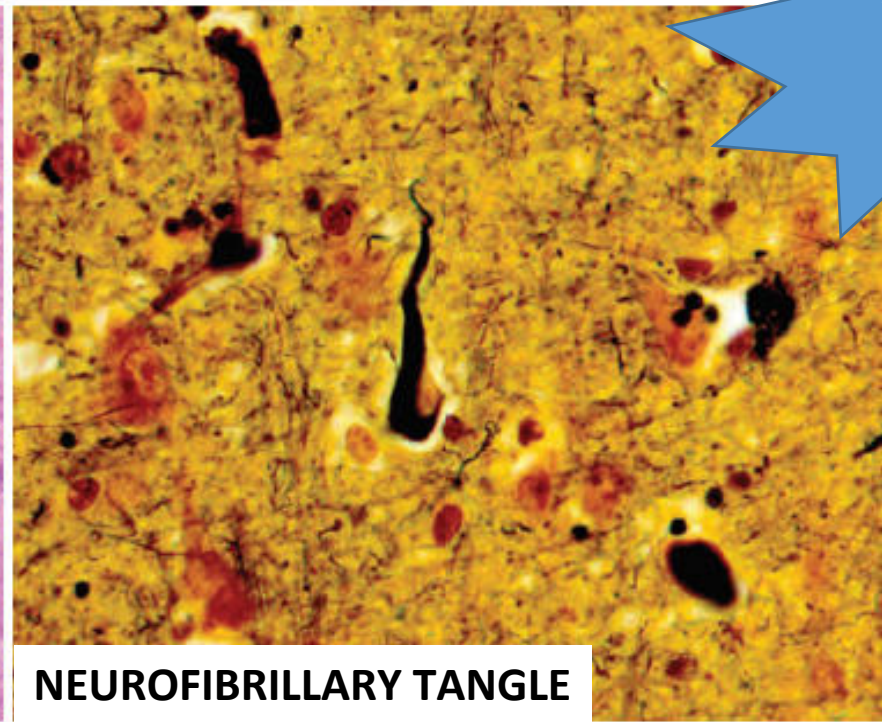
PLAQUE



B

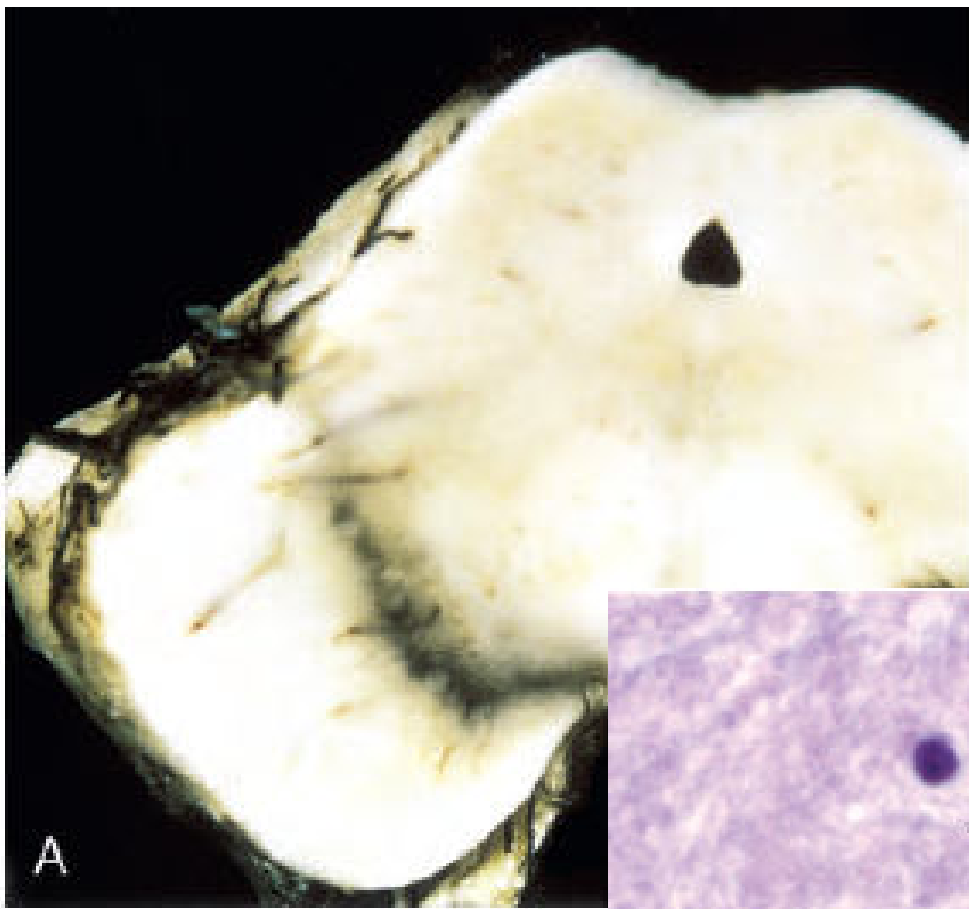


C

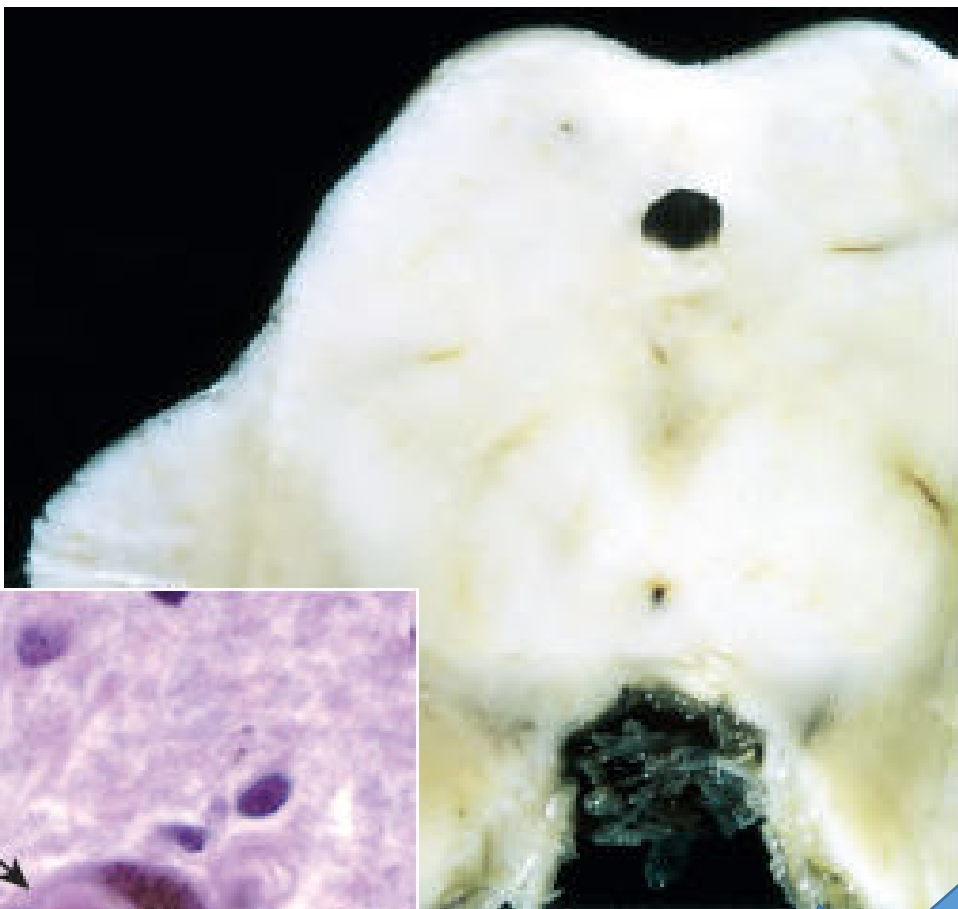


NEUROFIBRILLARY TANGLE

ALZHIEMERS



A

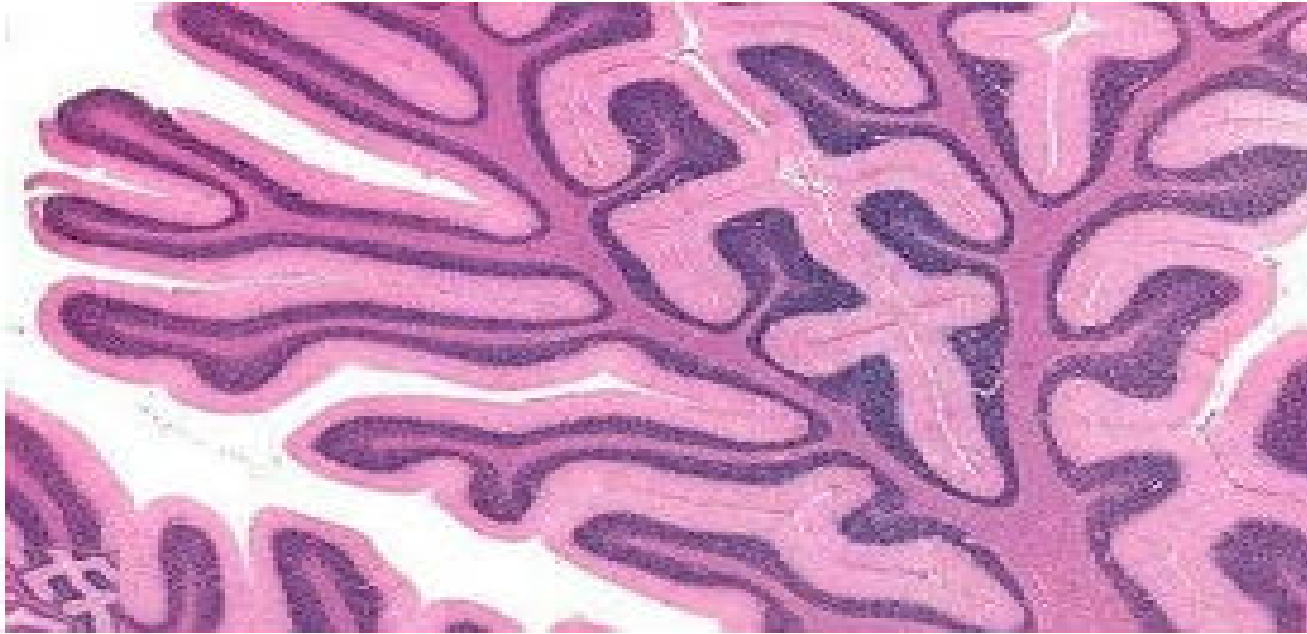


C

PARKINSONS

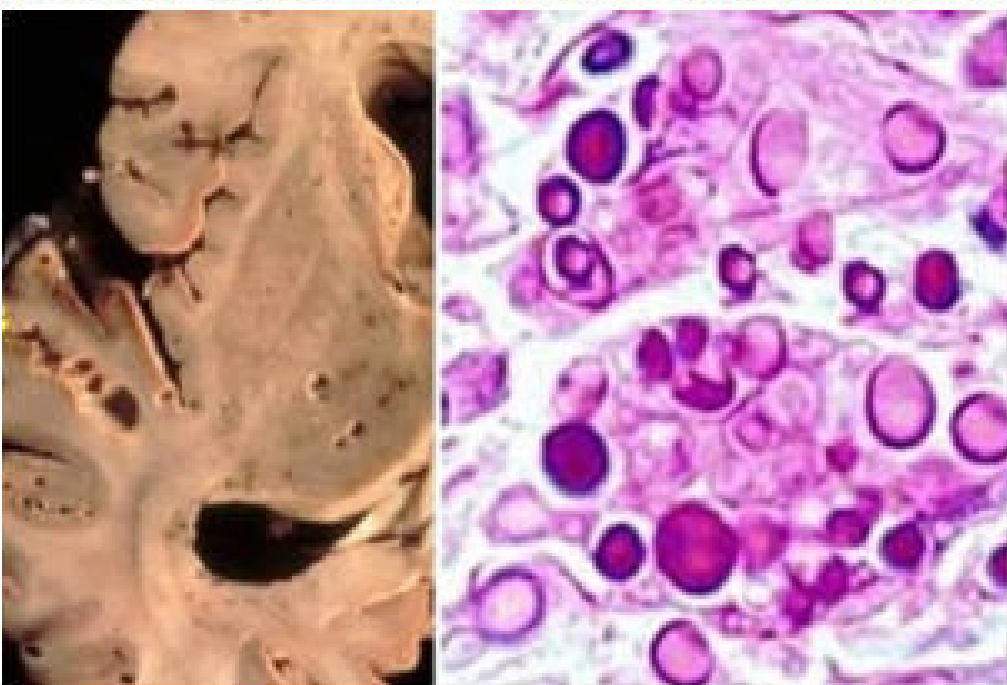
Questions which have been asked..

Q-3. Injury to this area causes what kind of speech defect



- a) Sensory aphasia
- b) Speech apraxia
- c) Aphonia
- d) Dysarthria

Q-11. A HIV patient presented with fever, neck rigidity and died in emergency department. After autopsy, gross with histopathological examination is gives as. It is due to



- a) Echinococcus
- b) Herpes infection
- c) Toxoplasmosis
- d) Cryptococcosis

Rupture of Charcot Bouchard aneurysm usually causes?

- A. Extradural haemorrhage
- B. Subdural haemorrhage
- C. Subarachnoid haemorrhage
- D. Intracerebral haemorrhage

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