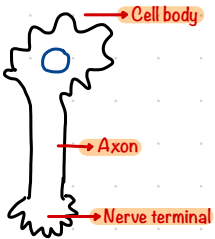


Pathology lecture I



Neuronal injury

cell body injury

VS

Axonal injury

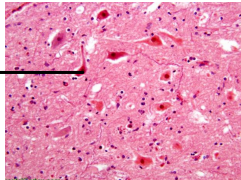
Sprouting: The process of forming new axon after its injury with corresponding changes in cell body

- 1- Irreversible injury
- 2- Shrinkage of cell body
- 3- Pyknosis of nucleus
- 4- Disappearance of nucleolus
- 5- Loss of Nissl substance (RER)

Note: These changes especially shrinkage of cell body will for what is called "red neurons"

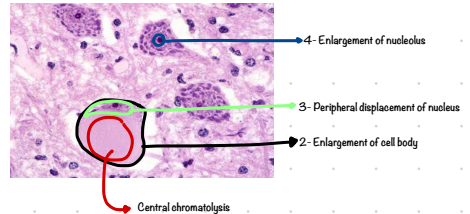
*These changes need 12-24 hours to occur

Red neuron



- 1- Reversible injury if cell body still exist
- 2- Enlargement of cell body
- 3- Peripheral displacement of nucleus
- 4- Enlargement of nucleolus
- 5- Peripheral dispersion of Nissl substance

Note: These changes especially peripheral displacement form what is called "Central chromatolysis"



Astrocytes injury: (has role in repairing and scaring) ^{Called gliosis}

Acute injury

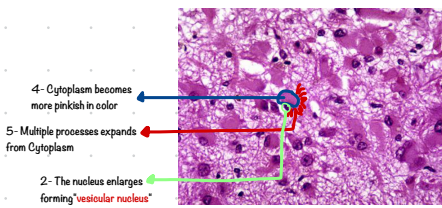
- 1- Astrocytes undergo hypertrophy and hyperplasia
- 2- The nucleus enlarges forming "vesicular nucleus"
- 3- The nucleolus becomes more prominent
- 4- Cytoplasm becomes more pinkish in color
- 5- Multiple processes expands from Cytoplasm

Note: These changes form what is called " gemistocytic astrocyte "

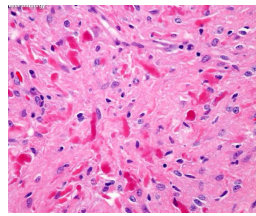
Long standing injury

- 1- Cytoplasm shrinks in size
- 2- Processes interwoven forming "fibrillary Astrocytes"

*Rosenthal fibers is a characteristic feature of chronic astrocytic injury and its also found in some low grade glioma "pilocytic astrocytoma"

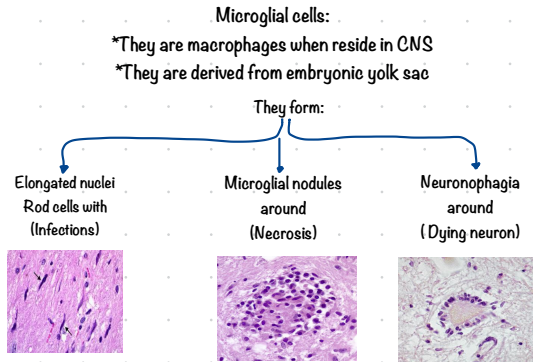


(Acutely astrocytic injury)

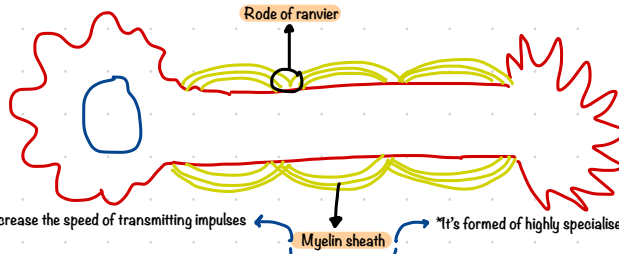


(Chronic astrocytic injury)

In some cases fibroblast participate in healing and scarring as in: 1- Penetrating brain trauma. 2- Around abscesses

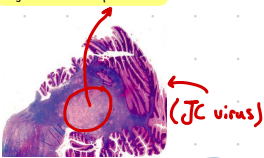


Myelin sheath



- *Increase the speed of transmitting impulses
- *Electrical insulator
- *Component of white matter
- *It's formed of highly specialised, closely apposed plasma membranes
- *In CNS it's formed by oligodendrocytes → It gives many internodes
- *In PNS it's formed by Schwann cells → It give one internode

Myelin usually stained with blue but when it is demyelinated it becomes pinkish in color



Demyelinating diseases

في هذي الاية ال myelin يكون موجود في
الاعصاب ولكن بسبب بعض المسببات اذتة
ازالة مثل:

- 1) Immune disease
- 2) Viruses as JC virus or polyomavirus
- 3) drugs

Demyelinating

Dysmyelinating diseases

* ال myelin في هاي الاية من الاعصاب
يتكون بشكل صحيح؛ بسبب طفرات في ال
proteins الية تدخ في تكوين myelin sheath

It's also called leukodystrophies diseases.

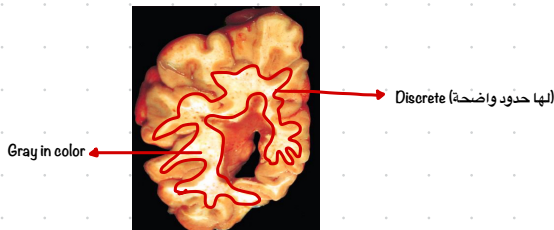
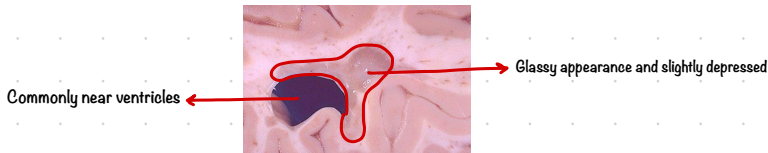
Leukodystrophies

- 1- Autosomal recessive **dysmyelinating disease**
- 2- There **are mutation in genes** associated with myelin generation and maintenance
- 3- Diagnosed by **genetic or biochemical methods**
- 4- Affected persons they are normal at birth then begin to **miss milestones**
- 5- They **affect white matter**
- 6- White matter **becomes grey and translucent in color**
- 7- White matter **decrease in size**
- 8- Brain becomes **atrophic and ventricles enlarges**
- 9- **progressive disease and symmetrical changes on MRI**

Multiple sclerosis

- 1- **Demyelinating disease**
- 2- **Autoimmune disease** attacks components do myelin sheath
- 3- **Affects female more than male**
- 4- **Episodic disease affects white matter**
- 5- There will be **courses of relapses** (ظهور الأعراض) followed by **courses of remission** (اختفاء الأعراض)
- 6- At beginning recovery will be completed **then it will not be completed**
- 7- **Unilateral visual impairment**
- 8- **Cranial nerve signs** due to brainstem involvement as:
 - 1- **Ataxia**
 - 2- **Nystagmus**
- 9- There will be elevated:
 - 1- **proteins**
 - 2- **Pleocytosis**
 - 3- **immunoglobulins** "oligoclonal bands"

White matter diseases features:



Lesions

Active plaques

There will be:
Macrophages and lymphocytes

لأنه ال myelin breakdown يحدث في اللحظة اى بية.
له خبثات من Myelin debris

Inactive plaques (quiescent)

* Inflammation disappears
* little or no myelin
* Gliosis present.

ال myelin breakdown حدث
داشبه ..