MULTIPLE SCLEROSIS

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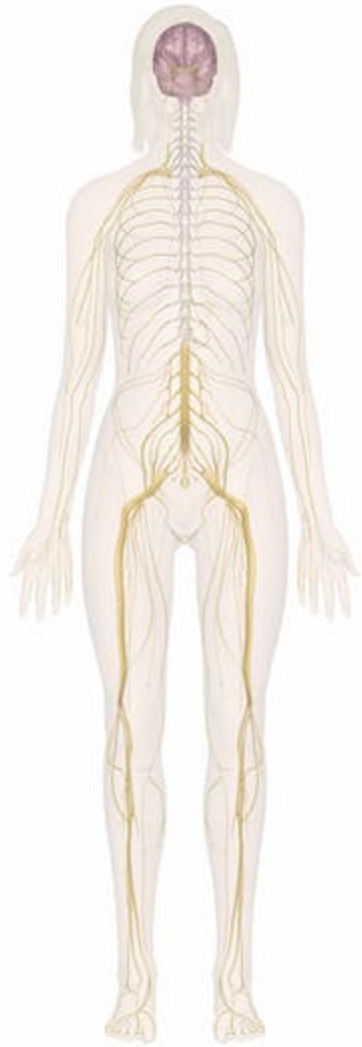
OUTLINES

- Introduction.
- Definition.
- Incidence.
- Etiology and Risk factors.
- Pathophysiology.
- Clinical Manifestations.
- Diagnostic Evaluation.
- Management.

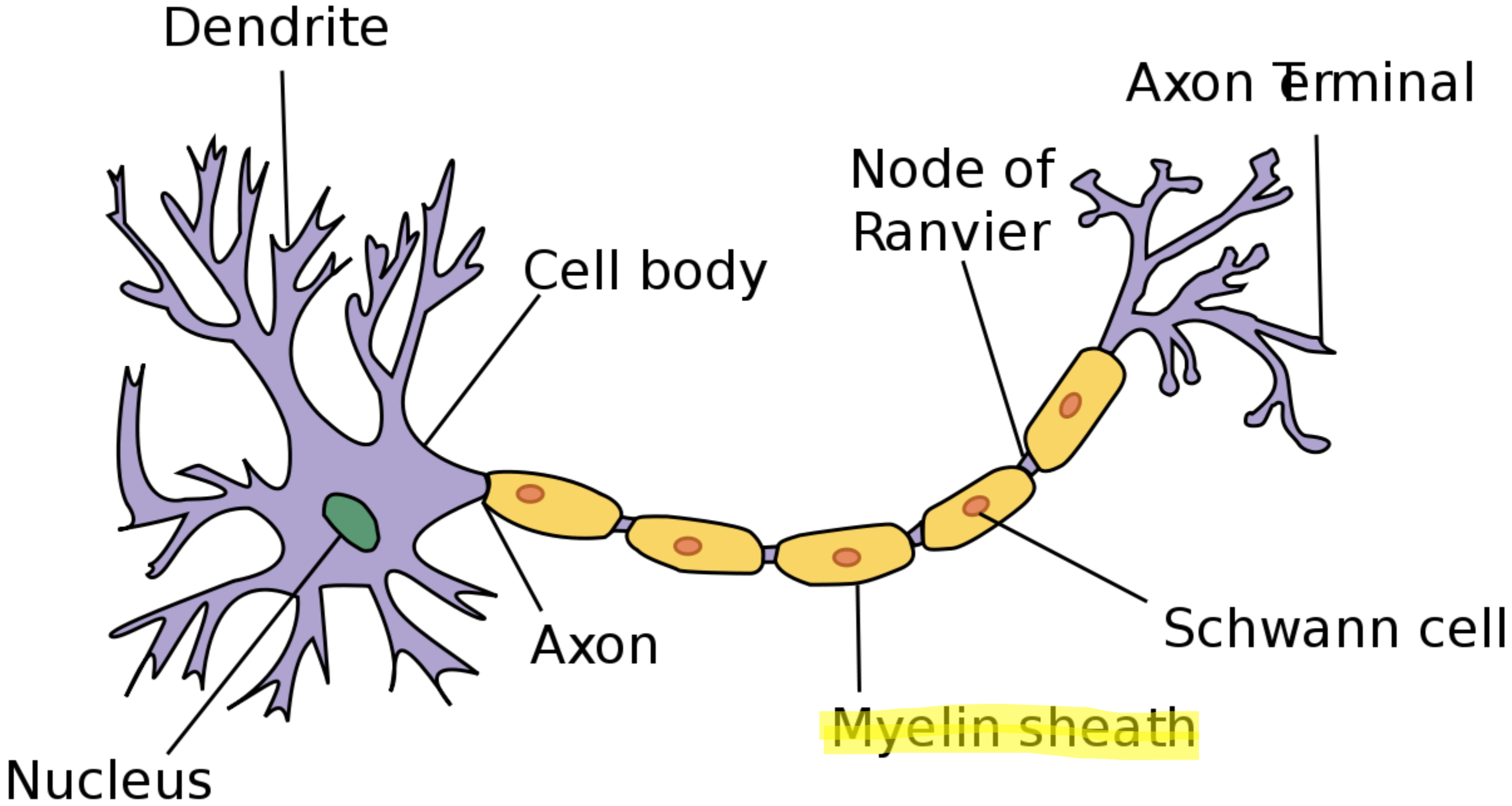
INTRODUCTION

- The autoimmune disorders of nervous system can attack the CNS which include brain and spinal cord, or PNS consisting of nerves that connect the CNS.
- Autoimmune nervous system disorders include Multiple sclerosis, Myasthenia gravis, and Guillain- barre syndrome.



DEFINITION

- Multiple sclerosis (MS) is a chronic demyelinating
- disease that affects the myelin sheath of neurons in the CNS.


Dendrite
Axon Terminal
Node of Ranvier
Cell body
Axon
Schwann cell
Myelin sheath
Nucleus

INCIDENCE

- Onset occurs between 20-40 years of age.
- Women are more affected than men. (AANN,2011).
- Whites are more affected than Hispanics, blacks, or Asians .
- Most prevalent in colder climates of North America & Europe.
- Migration.

ETIOLOGY & RISK FACTORS

- Exact cause is not known yet.
- Most theories suggest that MS is an immunogenetic viral disease (with Epstein Barr virus).
- Risk factors are:

– Age (most of the time between 20-40 yrs).

– Sex (women have more chance).

– Family history (genetic susceptibility).

– Certain infections (like Epsteinbarr virus).

Continued risk factors…

– Climate (more in cold climate areas).

– Certain auto-immune diseases (higher risks with thyroid disease, type-1 DM or IBD).

– Smoking.

– Stress, fatigue.

– Physical injury.

– Pregnancy (may relating to stress to labour).

PATHOPHYSIOLOGY

1- Due to etiological factors

2- Activated T-cells (which recognize self Ag) expressed in CNS, & Macrophages (B-cells) enters the brain from peripheral circulation

3- Production of inflammatory cytokines

4- Inflammation

5- Then activated T-cells & B-cells cause demyelination and destruction of oligodendrocytes

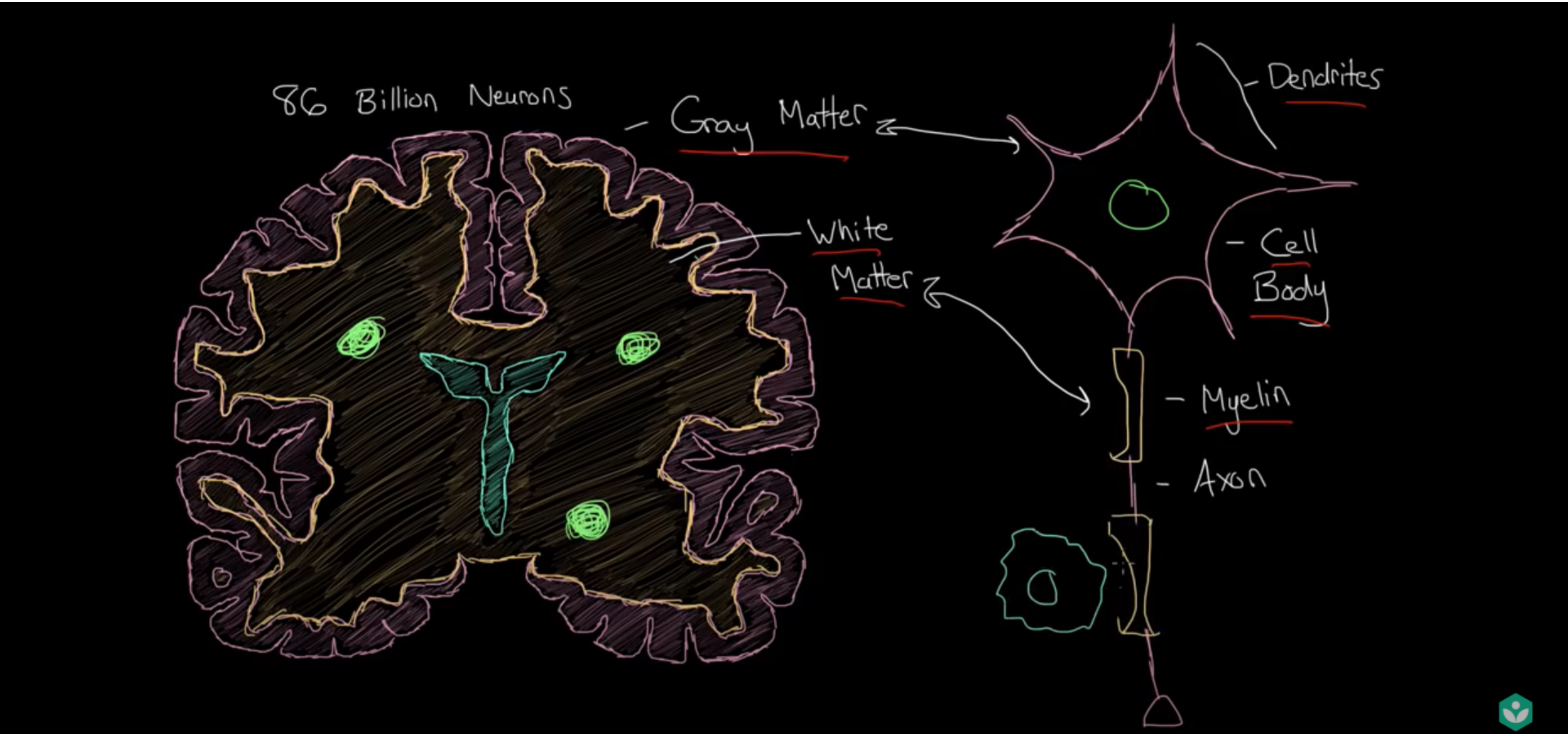
6- Formation of plaque

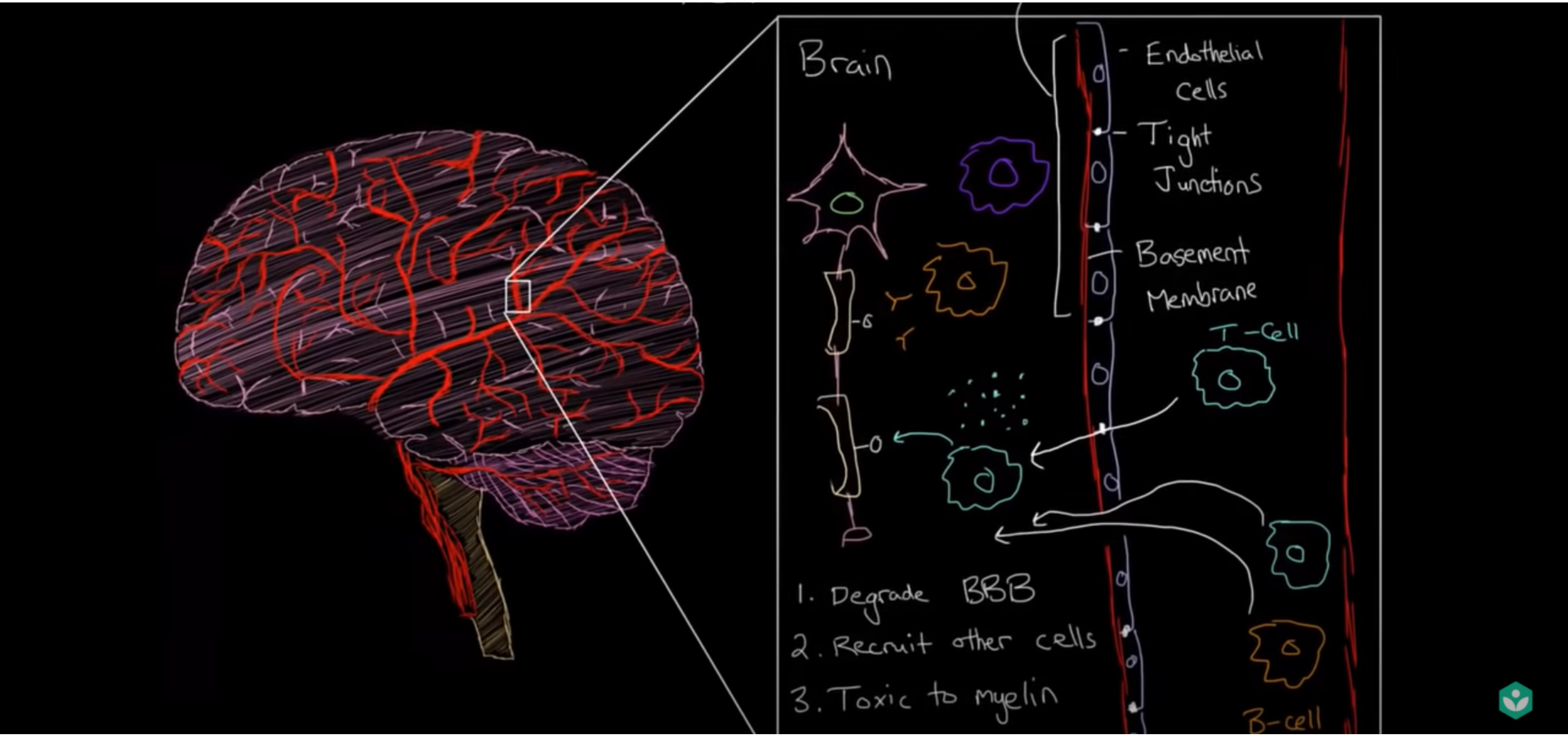
7- Causes scarring & destruction of sheath

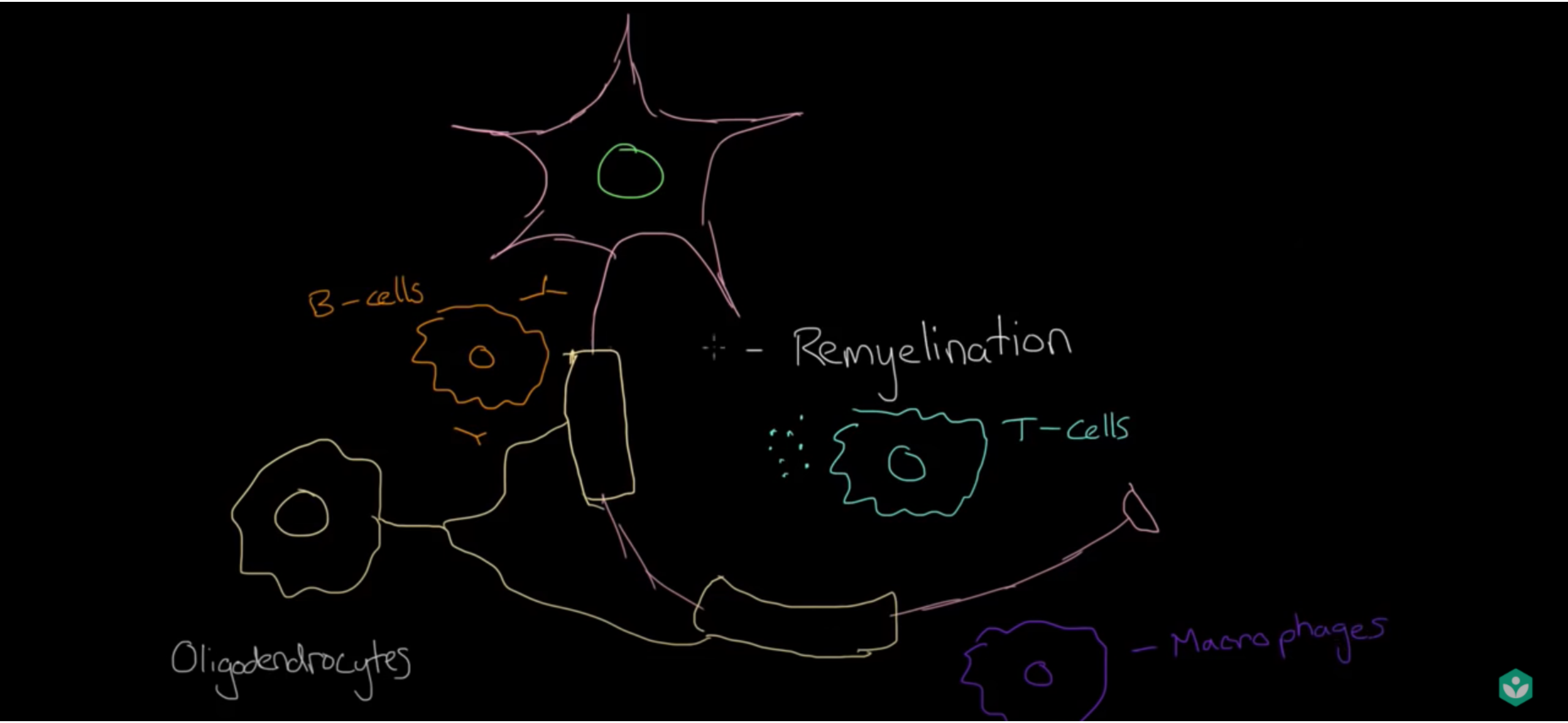
8- Compensatory system starts causing subsidation of edema & inflammation

9- After that some remyelination process occurs which is often incomplete

10- Multiple sclerosis.


86 Billion Neurons
Gray Matter
White Matter
Dendrites
Cell Body
Myelin
Axon


Brain
- Endothelial Cells
- Tight Junctions
Basement Membrane
T-Cell
B-cell
1. Degrade BBB
2. Recruit other cells
3. Toxic to myelin

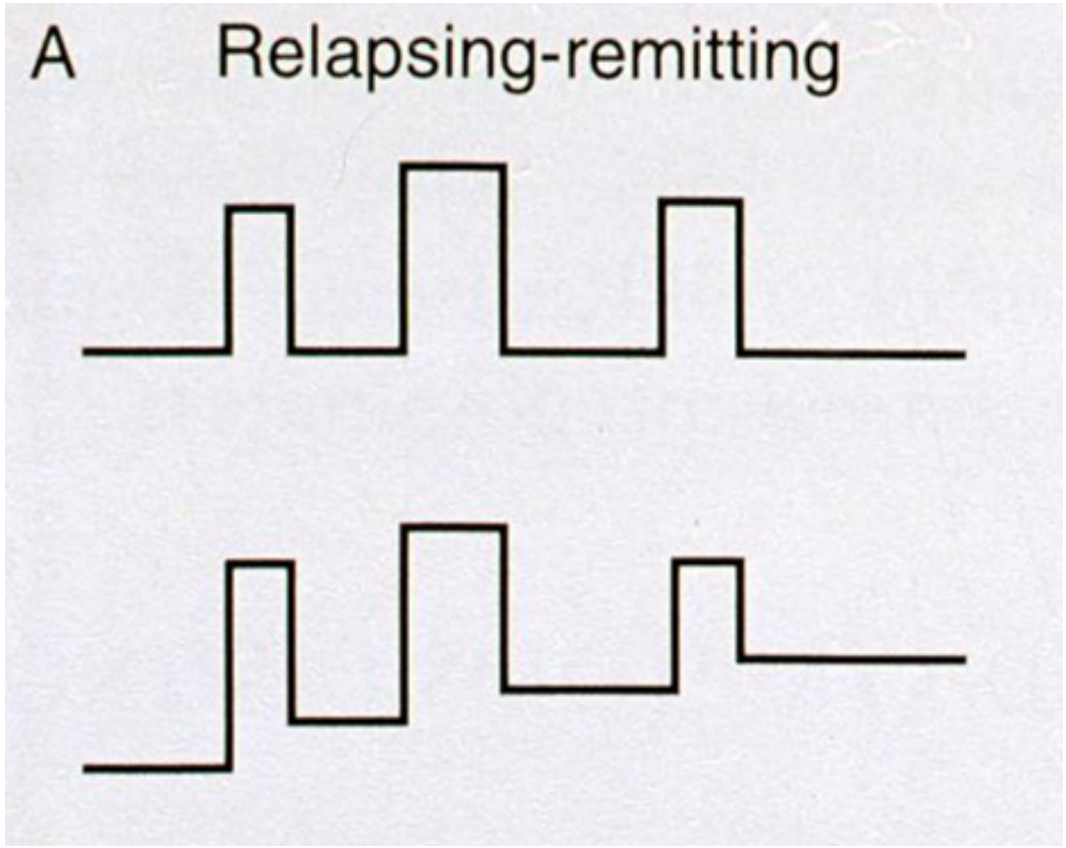

B-cells
- Remyelination
T-cells
Oligodendrocytes
- Macrophages

CLINICAL MANIFESTATIONS

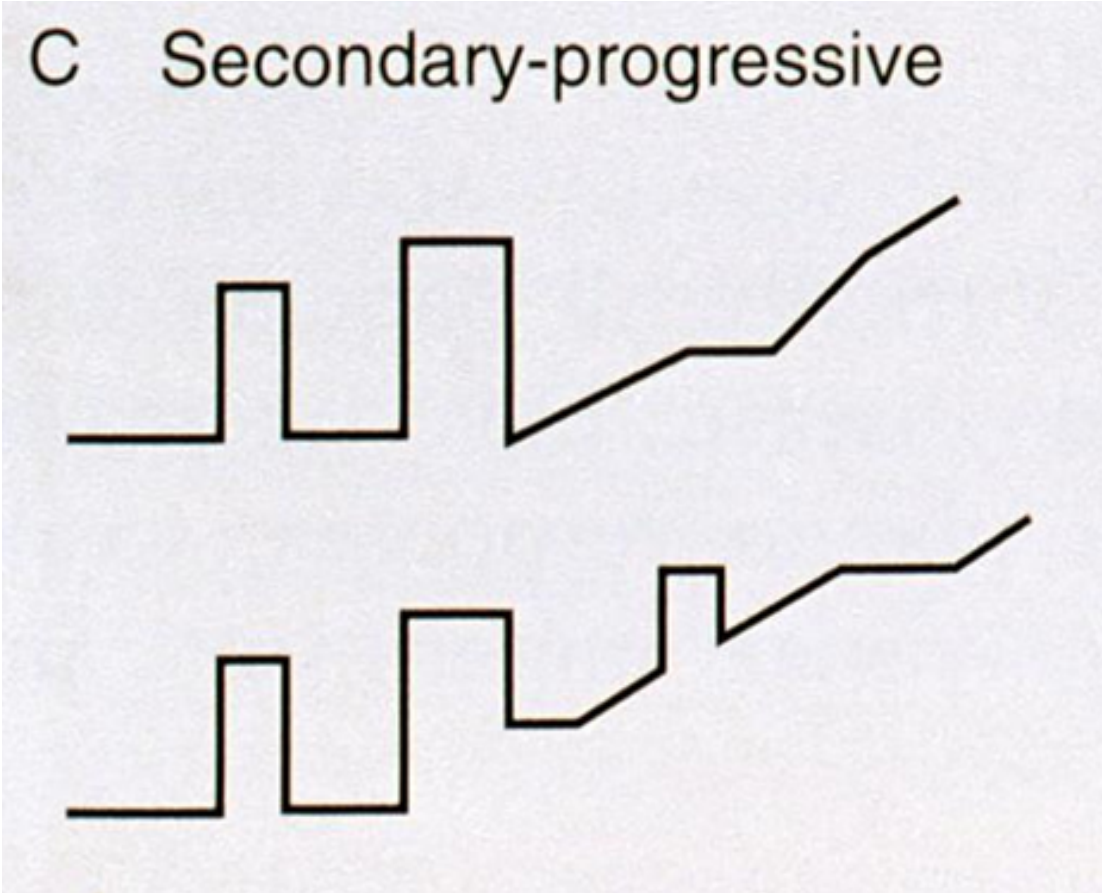
- The course of illness varies from person to person.

The 4 clinical patterns (types) have been identified:-

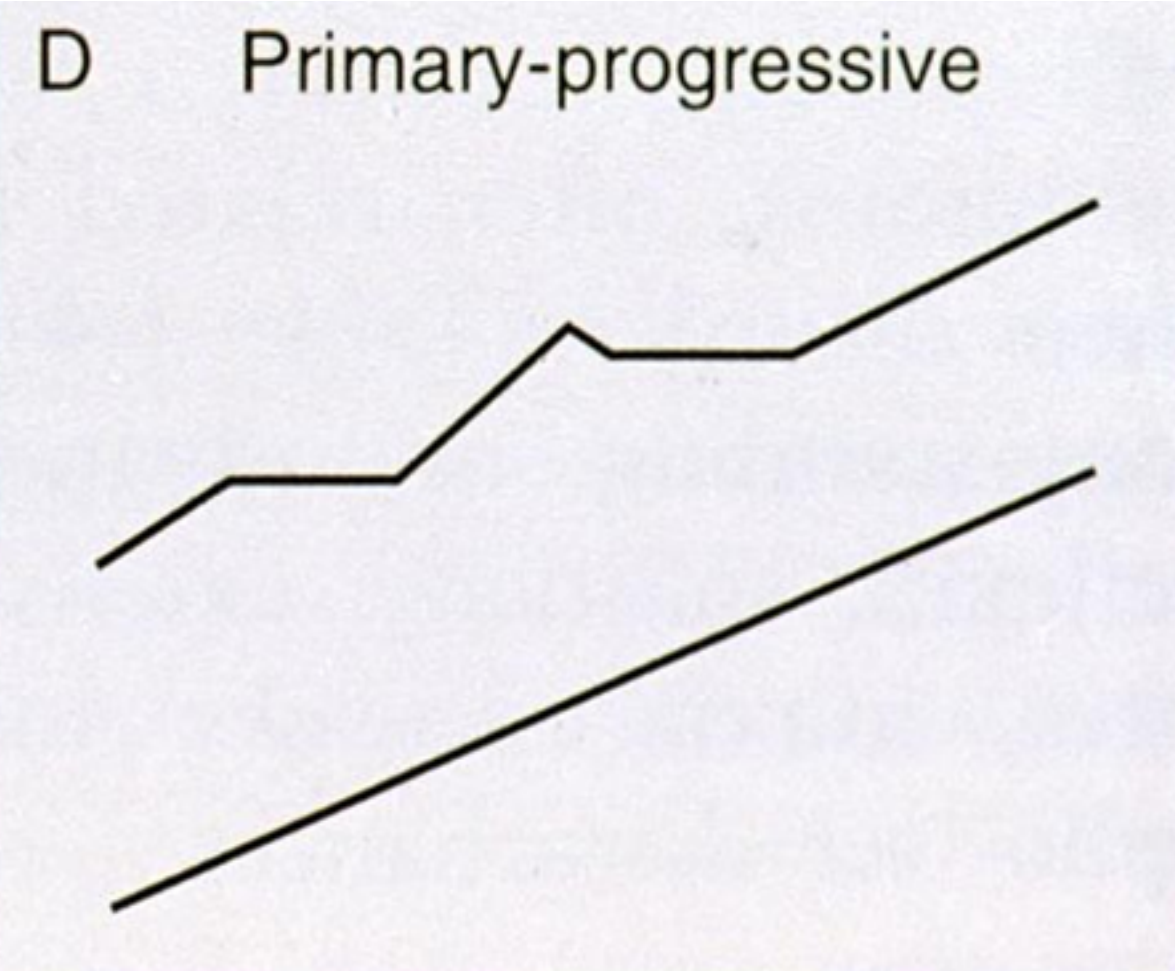
I. Relapsing – remitting MS (most common initial pattern): Episodes of acute worsening with recovery and a stable course between relapses.



2. Secondary progressive MS: Gradual neurologic deterioration with or without superimposed acute relapses in a client who previously had relapsing remiting MS.

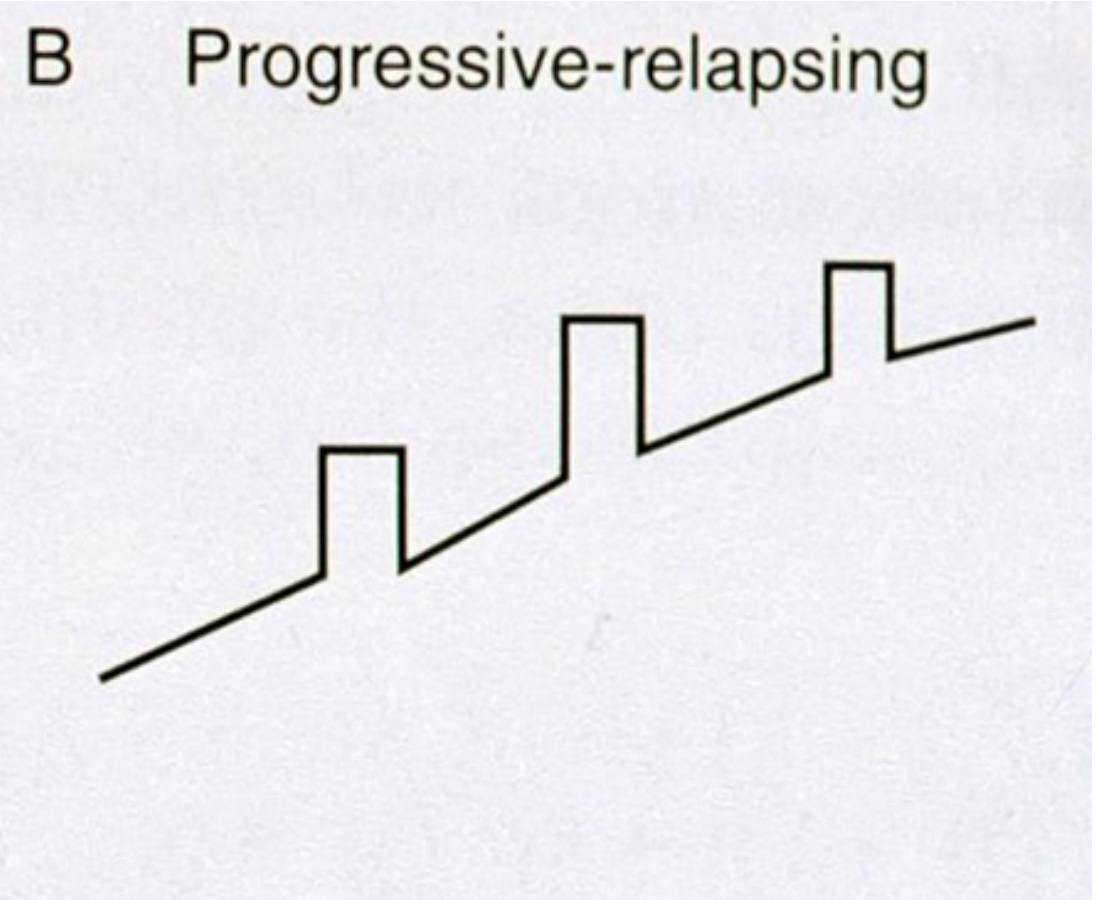


3. Primary progressive MS: Gradual, nearly continuous neurologic deterioration from onset of manifestations.



4. Progressive relapsing MS:

Gradual neurologic deterioration from the onset of manifestations but with sub-sequent superimposed relapses.



The other symptoms are:-

- **Cerebellar sign:**
  - Nystagmus
  - Ataxia
  - Dysarthria
  - dysphagia
- **Motor:**
  - weakness or paralysis of limbs , trunk or head
  - Scanning speech
  - Spasticity of muscles that are chronically affected.

- **Sensory:**

– Numbness , tingling

– Patchy blindness (scotomas)

– Blurred vision

– Vertigo, tinnitus, decreased hearing, chronic neuropathic pain

– Radicular (nerve root) pain in lower thoracic abdominal region.

– Lhermitte’ s sign is a transient sensory symptom described as an electric shock radiating down the spine or into limbs with flexion of neck.

- **Emotional problems:**
  - Fatigue (associated with energy needs)
  - Depression
  - Deconditioning
  - Medication side effects.

DIAGNOSTIC EVALUATION

- There is no definitive test for MS.
- Detailed history of episodes of neurologic dysfunction
- Physical examination.
- Other tests include:-

– CSF evaluation (for presence of IgG antibody or oligoclonal bonding)

– Evoked potentials of optic pathways & auditory system to assess presence of slowed nerve conduction.

– MRI of brain and spinal cord (to determine the presence of MS plaques)

– CT scan (to detect areas of demyelination , but with less detail as by MRI).

MEDICAL MANAGEMENT

- No exact cure.
- Aim is to prevent or postpone the long term disability (often evolves slowly over many years).
- The treatment falls into 3 categories:-

1. Treatment of acute relapses.

2. Treatment aimed at disease management.

3. Symptomatic treatment.

1. Treatment of acute relapse:-

- **Corticosteroid** therapy (anti-inflammatory & immunosuppressive property)

For example:

- ✓ Methyl-prednisolone , (given I.V. or orally)
- ✓ Azathioprine & cyclophosphamide (in severe cases)

2. Treat exacerbations:-
(treatment aimed at disease management)

➢ ***Interferon-Beta 1b***

- Betaseron, given subcutaneously.

(antiviral & immuno-regulatory)

(for ambulatory clients with relapsing –remitting).

➢ ***Interferon Beta 1a***

- Avonex,

(for treating replasing form of MS).

➢ ***Glatiramer acetate***

- Copaxane,

(for relapsing re-emitting MS).

3. Symptomatic treatment:-

- For bladder dysfunction:

- oxybutynin, propantheline.

- For constipation:

- psyllium hydrophilic mucilloid, suppositories.

- For fatigue:

- amantadine, modafinil .

- For spasticity:

- baclofen, diazefen, dantrolone.

- For Tremor :

- propanolol, phenobarbital, clonazepam.

- For dysesthesias & trigeminal neurolgia:

- carbamazepine, phenytoin, amitriptyline.

- For dysesthesias:

- Transcutaneous electrical nerve stimulation (TENS)

4. Nutritional therapy:-

- megavitamin therapy (cobalamin/vit. B12 and vit. C)
- low fat diet.
- high roughage diet (to relieve constipation)

5. Other therapies:-

(to improve neurological functioning)

✓Physical and speech therapies.

✓Exercise.

✓Water exercise.

SURGICAL MANAGEMENT

- Deep brain stimulation:-

if other options have failed then a device is implanted that stimulates an area of brain. (in case of severe tremor in limbs).

- Implantation of a drug catheter or pump:

a catheter is placed in lower spinal area to deliver a constant flow of drug like baclofen. (in case of severe pain or spasticity).

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