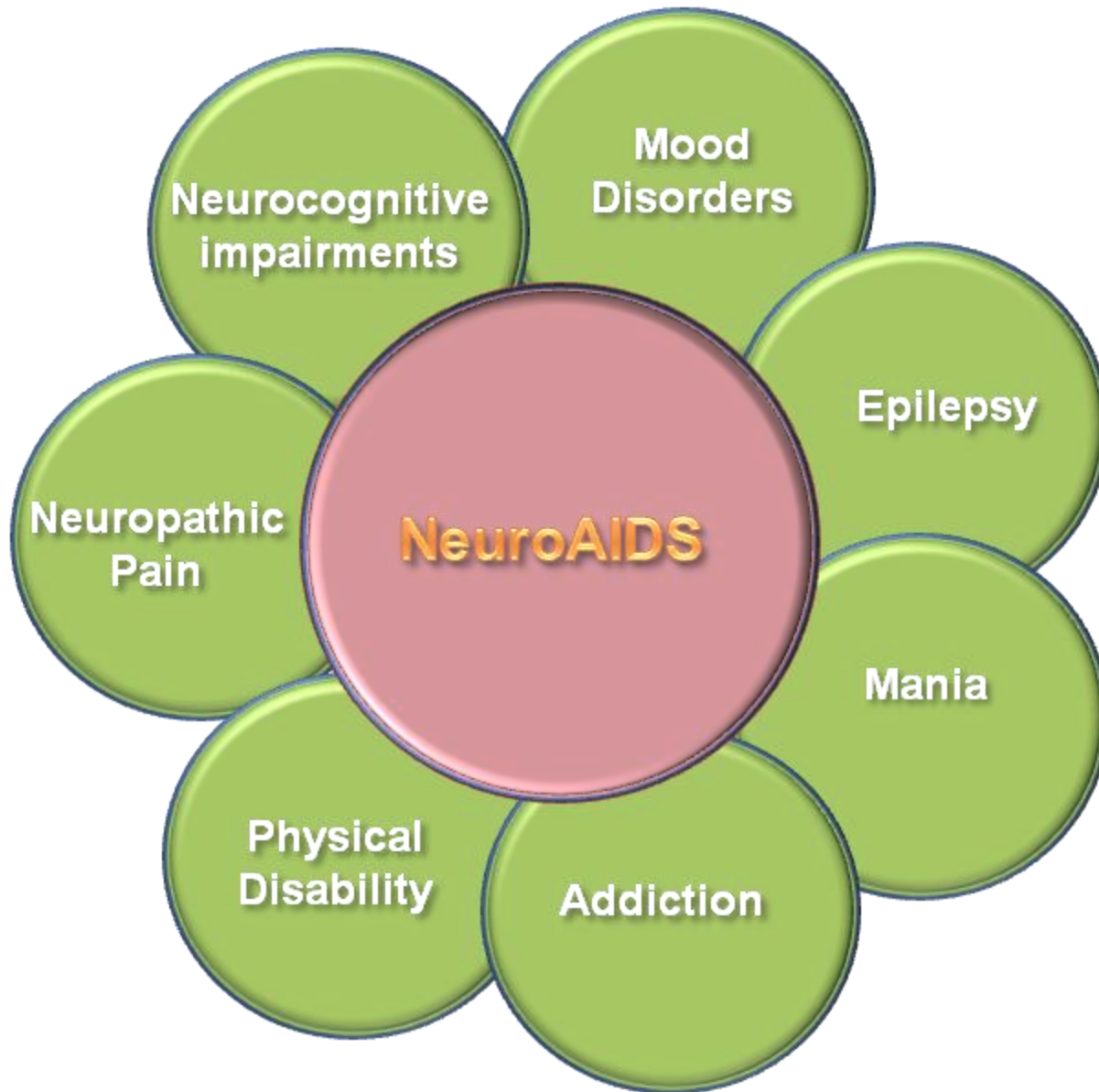


# Neuroaids



## **BACKGROUND**

- NeuroAIDS is the term given to the neurological complications of HIV-infection
- The disease is centered around dysfunction and degeneration of neurons in the CNS that may lead to a number of clinical syndromes involving behavioral, cognitive and motor functions, abnormal evoked potentials and other electrophysiological responses



## ETIOLOGY

- Primary
- Secondary: Opportunistic infections

Tumors

Drug related complications

## **PATHOPHYSIOLOGY**

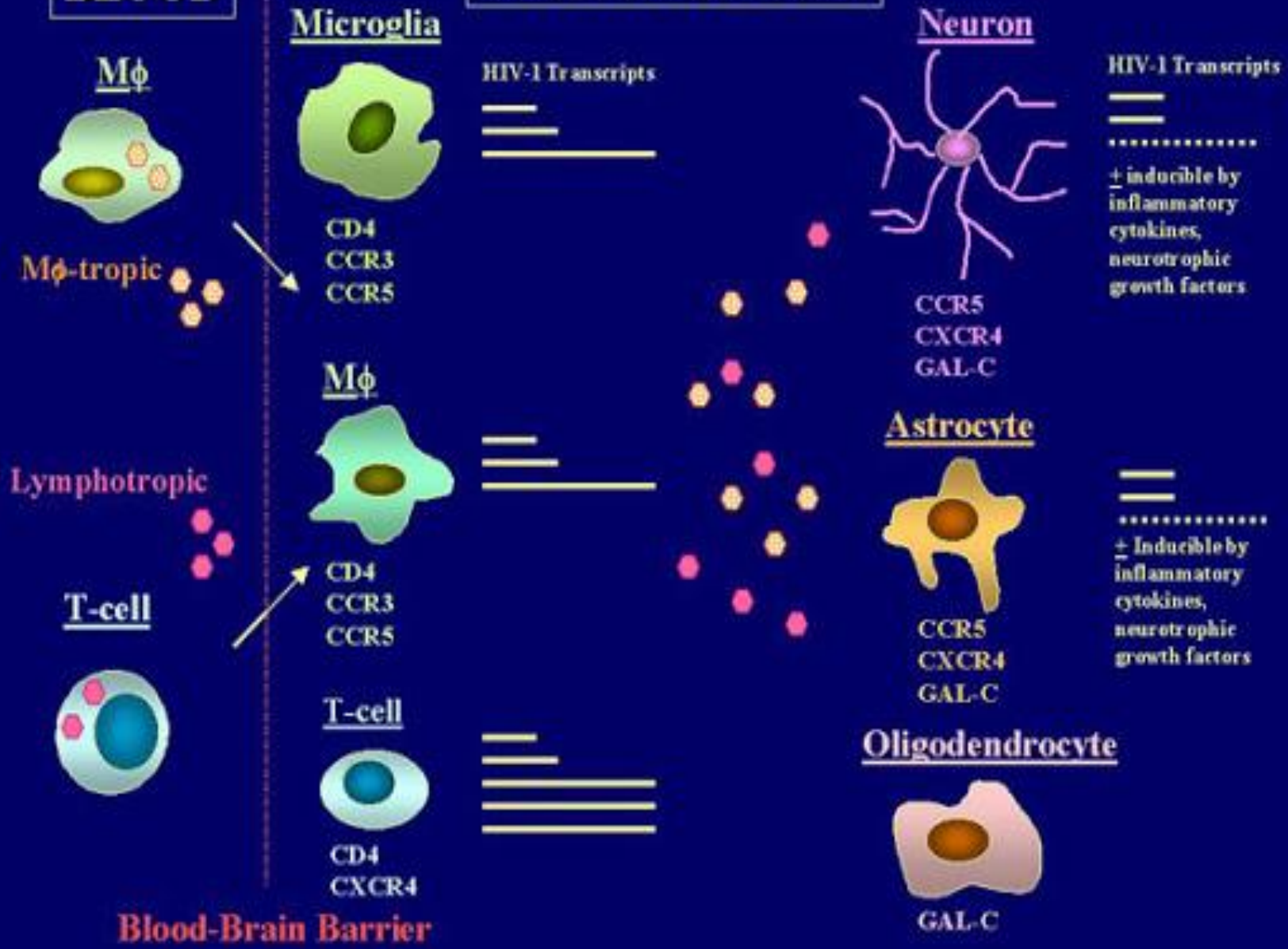
1. NeuroInvasion---The virus does not appear to directly invade nerve cells but it jeopardizes their health and function. Microglia, macrophages and astrocytes are major HIV-1 targets in the brain, whereas HIV-1 infected neurons have been rarely observed

- Virotoxins—Damage to neurons by actions of specific HIV proteins (gp120, gp41, Tat, Nef, Vpr, Rev). They may be directly toxic to neurons or indirectly by activating neural supporting cells to produce cytokines, chemokines

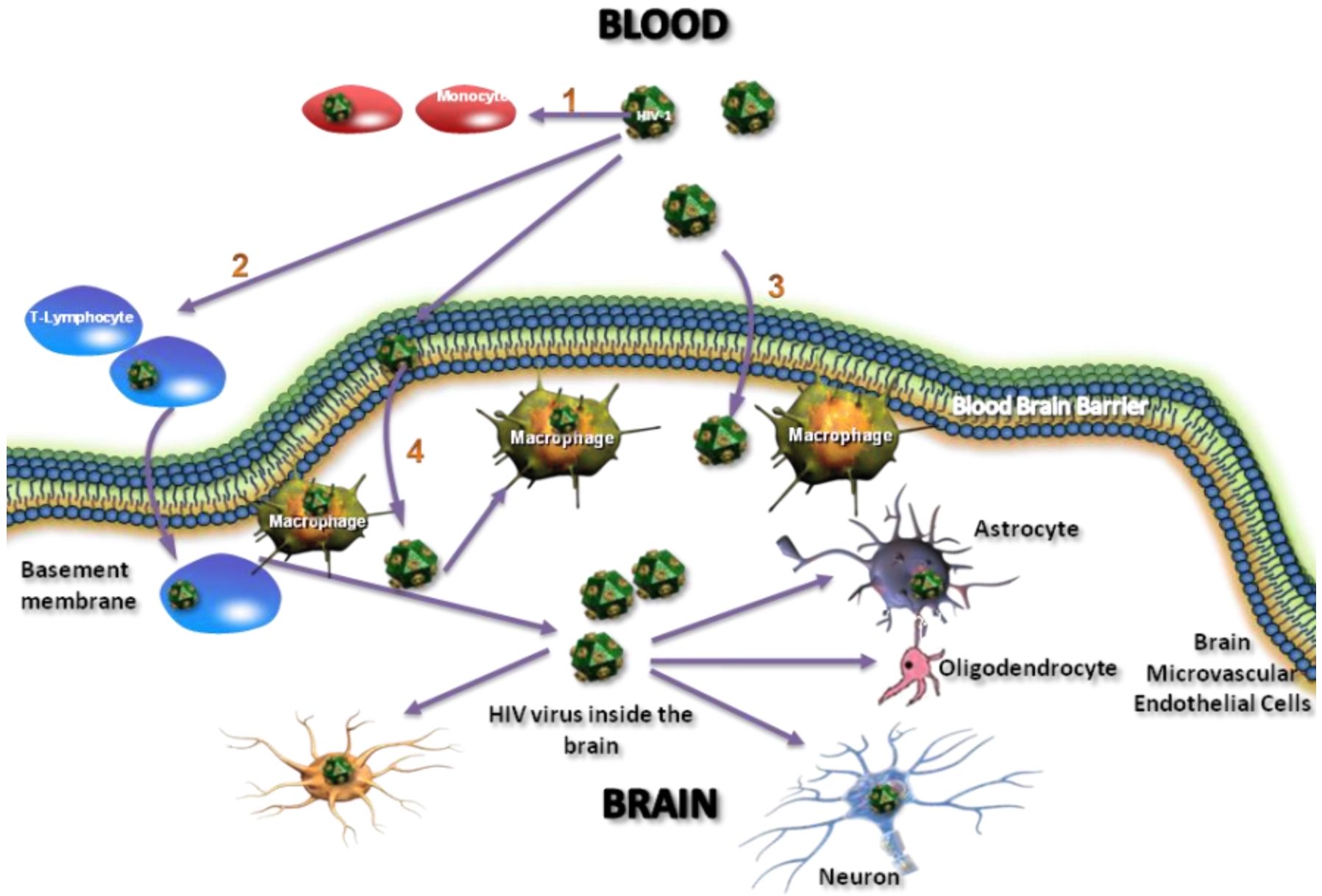
Autoimmune---- CNS damage by humoral immune mechanisms e.g Presence of anti-CNS antibodies in AIDS patients with dementia

# BLOOD

# DEVELOPING CNS

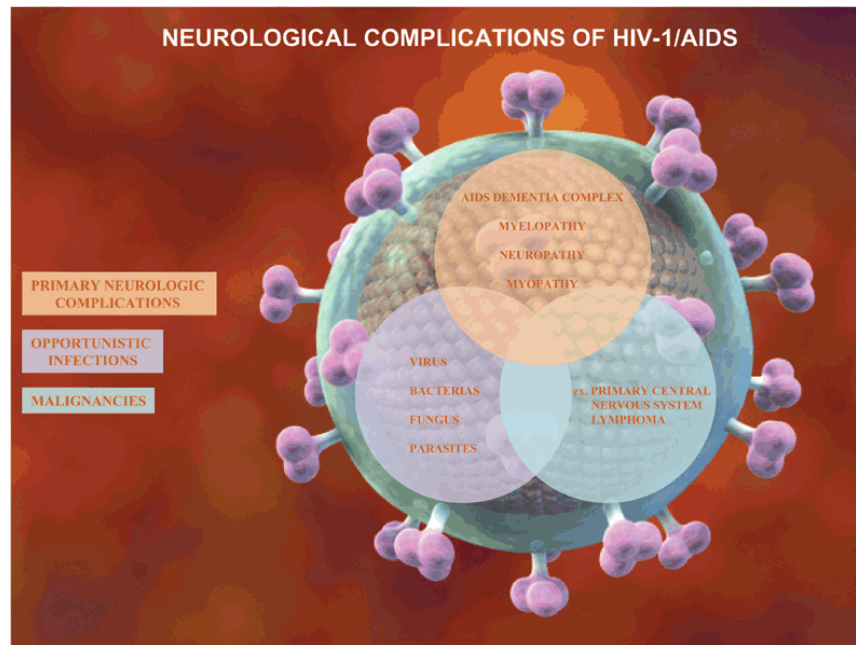






# Clinical Features

- Primary and secondary effect on NS
- Conditions affecting CNS and Conditions affecting PNS



# Conditions affecting CNS and PNS

- | • CNS   | PNS                                  |
|---|--------------------------------------|
| • <b>CNS Toxoplasmosis</b>                          | <b>Distal Sensory Polyneuropathy</b> |
| • <b>Primary CNS Lymphoma</b>                       | <b>Demyelinating Polyneuropathy</b>  |
| • <b>Progressive Multifocal Leukoencephalopathy</b> |                                      |
| • <b>HIV Encephalopathy</b>                         | <b>Mononeuritis Multiplex</b>        |
| • <b>CMV Encephalitis</b>                           | <b>Polyradiculopathy</b>             |
| • <b>Cryptococcosis</b>                             | <b>Myopathy</b>                      |
| • <b>Meningitis</b>                                 |                                      |
| • <b>Neurosyphilis</b>                              |                                      |
| • <b>Tuberculosis Meningitis</b>                    |                                      |
| • <b>Myelopathy</b>                                 |                                      |

# Primary and secondary effects

- Primary effect:
- AIDS dementia: Dementia refers to the deterioration of mental function. ADC typically occurs as CD4 cell counts fall below 200 cells/mm<sup>3</sup>, but there may be Mild Cognitive impairment at earlier stages
- **Staging:** The following clinical staging of ADC was proposed in 1988:
- **Stage 0 (normal):** Mental and motor functions are normal.
- **Stage 0.5 (equivocal/subclinical):** Symptoms may be absent, minimal, or equivocal, with no impairment of work or performance of activities of daily living (ADL). Mild signs, such as slowed eye or extremity movements, may be present. Gait (manner of walking) and strength are normal.
- **Stage 1 (mild):** The person can perform all but the more demanding aspects of work or ADL but has unequivocal evidence of functional, intellectual, or motor impairment. Signs or symptoms may include diminished performance on memory testing. The person can walk without assistance.
- **Stage 2 (moderate):** The person is ambulatory and able to perform basic activities of self-care but cannot work or maintain the more demanding aspects of daily life.
- **Stage 3 (severe):** The person has major intellectual incapacity (cannot follow news or personal events, cannot sustain complex conversation). Walking must be assisted . walking is usually slowed and accompanied by clumsiness of arms.
- **Stage 4 (end stage):** The person is bedridden in a nearly vegetative state with urinary and fecal incontinence. Intellectual and social comprehension and output are at a rudimentary level. The person is nearly or absolutely mute.

- Peripheral neuropathy : damage to sensory nerves in the extremities (feet and hands), is the most common type of HIV-associated neuropathy.
- People with DSP may complain of tingling, burning, or shooting pain on the soles of their feet. The pain slowly advances to the top of the foot and then may envelope the lower leg. As the DSP creeps up the leg to the knee, the fingertips and hands typically become affected. Bladder and bowel control may be affected, as well as the ability to achieve an erection in men.

Vacuolar Myelopathy: is the most common chronic spinal cord condition associated with late-stage HIV disease. People with HIV-associated myelopathy present with chronic progressive and painless leg weakness, stiffness, and imbalance. Sensory loss may be minor. Bowel and bladder control are affected only if the legs are severely weak.

## SECONDARY EFFECTS

- Opportunistic infections of CNS
  - Toxoplasma gondii----- causes encephalitis
  - Cryptogenic meningitis
  
  - Herpes zoster----- causes shingles
  - Neurosyphilis

- Primary CNS lymphoma: Associated with Epstein

Barr virus. HIV-associated primary CNS lymphoma (PCNSL) occurs in the brain, rarely in the spinal cord, and causes brain lesions and changes in mental functioning. The most common clinical symptoms of PCNSL are impaired cognition, aphasia (loss of ability to use or understand language), hemiparesis, and seizures.



## **DIAGNOSIS**

- *Brain imaging* : CT, MRI, Fmri
- *Electromyography*
- *Biopsy*
- Cerebrospinal fluid analysis

# TREATMENT

- TREATMENT
- No single treatment can cure the neurological complications of AIDS. Some disorders require aggressive therapy while others are treated symptomatically.
- Highly Active Anti-Retroviral Drugs
- Pain relief: Analgesics, anti-epileptics
- Anti-inflammatory : Corticosteroids, plasmapheresis
- Antidementia drugs may relieve confusion and slow mental decline
- Antibiotics