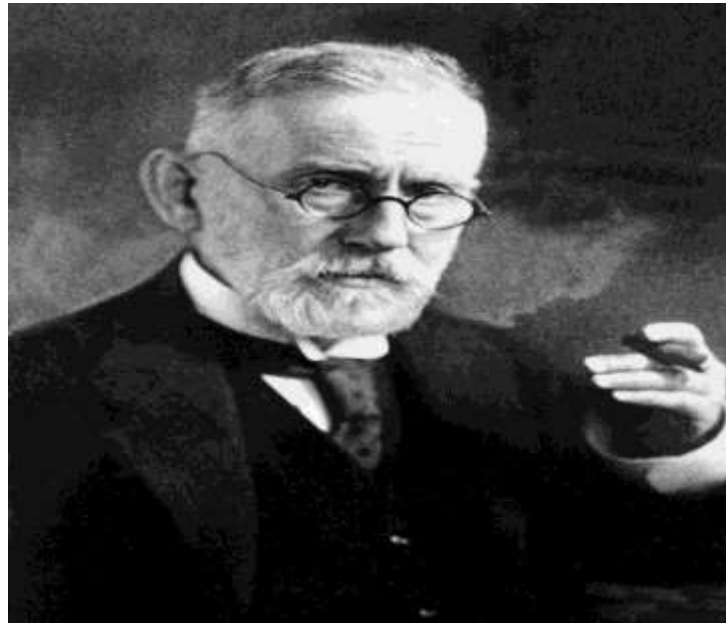


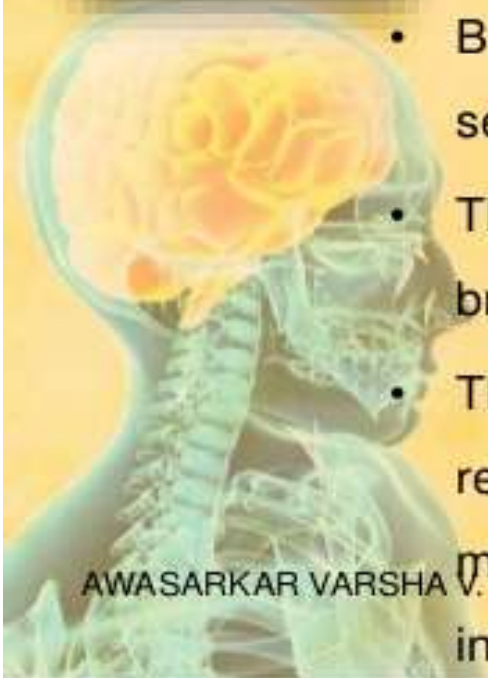
- First described by scientist Paul Ehrlich in 1882.



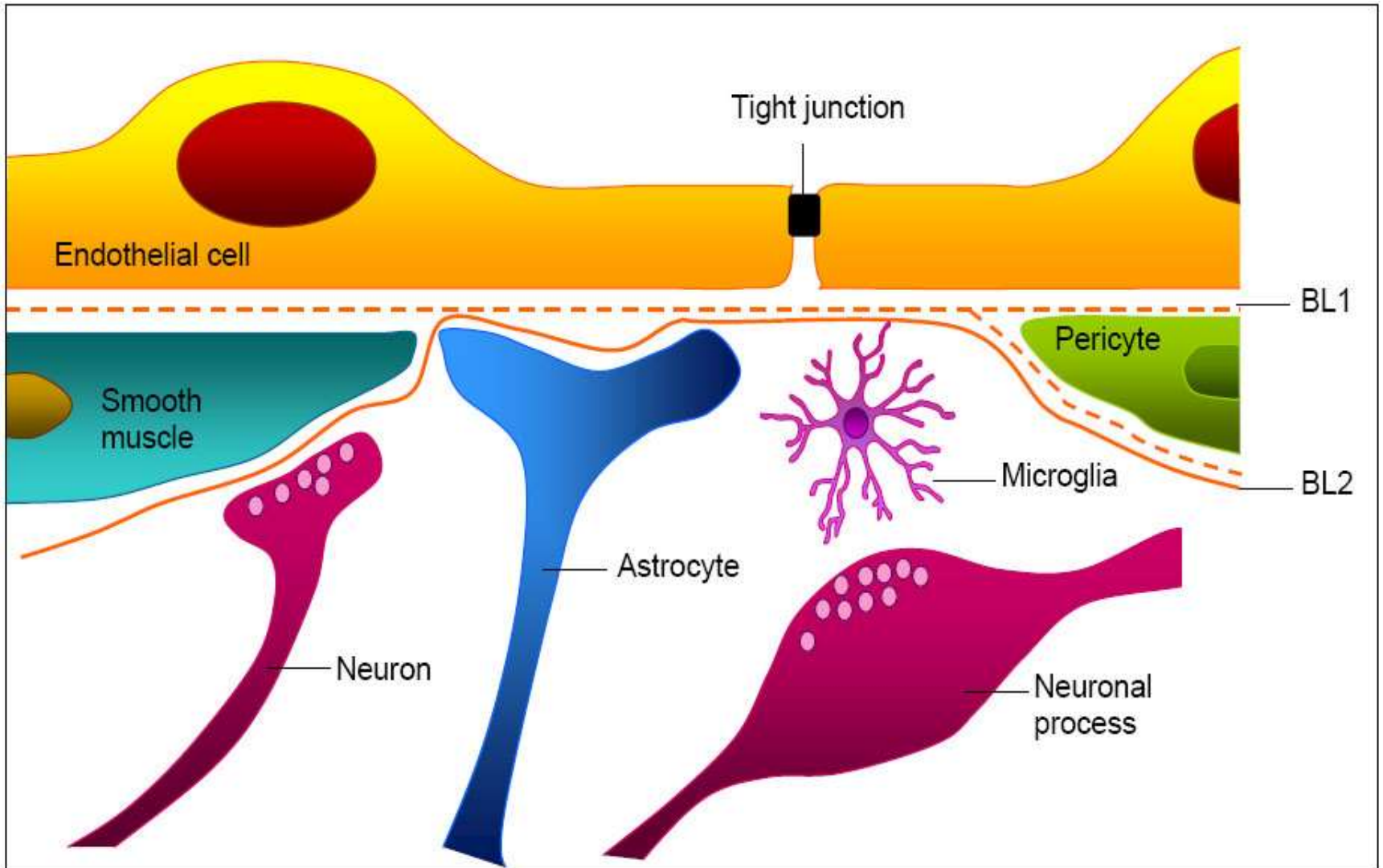
BLOOD-BRAIN BARRIER



- The **blood-brain barrier (BBB)** is a highly selective permeability barrier that separates the circulating blood from the brain extracellular fluid (BECF) in the central nervous system (CNS).
- BBB is a unique membranous barrier that tightly segregates the brain from the circulating blood .
- The blood-brain barrier acts very effectively to protect the brain from many common bacterial infections.
- The blood-brain barrier is composed of high density cells restricting passage of substances from the bloodstream much more than endothelial cells in capillaries elsewhere in the body.



STRUCTURE

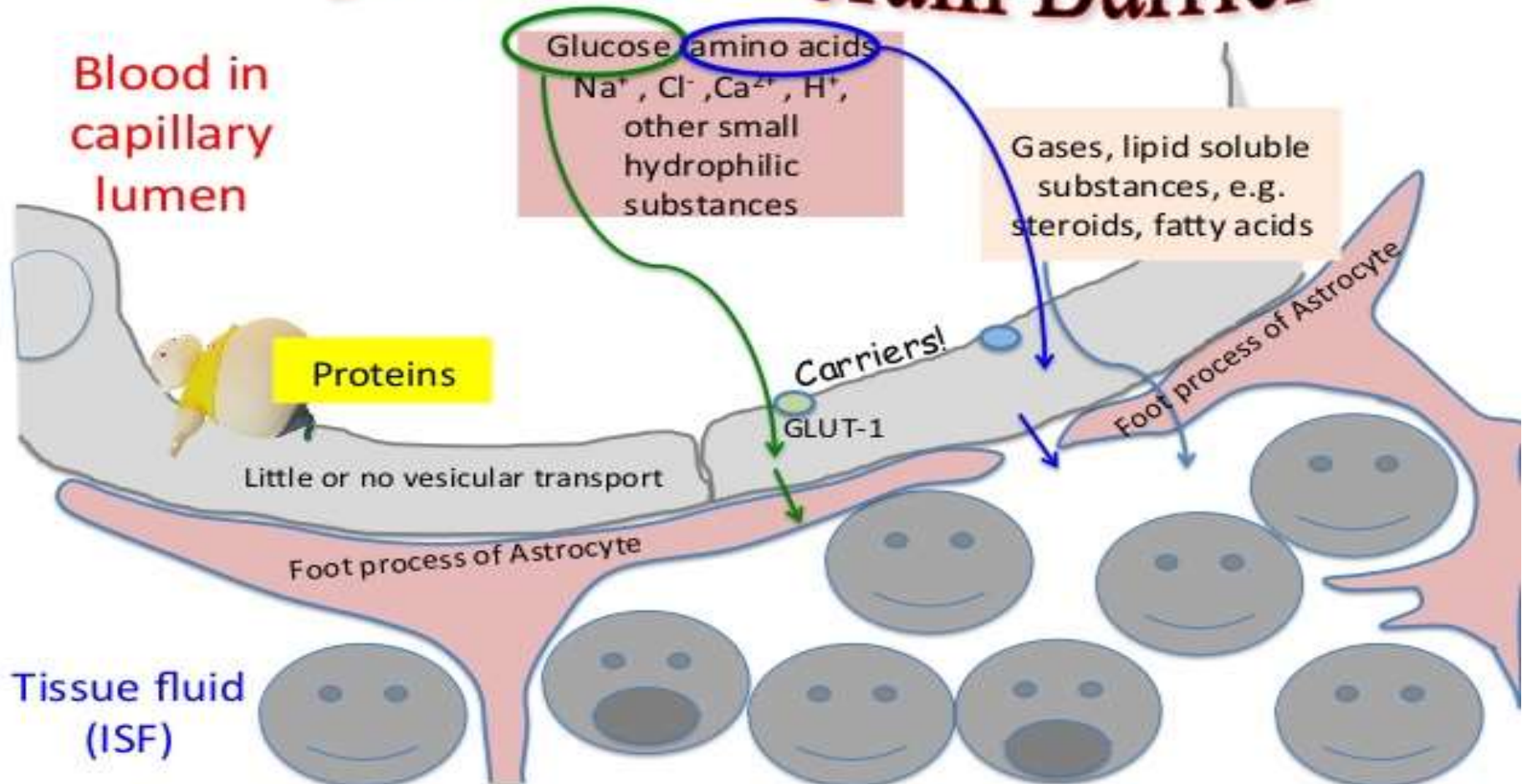


Transport across the BBB

- Freely permeable: Diffusion: Water, CO₂, O₂, free forms of steroid hormones, alcohol and lipid-soluble substances
- Carrier-mediated transport: glucose (by GLUT-1), amino acids, thyroid hormones, several organic acids, choline, nucleic acid precursors,
 - Ions: transport is regulated and limited.
- Practically impermeable: proteins and polypeptides

TRANSPORT ACROSS BBB

The Blood- brain Barrier



FUNCTIONS

1. protection – BBB protects the microenvironment or extracellular environment of CNS from extra fluctuation of blood.
- Also protect CNS from toxins.

2. Stabilizer – it stabilize the internal environment of CNS including blood and brain.

3. Holder – it holds the neurotransmitter within CNS.



BBBB :

BBB Breakdown

The blood—brain barrier tends to break down in areas of infection or injury.

- Brain tumors develop new blood vessels without tight junctions (due to lack of contact with normal astrocytes) → leaky → cerebral edema. The lack of a barrier helps in identifying the location of tumors (allows radioactive substances to get to the site of tumor)
- Temporarily disruption of BBB: by sudden marked increases in blood pressure

DISEASES

- **Meningitis**
- **Brain abscess**
- **Epilepsy**
- **Multiple sclerosis**
- **Neuromyelitis optica**
- **Alzheimer's disease etc...**