Gantenerumab, drug on early-onset Alzheimer's disease

Prelims – *General Science.*

Mains (GS III) – *Achievements of Indians in science & technology.*

Why in News?

A recent study found that gantenerumab, experimental drug reduced the build-up of amyloid plaques one of the hallmarks of Alzheimer's disease in the brain.

Alzheimer's disease

- It is a progressive ***neurodegenerative disorder*** that primarily affects memory and thinking skills, eventually leading to a loss of the ability to perform simple tasks.
- It is the most common cause of dementia, and is characterized by the abnormal buildup of proteins in the brain, forming plaques and tangles that disrupt brain cell function.
- Alzheimer's disease is usually associated with old age. But around 5%-10% of all Alzheimer's cases occur in people under the age of 65.
- **Early-onset Alzheimer's disease** – It progresses more rapidly and often strikes people in the prime of their lives.
- Early-onset Alzheimer's is often linked to genetic mutations in 3 specific genes.
- These mutations cause the brain to produce excessive amounts of amyloid beta, a protein that clumps together to form plaques.
- These plaques disrupt brain function, leading to memory loss.

Gantenerumab

- **Recent Trial -** Gantenerumab is an experimental drug, initially discontinued but has now shown promise in new clinical trials.
- The recent clinical trial was a randomised, placebo-controlled study to evaluate gantenerumab's effects on people with early-onset Alzheimer's.
- Researchers monitored changes in the participants' cognitive abilities, and also used brain imaging and blood biomarkers.
- **Gantenerumab** – It is a type of antibody called a monoclonal antibody, designed to target and remove amyloid plaques in the brain through a subcutaneous administration.
- **Developed by -** Hoffmann-La Roche.
- It works by binding to amyloid plaques, promoting their clearance through a process called phagocytosis, where microglia (brain's immune cells) engulf and remove the plaques.
- The drug works by engaging microglial cells. Microglia constantly monitor the brain for damage and remove harmful substances, including amyloid beta.

- However, in people with Alzheimer’s disease, microglia often fail to clear plaques efficiently.
- Gantenerumab enhances this natural defense mechanism by tagging amyloid plaques, making them easier for the microglia to recognize and break down.

Reference

The Indian Express | Early-onset Alzheimer’s drug