Parkinson's Disease

Source: TH

Why in News?

A recent research has proposed a significant shift in understanding **Parkinson's Disease (PD)** through the **"gut-first hypothesis"**, suggesting a gut-brain connection in its onset and progression.

- The research is significant as it may shift the understanding of the diagnosis, development and treatment of this neurodegenerative disorder.

What are the Key Points of Research?

- The **"gut-first hypothesis"** suggests that PD may begin in the gut, with implications for understanding disease progression and therapeutic strategies.
  - The **gut microbiome** spans from the mouth to the colon. It is the network of microorganisms — bacteria, viruses, fungi and more — and their collective genetic material that lives within the intestinal tract.
  - The research identifies gastrointestinal symptoms, like constipation, as early signs of PD, potentially reshaping diagnosis and treatment approaches.
- Abnormal protein aggregates (Lewy bodies) linked to PD are found in both the gut and brain, indicating a complex interplay in disease development.
  - Lewy bodies are primarily composed of alpha-synuclein, a protein that misfolds and clumps together, contributing to the death of dopamine-producing neurons in the brain.

What is Parkinson's Disease?

- **About:** Parkinson's Disease (PD) is a progressive **neurodegenerative disorder** marked by motor symptoms like tremors, rigidity, **bradykinesia (slow movement)**, and postural instability. Non-motor symptoms include cognitive issues, mental health disorders, sleep disturbances, pain, and sensory problems.
  - **Bradykinesia** means slowness of movement and speed (or progressive hesitations/halts) as movements are continued.
- **Causes:** The exact cause of Parkinson's disease is not fully known yet, but it is believed to involve a combination of genetic and environmental factors**.**
  - It is primarily characterised by the loss of dopamine-producing neurons in the brain, leading to motor and non-motor symptoms.
- **Prevalence:** The global prevalence of PD has doubled in the past 25 years. Global estimates in 2019 showed over 8.5 million individuals with PD.
  - **Every year, 13th April is observed as World Parkinson's Day.**
- **Treatment:** There is no cure for Parkinson disease, but therapies including medicines, surgery and rehabilitation can reduce symptoms.
  - **Levodopa/carbidopa**, a combination medicine that increases the amount of dopamine in the brain, is the most common medication.

What are Neurodegenerative Disorders?

- **About:**
  - Neurodegenerative diseases are conditions that gradually damage and destroy parts of the nervous system, especially areas of the brain.
- **Types:**
  - **Dementia-type diseases:** These cause progressive damage to various areas of your brain, causing neurons in several areas of your brain to die. For example, **Alzheimer's disease**, frontotemporal dementia, chronic traumatic encephalopathy (CTE), Lewy body dementia.
  - **Parkinsonism-type diseases:** It results from damage to specific brain neurons responsible for coordination and muscle control, including Parkinson's disease and similar conditions.
  - **Motor neuron diseases:** These happen when neurons that control movement die off. Examples include **amyotrophic lateral sclerosis**.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims:

Q. Consider the following statements

1. Genetic changes can be introduced in the cells that produce eggs or sperm of a prospective parent.
2. A person's genome can be edited before birth at the early embryonic stage.
3. Human induced pluripotent stem cells can be injected into the embryo of a pig.

Which of the statements given above is/are correct?

(a) 1 only

(b) 2 and 3 only

(c) 2 only

(d) 1, 2 and 3

Ans: (d)

Q. Which one of the following statements best describes the role of B cells and T cells in the human body? (2022)

(a) They protect the body from environmental allergens.

(b) They alleviate the body's pain and inflammation.

(c) They act as immunosuppressants in the body.

(d) They protect the body from diseases caused by pathogens.

Ans: (d)