Z-scan Method for Parkinson's Disease

Why in News

Recently, scientists from IIT (Indian School of Mines) Dhanbad and **CSIR**-Indian Institute of Chemical Biology (Kolkata) have developed the **Z-scan method** to monitor the **origin as well as the progression of Parkinson's disease** in human beings.

Parkinson's Disease

- Parkinson's disease is a chronic, degenerative neurological disorder that **affects the central nervous system.**
- It **damages nerve cells** in the brain **dropping** the levels of **dopamine.** Dopamine is a chemical that sends behavioural signals from the brain to the body.
- The disease causes a variety of "motor" symptoms (symptoms related to movement of the muscles), including rigidity, delayed movement, poor balance, and tremors.
- Medication can help control the symptoms of the disease but **it can't be cured.**
- It affects the age group from **6 to 60 years. Worldwide,** about **10 million people** have been affected by this disease.

Key Points

- **Aggregation of ASyn:**
    - An aggregation of a protein called **Alpha-synuclein (ASyn)** plays a crucial role in the development of Parkinson's disease.
        Protein aggregation is a biological phenomenon in which destabilized proteins aggregate (i.e., accumulate and clump together) leading to many diseases.
    - Alpha-synuclein is a protein found in the human brain, while smaller amounts are found in the heart, muscle and other tissues.
        - In the brain, alpha-synuclein is found mainly at the tips of neurons in specialized structures called presynaptic terminals.
        - Presynaptic terminals release chemical messengers, called neurotransmitters.
        - The release of neurotransmitters relays signals between neurons and is critical for normal brain function.
- **Use of Z-scan Method:**
    - The discovered Z-scan method is expected to help in **monitoring both the early as well as late stages of the aggregation of ASyn and death of neuronal cells.**
    - Until now, worldwide studies could not establish any strong relation between ASyn aggregations and subsequent death of neuronal cells observed in Parkinson's disease.

CSIR-Indian Institute of Chemical Biology

- Indian Institute of Chemical Biology (IICB) was established in **1935 as the first non official centre in India** for **biomedical research** and was included within the aegis of Council of Scientific and Industrial Research (CSIR) in 1956.
- It is located in **Kolkata (West Bengal).**
- CSIR-IICB is engaged in research on diseases of national importance and biological problems of global interest and also helps to maintain momentum in life science research.
- It conducts research in a variety of areas including chemistry, biochemistry, cell biology, molecular biology, neurobiology and immunology which promotes productive interdisciplinary interaction.

Source:PIB