PARKINSON'S DISEASE : SCIENCE & TECHNOLOGY

NEWS : New smart sensor for adjusting drug dosage to manage Parkinson's Disease

WHAT'S IN THE NEWS?

Portable Smartphone-Based Sensor for Parkinson's Disease Management

Purpose: Developed to manage Parkinson's disease by accurately detecting L-dopa concentration in the body, ensuring proper dosage.

Parkinson's Disease:

- Characterized by the progressive loss of neuron cells, leading to reduced dopamine levels.
- L-dopa, converted to dopamine in the body, acts as an anti-Parkinson's drug, compensating for dopamine deficiency.

L-dopa Dosage Importance:

- Correct dosage keeps the disease manageable.
- Excessive L-dopa can cause side effects (e.g., dyskinesia, gastritis, psychosis).
- Insufficient L-dopa can lead to the return of Parkinson's symptoms.

Sensor Development:

- Developed by IASST, an autonomous institute under the Department of Science and Technology.
- The sensor is a portable, smartphone-based system using fluorescence turn-on mechanism.
- It detects low levels of L-dopa in biological fluids (blood plasma, sweat, urine).

Technical Details:

- Sensor constructed using a silk-fibroin protein nano-layer coated on reduced graphene oxide nanoparticles.
- Forms core-shell graphene-based quantum dots with strong photoluminescence for detecting L-dopa.
- Detects L-dopa within a range of 5 µM to 35 µM, with detection limits as low as 93.81 nM to 104.04 nM.

Functionality:

- A smartphone-based device with a 365nm LED, powered by a 5V charger, is used in a dark chamber.
- Visual color changes during detection are captured with a smartphone camera.
- RGB values from images are analyzed via a mobile app to determine L-dopa concentration.

Significance:

- Provides a simple, cost-effective, and rapid tool for L-dopa detection, crucial for on-spot analysis in remote areas lacking advanced equipment.

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