

## Science & Technology

### Can AI Detect Parkinson's Disease

**Context:** A groundbreaking study by University College London and University Medical Center Goettingen, published in Nature Communications, introduces a new blood test capable of detecting Parkinson's disease approximately seven years before symptoms appear.

- ❖ This innovative test leverages artificial intelligence (AI) to identify specific markers in the blood, representing a significant advance in early disease detection and treatment.



### Current Diagnostic Practices for Parkinson's Disease

- ❖ Currently, diagnosing Parkinson's disease involves a combination of neurological assessments, patient medical history, and clinical evaluations. Imaging tests, such as the DaTscan, are also employed to assist in diagnosis.

- ❖ Despite these methods, there remains a significant need for biological markers that can predict the disease, facilitating faster and more accurate diagnosis.

### Understanding the Study and Its Findings

- ❖ The research focused on individuals with Rapid Eye Movement Sleep Behavior Disorder (iRBD), a condition where individuals act out their dreams.
- ❖ Approximately 75% to 80% of those with iRBD will develop synucleinopathies, such as Parkinson's, which are diseases characterized by an accumulation of alpha-synuclein protein in the brain. Utilizing a machine-learning tool, the test identified 79% of iRBD patients with biomarker profiles indicative of Parkinson's.
- ❖ The AI analyzed eight blood-based markers and accurately predicted that 16 individuals would develop Parkinson's disease seven years before clinical diagnosis. Follow-up studies confirmed the test's validity.

## Ancient Pearl City Tu'am Discovered in UAE

**Context:** Archaeologists have unearthed the remains of the ancient city of Tu'am on Siniyah Island in the UAE. This city, once renowned for its thriving pearl trade, had long been shrouded in mystery due to its uncertain location.

- ❖ Recent excavations by the Italian Archaeological Mission in Umm al-Quwain uncovered ancient homes, reinforcing the identification of Siniyah Island as the true site of Tu'am.



### Historical Context of Tu'am

- ❖ Evidence indicates that Tu'am was a significant city as early as the fourth century, reaching its peak in the sixth century.

- ❖ The city was a major center for the pearl trade, which bolstered its economy and regional fame.
- ❖ Historical records often describe Tu'am as a coastal city renowned for pearl fishing. However, the city eventually declined due to regional unrest and the devastating bubonic plague.

### Archaeological Significance of the Findings

- ❖ The discovery of densely packed ancient homes on Siniyah Island confirms the existence and accurate location of Tu'am.
- ❖ These findings align with descriptions found in early Islamic geography texts, establishing the site as the largest town of its era found on the Gulf coast of the Emirates.
- ❖ Additionally, the site reveals a Christian monastery dating from the late sixth to early seventh centuries and a historically significant pearling town, indicating a large and diverse community.

## International Relation

### India-Italy Friendship

**Context:** The friendship between India and Italy has significantly improved recently, bolstered by high-level engagements, including visits from the leaders of both nations. A notable event in this regard was the India Forum 2024 held in Rome, where the Indo-Mediterranean Initiative (IMI) was introduced to further enhance these ties.



### Indo-Mediterranean Initiative (IMI)

- ❖ The IMI was officially launched at the India Forum 2024, with the objective of fostering and promoting the growing relationship between India and Italy.
- ❖ Spearheaded by Senator Giulio Terzi di Sant'Agata, the initiative aims to focus on strategic economic and geopolitical partnerships, including the India-Middle East-Europe Economic Corridor (IMEC).

### Significance of the India-Middle East-Europe Economic Corridor (IMEC)

- ❖ The IMEC was first discussed during the G20 meeting in New Delhi in September 2023. This ambitious economic project aims to connect India, the Middle East, and Europe.
- ❖ Senator Terzi highlighted IMEC's transformative potential, emphasizing that it extends beyond mere infrastructure development.

## Defence

### Hindustan Aeronautics Limited Secures Contract for Combat Helicopters

**Context:** Hindustan Aeronautics Limited (HAL), a prominent Indian state-owned aerospace and defense company, has been awarded an unprecedented contract worth approximately Rs 50,000 crore by the UK Ministry of Defence.

- ❖ This contract represents the largest single helicopter order ever placed with an Indian company, designated for the procurement of Light Combat Helicopters (LCH), known as "Prachand."



### Specifications of the LCH

- ❖ The Prachand helicopters have been designed to perform optimally in Indian terrains. During test flights in Ladakh, these helicopters demonstrated exceptional performance at high altitudes.
- ❖ They are equipped with advanced weaponry suitable for a variety of missions, including:

- Combat Search and Rescue (CSAR)
  - Destruction of Enemy Air Defense (DEAD)
  - Counter Insurgency (CI)
- ❖ Additionally, the LCHs are capable of engaging slow-moving aircraft and Remotely Piloted Aircraft (RPAs), ensuring operational effectiveness in diverse weather conditions and terrains.



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