

SHORTNEWS

1.TERBIUM

Context: Scientists at the **Indian Institute of Science (IISc), Bengaluru**, have developed a **glowing paper sensor** that can help detect **liver cancer**.

- The sensor detects **β -glucuronidase**, an enzyme found in many living organisms using the fluorescence of a **rare earth metal – terbium**.

About Terbium

- **Terbium** is a silvery-white metal that is fairly hard and stays stable in air, even at high temperatures, because it forms a protective dark oxide layer on its surface.
- It reacts easily with diluted acids but **doesn't dissolve in hydrofluoric acid**. This is because the acid forms a protective layer that stops further reaction.
- Terbium is found in small amounts in rare-earth minerals like **bastnasite** and **ion-exchange clays**, and also in nuclear waste.
- It is **one of the rarest rare earth metals** found on Earth—about as rare as **thallium**.
- Terbium is mainly used to make **green light** in devices such as **fluorescent lamps**, **TVs**, and **computer monitors**.

What are Rare Earth elements ?

- Rare Earth Elements are a group of **17 elements** — made up of **15 lanthanides**, plus **scandium** and **yttrium**.
- They have **similar properties** like **high density** and **excellent conductivity**.
- Despite their name, these elements are **not truly rare** — they are **fairly abundant** in Earth's crust.
- However, they are **rarely found in concentrated deposits**, which makes **mining them economically challenging**.

2.WHOLE GENOME SEQUENCING OF ANCIENT EGYPTIAN

Context: For the first time, researchers have successfully sequenced the whole genome of an ancient Egyptian individual over 4,500 years old.

About the Sequencing

- The DNA belongs to a male from **Egypt's Old Kingdom (3rd–4th dynasties)** and is the oldest, most complete genome from Ancient Egypt.
- The body, buried in a **pottery vessel at Nuwayrat** in Cairo, Egypt, was well-preserved due to stable burial conditions in a rock-cut tomb.
- DNA was extracted from the **tooth root tips**, enhancing its preservation despite Egypt's warm climate.

Scientific Significance

- **Unprecedented DNA Recovery:** This genome is the first full ancient Egyptian sequence, surpassing previous **partial datasets from later periods (787 BCE–23 CE)**.

- **Preservation Breakthrough:** Whole-genome sequencing from hot regions like Egypt is rare; most ancient DNA studies are from colder climates like Europe and Siberia.

Cultural Significance

- **Ancestral Links:** About 78% of the man's ancestry traces to North African Neolithic populations, while 22% links to early Mesopotamian farmers.
- **Cross-Regional Interaction:** The findings provide biological proof of cultural exchanges and migrations between Egypt and the Eastern Fertile Crescent over 10,000 years ago, shaping early farming, trade, and writing systems.
- **Historical Connectivity:** Supports theories of long-distance genetic and cultural interactions far before the pyramid era.

3.C-FLOOD

Context: Union Minister of Jal Shakti inaugurates **C-FLOOD, a Unified Inundation Forecasting System.**

- The project marks a transformative step towards **strengthening India's flood management and disaster response framework.**

About C-FLOOD

- C-FLOOD is a web-based platform that provides **two-days advance inundation forecasts** up to village level in the form of **flood inundation maps and water level predictions.**
- The platform will act as **a unified system integrating flood modelling outputs from national and regional agencies**, offering **a comprehensive decision-support tool for disaster management authorities.**
- It uses advanced **2-D hydrodynamic modelling** to simulate flood scenarios and Inundation forecasts will be integrated into the **National Disaster Management Emergency Response Portal (NDEM).**
- **Co- Developed by:**
 - the Centre for Development of Advanced Computing (C-DAC), Pune
 - Central Water Commission (CWC) and
 - National Remote Sensing Centre (NRSC) under the National Hydrology Project (NHP).
- **Execution:** under the **National Supercomputing Mission (NSM).**
- **Present Coverage:** **Mahanadi, Godavari, and Tapi** river basins (more river basins to be incorporated in the future).