1. **World's First Malaria Vaccine (RTS,S) :** Recently, Bharat Biotech International Ltd. and GSK plc announced a landmark decision to reduce the price of the world's first malaria vaccine, RTS,S, by over 50% by 2028.
   - **About RTS,S :** Also known as **Mosquirix**, is the world's first and only malaria vaccine shown to significantly reduce malaria in children.
     - **Scientific basis**: RTS,S is the technical name denoting the vaccine's composition; it is designed to stimulate the immune system against malaria.
     - **Mode of action**:Targets the early stage of malaria infection.
       - ✓ Prevents the malaria parasite from infecting liver cells after entering the bloodstream through a mosquito bite.
     - **Efficacy (clinical trials)**: Prevents about **40% of malaria cases** and reduces **30% of life-threatening severe malaria cases** in children.
   - **World Health Organization (WHO)** recently prequalified a second malaria vaccine—**R21/Matrix-M**, developed by the University of Oxford and Serum Institute of India
2. **Periyar Tiger Reserve (PTR) :** Recently, a herpetofauna survey conducted in the **Periyar Tiger Reserve (PTR)** led to the discovery of five new species of amphibians and three new species of reptiles, highlighting the region's remarkable biodiversity.
   - **About PTR :** Located in Idukki district, central Kerala, along the Tamil Nadu border.
     - **Geography**: Situated in the **Cardamom and Pandalam Hills** of the Western Ghats.
     - **Area**: Covers around **777 sq. km**, established in **1982**.
     - **Periyar Lake**: Formed in **1895** after the construction of a dam on the Periyar River to divert water to Tamil Nadu.
     - **Elevation**: Hilly terrain with **Kottamala (2016 m)** being the highest peak.
     - **Rivers**: Acts as a watershed for both the **Periyar and Pamba rivers**.
     - **Dam**: The **Mullaperiyar Dam** lies within the reserve.
     - **Tribes**: Inhabited by indigenous groups like the **Mannans** and **Palians**.
     - **Flora**: Rich in species like teak, rosewood, tamarind, jamun, mango, bamboo, and more.
     - **Mammals**: Home to **tigers, elephants, wild pigs, sambar, gaur, barking deer**, Indian wild dogs, and mouse deer.

- **Primates**: Hosts five species including the **rare lion-tailed macaque, Nilgiri langur**, and **bonnet macaque**
- **Birds**: Over **260 species**, including the **great hornbill** and **Malabar grey hornbill**.
- **Other Species**: Possible habitat for the **elusive Nilgiri Tahr**.

3. **Small Modular Reactor (SMR):** Recently, Bihar marked a significant step towards energy self-sufficiency as the Centre approved its first nuclear power plant.
   - Announcing the development at a regional energy ministers' meeting, the Union Power Minister revealed that the project will be based on a Small Modular Reactor (SMR) technology.

- **About SMR :** Compact nuclear reactors designed to produce a maximum of **300 Megawatt electric (MWe)**, generating approximately **7.2 million kilowatt-hours (kWh) per day**.
  - In contrast, **conventional large-scale nuclear plants** produce over **1,000 MWe**, with a daily output of around **24 million kWh**.
  - **Key Characteristics**: SMRs are engineered to deliver **low-carbon electricity** efficiently and are defined by three main features:
    - ✓ **Small**: Physically much smaller than traditional nuclear reactors.
    - ✓ **Modular**: Designed for **factory assembly**, enabling easier transport and on-site installation.
    - ✓ **Reactors**: Operate on the principle of **nuclear fission** to produce energy through heat.
  - **Advantages of SMRs**: Provide strong non-proliferation and safeguard measures.
  - **Multi-Purpose Utility**: Generate electricity, supply industrial heat, enable district heating and support hydrogen production

4. **Lenacapavir (LEN)** : The U.S. Food and Drug Administration (FDA) has recently given its approval to Lenacapavir (LEN), a groundbreaking HIV prevention drug hailed as one of the most effective solutions developed to date.

- **About LEN :** An **antiretroviral drug** used for **HIV prevention** under the strategy of **Pre-Exposure Prophylaxis (PrEP)**.
  - **PurEfficacy**: Clinical studies have shown that Lenacapavir can prevent up to **99.9% of HIV transmissions**.

- **Dosage**: As preventive dose: PrEP is intended for individuals who are HIV-negative but at high risk of infection, significantly reducing their chances of contracting the virus.
- a **twice-yearly injection**, making it a convenient and discreet option compared to daily oral pills.
- **Developer**: Manufactured by **Gilead Sciences** and marketed under the brand name **Yeztugo**
- **Mechanism**: Lenacapavir is a **capsid inhibitor**, meaning it blocks the HIV virus's **protein shell (capsid)**, which is essential for the virus to replicate and spread in the body.
- **Innovation**: Its **long-acting injectable form** offers a new level of convenience, compliance, and privacy in HIV prevention strategies.

5. **International Potato Center (CIP) :** Recently, the Government of India approved the establishment of the South Asia Regional Centre (CSARC) of the **International Potato Center (CIP)** in Singna, Agra (Uttar Pradesh).
   - This significant move aims to strengthen agricultural research, promote climate-resilient farming, enhance food security, and boost farmer incomes across South Asia.

- **About CIP :** Established in **1971**, the International Potato Center (CIP) is a **research-for-development** organization. (**HQ : Lima, Peru**)
  - Focuses on **potato, sweet potato**, and **Andean root and tuber crops**
  - Has a **research presence in over 20 countries** across **Africa, Asia**, and **Latin America**.
- **Key Highlights :** The centre will benefit **farmers in India** (especially from **Uttar Pradesh, Bihar, West Bengal**) and serve **other South Asian countries**.
  - **Primary Objectives:** Enhance food and nutrition security, boost farmers' income and job creation , improve productivity, post-harvest management, and value addition of potato and sweet potato.
    - ✓ Develop **climate-resilient, disease-free, and processing-friendly varieties**.
- **Significance of Potato Sector:** India is the **world's 2nd largest producer and consumer** of potatoes.
  - This will be India's **second major international agri-research centre** after **IRRI-SARC** (International Rice Research Institute - South Asia Regional Centre), established in **Varanasi (2017)**.



6. **Himalayan Brown Bear:** Recently, a **rare sighting** of the **Himalayan brown bear**, reportedly with its family, was recorded in the **Nelong and Jadung Valleys** within **Gangotri National Park**, Uttarakhand.
   - The sighting has generated significant excitement among wildlife experts and conservationists.

- **About Himalayan Brown Bear : Scientific Name**: Ursus arctos isabellinus
  - Also known as the **Himalayan Red Bear**, **Isabelline Bear**, or **Denmo** (in Ladakhi).
  - One of the **oldest lineages of brown bears**, believed by some to have inspired the **Yeti (Abominable Snowman)** legend due to its upright walking ability.
  - **Largest mammal** in the high-altitude Himalayan ecosystem.
  - **Habitat & Distribution:** Found in the **northwestern and central Himalayas**, including regions of: **India**, **Pakistan**, **Nepal**, **Tibet (China)**, and **Bhutan**.
    - ✓ Lives **above the timberline**, at elevations between **3,000 and 5,500 metres**.
    - ✓ In India, small isolated populations exist in: **Jammu & Kashmir**, **Himachal Pradesh**, and **Uttarakhand**.
  - **Omnivorous**: Eats grasses, roots, bulbs, insects, and small mammals like marmots and pikas.
  - **Solitary** by nature, except during mating season or between mother and cubs.

7. **Sea Turtle :** Recently, a landmark study published in Science Advances has raised serious concerns about the future of **sea turtle** populations.

- **Major Findings from the Study:** Over **50% of current sea turtle habitats** may disappear by 2050 due to climate change-induced ocean warming.
  - Sea turtles are moving toward **cooler waters** outside **Marine Protected Areas (MPAs)**, exposing them to high-risk **shipping zones**.
  - The study is based on **27,703 sea turtle sightings** and over **1 billion ship locations**.
  - **Rising Threats:** New turtle habitats such as the **North Sea**, **Mediterranean**, **East China Sea**, and near the **Galápagos Islands** face **heavy ship traffic**, increasing the risk of **vessel strikes**.
  - Shipping traffic is projected to grow by 1,200% by 2050, compounding the threat.

- Although the study is global in scope, it holds particular relevance for **India**, which is home to key turtle nesting beaches like **Gahirmatha (Odisha)**, **Chennai (Tamil Nadu)**, and **Andaman & Nicobar Islands**.
  - The **olive ridley sea turtles**, known for their mass nesting events (arribadas), are particularly vulnerable to shifting ocean currents and rising sea surface temperatures.

8. **Kounis Syndrome**: Recently, the death of a prominent Indian industrialist following a **bee sting** has drawn public attention to **Kounis Syndrome**.
   - **About Kounis Syndrome:** A **rare medical condition** in which an **allergic or hypersensitivity reaction** leads to **acute coronary syndrome (ACS)**, such as angina or heart attack.
     - Also referred to as **"allergic angina"** or **"allergic myocardial infarction."**
     - The allergic response activates **mast cells**, which release inflammatory chemicals like **histamine and cytokines**.
     - These substances can cause: **Spasms or narrowing** of coronary arteries.
       - ✓ **Plaque rupture** in patients with underlying heart disease.
       - ✓ Reduced **blood flow to the heart**, resulting in **ischemia** (oxygen shortage) or **infarction** (tissue damage).
     - Triggered by various allergens, including **insect stings or bites** (like bees and wasps), **certain medications** (especially antibiotics and NSAIDs), **specific foods** (such as nuts, shellfish, and kiwi), **environmental allergens** (like latex or contrast dyes), and **underlying conditions** such as **mastocytosis**, which involves an excess of mast cells.
   - **Types of Kounis Syndrome: Type I**: Occurs in people with **normal coronary arteries**; allergic reactions cause artery spasms, possibly leading to a heart attack.
     - **Type II**: Affects those with **pre-existing coronary artery disease**; allergic reactions can cause **plaque rupture** and a **full-blown heart attack**.
     - **Type III**: Seen in patients with **coronary stents**; allergic triggers may lead to **clot formation inside the stent**.
   - **Treatment** : Allergic reaction with **antihistamines, corticosteroids, and epinephrine (if severe)**, alongside standard cardiac care such as **oxygen therapy, nitrates for chest pain, and blood thinners or antiplatelet drugs** to restore proper heart function.