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10 May, 2024

West Nile fever

Context: *On Tuesday (May 7), the Kerala government announced that instances of West Nile fever have been identified in three districts of the state: Thrissur, Malappuram, and Kozhikode.*

What is West Nile Virus?

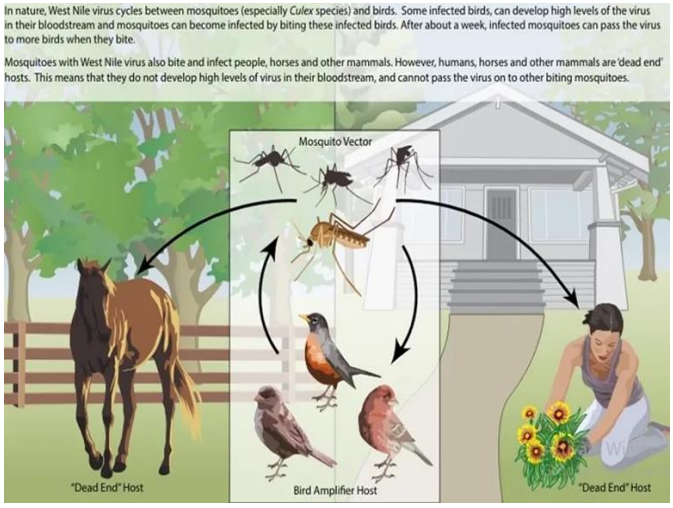
- West Nile Virus (WNV) is transmitted through mosquito bites.
- Most infected individuals are asymptomatic, but about 1 in 5 develop symptoms resembling flu, known as West Nile fever.
- In rare cases, the virus can lead to severe neurological conditions like encephalitis or meningitis.

Prevalence of West Nile Virus:

- WNV is found globally in regions including North America, Europe, Africa, the Middle East, Australia, and Asia.
- It's the most common mosquito-borne virus in the United States, with cases reported in 49 states since 1999.
- Over 51,000 symptomatic cases have been reported in the U.S. since its first appearance.

Transmission of West Nile Virus:

- Culex mosquitoes are the primary vectors, transmitting the virus among humans and animals, particularly birds.
- Mosquitoes become infected by feeding on infected birds and subsequently transmit the virus through bites.
- Transmission can also occur through blood transfusion, mother-to-child transmission, or laboratory exposure.



Symptoms of West Nile Fever:

- 80% of infected individuals show no symptoms.
- Symptoms of West Nile fever include fever, headache, fatigue, body aches, nausea, rash, and swollen glands.
- Severe cases can result in permanent neurological effects and may be fatal, especially in immunocompromised individuals.

Treatment and Prevention:

- There's no specific treatment or vaccine for WNV; supportive care is provided for severe cases.
- Personal protective measures such as mosquito repellents are recommended to reduce the risk of mosquito bites.
- Public health efforts focus on larval source reduction and surveillance of mosquito vectors.

Origin and Spread:

- WNV was first isolated in Uganda in 1937 and identified in birds in the Nile delta region in 1953.
- The virus spread to North America in 1999, causing a large outbreak.
- Today, WNV is found commonly along major bird migratory routes in Africa, Europe, the Middle East, North America, and West Asia.

West Nile Virus in India:

- WNV antibodies were detected in Mumbai in 1952, and virus activity has been reported in southern, central, and western India.
- WNV has been isolated from mosquitoes and humans in various states, including Andhra Pradesh, Tamil Nadu, Maharashtra, and Karnataka.

Dietary Guidelines for India 2024

Context: *The Indian Council of Medical Research (ICMR) has issued new dietary guidelines, cautioning that the nutritional information displayed on packaged food items may be deceptive.*

Misleading Health Claims on Packaged Foods:

- The Indian Council of Medical Research (ICMR) and the National Institute of Nutrition (NIN) warn against deceptive health claims on packaged foods.
- Examples include "sugar-free" foods, which may contain hidden fats, refined cereals, and sugars, potentially leading to high glycemic index and calorie content.
- Products labeled as "all-natural" could contain added flavours or substances despite minimal processing.
- Claims regarding nutrient proportions in single servings should be evaluated in relation to daily requirements.

Organic Food Labelling Guidelines:

- Not all organic food claims may be accurate; labels stating "organic" should meet criteria set by the Food Safety and Standards Authority of India (FSSAI).
- The "Jaivik Bharat" logo indicates adherence to organic standards regarding preservatives, flavours, colours, and pesticide use.

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- **Misleading Fruit Content Claims:**
  - Products like fruit juices may claim to contain real fruit despite only containing a small percentage of actual fruit pulp.
  - Consumers should be cautious of added sugars and additives in products claiming to be made with real fruit.
  - Cautionary Notes on Oil Labels: Despite claims of being cholesterol-free or heart-friendly, all oils contain 100% fat and should be consumed in moderation.
- **Dietary Guidelines and Recommendations:**
  - ICMR advises consumers to read food labels and minimise consumption of high-fat, sugar, salt, and ultra-processed foods.
  - The World Health Organisation is considering revising sugar intake recommendations to less than five percent of daily kilocalories.
  - Long-term consumption of sugar substitutes may lead to obesity, diabetes, hypertension, and other non-communicable diseases.
- **Impact of Unhealthy Diets:**
  - Unhealthy diets contribute significantly to India's disease burden, with 56% attributed to poor dietary choices.
  - Healthy diets and physical activity can substantially reduce the risk of coronary heart disease, hypertension, and type 2 diabetes.
  - Protein Consumption Recommendations: ICMR advises against excessive protein consumption, particularly through protein supplement powders, as it may not necessarily aid muscle building and can lead to health issues.

mRNA Vaccine for Brain Cancer

Context: *A novel mRNA vaccine is combating brain cancer in children by eliciting an internal attack mechanism.*

- **Challenges in Treating Brain Cancers:**
  - Brain cancers pose significant challenges due to the protective barrier around the brain, limiting the effectiveness of traditional treatments like chemotherapy.
  - Treatments such as radiation and surgery can result in debilitating side effects, contributing to the complexity of managing brain tumours.
  - Brain cancer is the leading cause of cancer-related death in children, necessitating the development of targeted therapies.
- **Introduction of mRNA Cancer Vaccine:**
  - A new messenger-RNA (mRNA) cancer vaccine has been developed to address the challenges of treating brain cancer in children.
  - The vaccine aims to deliver treatments more effectively and stimulate the immune system to combat cancer cells.
- **Mechanism of Cancer Vaccines:**
  - Cancer vaccines work by delivering tumour antigens into the body, teaching the immune system to recognise and attack cancer cells displaying those antigens.
  - Various types of cancer vaccines exist, including those utilising protein fragments, reengineered viruses, or a patient's own immune cells.
- **Advantages of mRNA Cancer Vaccines:**
  - mRNA-based vaccines have garnered attention for their potential to stimulate the immune system, with applications extending beyond COVID-19.
  - Researchers have been investigating mRNA vaccines for treating cancers, including brain tumours, prior to the pandemic.
- **Unique Features of mRNA Cancer Vaccine:**
  - The mRNA vaccine utilises a patient's own cancer cells as a template for mRNA inside specialised lipid nanoparticles.
  - Nanoparticles are injected into the bloodstream to travel to immune response organs, leading to immediate and potent immune activation.
- **Clinical Trials and Future Prospects:**
  - Early-phase clinical trials are underway to evaluate mRNA-based vaccines for brain cancer treatment in real patients.
  - Initial results in adult patients with glioblastoma have shown extended survival rates, with plans to expand treatment to children with paediatric high-grade glioma.
  - Future initiatives aim to develop mRNA vaccines for various cancer types, including childhood brain tumours like medulloblastoma, as part of the Paediatric Cancer Immunotherapy Initiative.

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NEWS IN BETWEEN THE LINES

Kishtwar High Altitude National Park

Recently, a team of four scientists from the University of Kashmir, Srinagar and the National Development Foundation, Jammu, successfully captured images of four snow leopards in the Kishtwar High Altitude National Park.

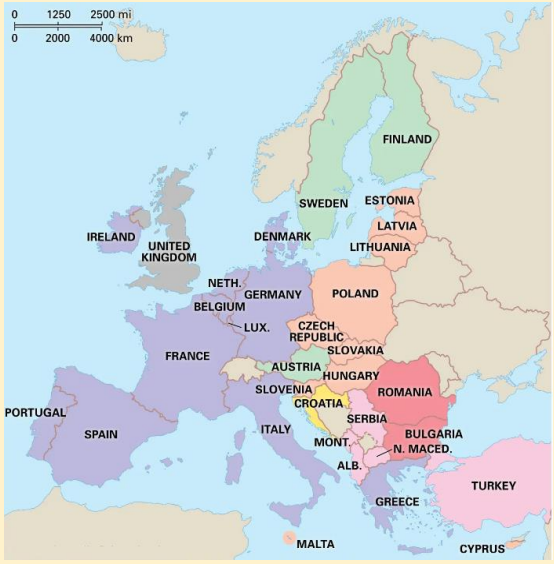
About Kishtwar High Altitude National Park:

- Kishtwar High Altitude National Park is situated in the Kishtwar district of the Union Territory of **Jammu and Kashmir.**
- It was established on **February 4, 1981** to protect snow leopards, which are listed as vulnerable by the International Union for Conservation of Nature (IUCN) Red List.
- It lies in the central crystalline belt of the great Himalayas, encompassing sub-alpine and alpine zones.
- The park is **bordered by the Rinnay River** to the north, **Kibar Nala** catchment to the south, the **Great Himalayas** to the east and the **Marwa River** to the west.
- **Flora:** The park boasts a variety of temperature conifer forests, including **Fir**, **Himalayan Yew**, **Deodar**, **Blue Pine** (Kail), and Spruce.
- **Fauna:** This park is a reserve for **snow leopards** and supports various other wildlife species such as **Brown bear**, Himalayan musk deer, **Hangul** (Kashmir stag), Ibex, Wild boar, Indian muntjac, Serow, Himalayan Tahr, and **Bharal** (Himalayan blue sheep).

European Union

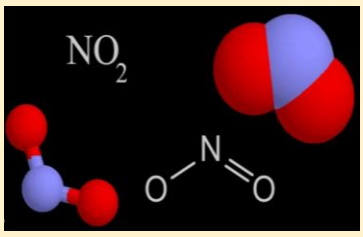
Recently, the 14th Counter-Terrorism Dialogue between the European Union and India was convened in New Delhi.

About the European Union:



- The European Union (EU) is a political and economic union of **27** European countries.
- **19 European** Union member states use the **euro (€)** as their official currency, **while 8 do not use the euro.**
- It plays a role in **external relations** and **defense** through the Common Foreign and Security Policy.
- It **maintains diplomatic missions** worldwide and participates in international organizations like **the UN, WTO, G7 and G20**.
- The EU was officially established with the **Maastricht Treaty in 1993**, achieving full legal personality with the **Treaty of Lisbon in 2009**.
- The EU was formed to promote peace and unity in Europe after **World War II** to prevent future conflicts.
- European Union awarded with **Nobel Peace Prize in 2012** for contributing to peace, reconciliation, democracy and human rights in Europe.

Nitrogen Dioxide



A recent study by Stanford University has raised concerns about the health risks associated with gas and propane stoves and revealed that these appliances can significantly increase indoor air pollution levels of nitrogen dioxide (NO_2), a pollutant linked to respiratory problems.

About Nitrogen Dioxide:

- Nitrogen Dioxide (NO_2) is a **reddish-brown gas** with a pungent odor, **comprising nitrogen** and **oxygen molecules**.
- NO_2 emissions originate from combustion processes in **vehicles**, **power plants**, **industrial facilities** and **residential heating** systems.
- Natural events such as **wildfires**, **lightning** and **volcanic eruptions** also contribute to NO_2 levels.
- It is a hazardous air pollutant known to **cause respiratory issues**, **exacerbate asthma** and **diminish lung function**.
- It participates in the formation of **ground-level ozone** (smog) and particulate matter, deteriorating air quality.
- It can **harm vegetation**, **degrade water quality** and **contribute to acid rain** formation when reacting with atmospheric moisture.
- Measurements are often reported in parts per billion (ppb) or micrograms per cubic meter ($\mu g/m^3$) of air.

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Gene Therapy

An 18-month old British girl, Opal, who was born without hearing faculty, is believed to be the youngest person to have their hearing restored after undergoing groundbreaking new gene therapy developed by U.S. biotech firm Regeneron.

About Gene Therapy:

- Gene therapy is a **biotechnology technique** that involves altering a **patient's genetic** material to treat or prevent diseases by introducing functional genes to compensate for defective ones.
- It can be used to **treat genetic**, **infectious** and **cancerous diseases**.
- It aims to **address genetic disorders** at the root genetic level by replacing, inactivating or introducing genes to correct abnormalities.
- Gene therapy includes Somatic Cell Gene Therapy, targeting living individuals' somatic cells, and Germline Gene Therapy, which alters genes in egg or sperm cells, usually banned due to ethical reasons.
- Sources of Cells for gene therapy include autologous, which uses the patient's own cells, and allogeneic, which utilizes cells from a donor.
- Initially, it was focused on **monogenic disorders** such as Severe Combined Immunodeficiency (SCID), **haemophilia** and **muscular dystrophy**.
- Now, it has been expanding to address complex multigenic diseases like cancer, **heart disease** and **diabetes** by targeting multiple genes simultaneously.

Place in News

Hungary

Recently, Chinese President Xi Jinping visited Hungary to foster closer ties with Beijing's key European Union ally amidst strained relations with the West.

Hungary (Capital: Budapest)

Location: Hungary is a **landlocked country** situated in Central Europe.

Political Boundaries: Hungary shares its border with **Romania** (East), **Austria** (West), **Slovakia** (North), **Ukraine** (Northeast), **Serbia** (South) and **Croatia** and **Slovenia** (Southwest).

Physical Features:

- The highest point in Hungary is **Kekes**, which is located in the **Bukk Mountains** in the northeastern part of the country.
- The major rivers in Hungary include the **Danube**, **Tisza**, **Drava** and **Szamos**.
- Hungary's mineral resources include **bauxite**, **coal**, **natural gas** and various industrial minerals such as **barite**, **gypsum**, and **kaolin**.
- **Lake Balaton** is the largest freshwater lake in Hungary and Central Europe, located in the Transdanubian region.
- **Lake Heviz, the largest thermal lake** in the world is located in Hungary, near the western end of Lake Balaton.

Political System: Hungary is a parliamentary republic with a unicameral legislature called the **National Assembly or Orszaggyules.**

POINTS TO PONDER

- Which article of the Indian Constitution mandates the state to provide primary education to children belonging to linguistic minority groups in their mother tongue? **– Article 350A**
- According to the Global Electricity Review (GER) 2024 report by Ember, which position does India hold in terms of solar power generation worldwide? **– Third**
- How many member countries, including India, are part of International Criminal Police Organization (INTERPOL)? **– 196 member countries**
- The Glide Phase Interceptor (GPI) Project involves the joint development of a missile-intercepting system between which two countries? **– United States and Japan**
- Which version of the artificial intelligence model "AlphaFold" has recently been unveiled by Google DeepMind? **– AlphaFold 3**

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