FINDER
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FORTUNE IAS NEWS DAILY EXPLAINER
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Hope for pancreatic cancer as new drug shows promise

Prelims: General Studies Paper - 1
Current events of national and international importance

Mains: General Studies - 3
Awareness in the fields of IT, Space, Computers, robotics, nano-technology, bio-technology and issues relating to intellectual property rights.

1.Context

- **KRAS (Kirsten Rat Sarcoma Viral Oncogene Homolog) is a gene belonging to the RAS** (Rat Sarcoma) family that controls cell growth and division.
- A 1988 study published in Cell found **KRAS mutations in nearly 95% of pancreatic cancers.**
- KRAS normally **acts as an on/off switch regulating cell division.**
- Mutations lock KRAS in the active "on" state, **causing uncontrolled cell growth.**
- These mutations are linked to pancreatic, colorectal, and lung cancers.

2. Why Pancreatic Cancer is Deadly

- Pancreatic cancer is **usually detected only at advanced stages.**
- By diagnosis, the **disease often spreads to nearby tissues and organs.**
- Surgical treatment **options are very limited** for most patients.
- Even after surgery, **cancer recurrence is common.**
- Standard chemotherapy treatments often show poor effectiveness.

3. KRAS as an "Undruggable" Target

- Scientists considered KRAS an important target for cancer treatment for decades.
- Most **drugs work by attaching to pockets on protein surfaces.**
- KRAS has a **smooth and compact surface with very few binding sites.**
- Many research attempts to inhibit KRAS failed in clinical trials.
- Because of these failures, **KRAS was labelled "undruggable."**

4. Daraxonrasib: A New Breakthrough Drug

- In 2024, **Revolution Medicines developed daraxonrasib to target KRAS** and related RAS proteins.
- The drug works when KRAS is in its active state promoting cell division.
- Daraxonrasib binds with cyclophilin-A and locks KRAS into a nonfunctional state.

Cyclophilin-A is a **protein naturally present inside human cells** that helps other proteins fold and function properly.

- Since it targets multiple RAS variants, it may help treat different cancers.
- Researchers believe the drug could become a major breakthrough in cancer therapy.

5. Clinical Trial Results and Future Hope

- Clinical trials **showed tumour reduction in 51% of pancreatic cancer patients.**
- In **97% of patients, the cancer either shrank or stopped growing further.**
- Common side effects included rash, diarrhoea, nausea, fatigue, and mouth sores.
- **No life-threatening side effects were reported** during the trials.
- The U.S. The Food and Drug Administration granted daraxonrasib "National Priority Voucher" status, raising hopes for faster approval and wider patient access.

What is the Governor's role in a hung Assembly?

Prelims: General Studies Paper - 1
Current events of national and international importance

Mains: General Studies - 2
Functions and responsibilities of the Union and the States, issues and challenges pertaining to the federal structure, devolution of powers and finances up to local levels and challenges therein.

1. Context

- In the 2026 Tamil Nadu Assembly elections, Tamilaga Vettri Kazhagam emerged as the **single largest party** without a majority in the 234-member House.
- C. Joseph Vijay,the party president,faced **delay in swearing-in** by Rajendra Arlekar(Governor).
- The Governor demanded **physical letters of support (118 MLAs)** before inviting him to form the government.
- Vijay staked claim on **May 9**; oath scheduled for **May 10**.
- The issue raised concerns about the Governor's **discretion and constitutional conventions**.

2. Role of the Governor

- Appoints CM under **Article 164**; no fixed procedure for **hung Assembly**.
- Must ensure a **stable government**, acting **objectively (not personal discretion)**.
- Sarkaria Commission: Governor should explore all options within **reasonable time**.
- The Constitution does not define "reasonable time," but the Governor cannot delay indefinitely as it may encourage **horse-trading and instability**.
- As a last resort, if no viable government can be formed, the Governor may recommend **President's Rule under Article 356**, but only after exhausting all alternatives.
- Under **Article 174(2)(b)** and cases like B.R. Kapur vs State of Tamil Nadu(2001) and Rameshwar Prasad vs Union of India(2006), Assembly can be **dissolved if no viable government emerges**.

3. Order of Preference

- Sarkaria Commission hierarchy:
  - **First preference: Pre-poll alliance commanding a clear majority.**
  - **Second preference: Single largest party able to secure majority support.**
  - **Third preference: Post-poll coalition with majority backing**
- In this case, **the single largest party option applies**.
- S.R. Bommai vs Union of India(1994): **Majority at formation not necessary**, but must prove confidence of the House.
- **Minority governments are valid** if they enjoy House support.
- **President's Rule = last resort**, not routine option.

4. Floor Test as Final Test

- **Most objective method** to prove majority → **floor test in Assembly**.
- The Committee of Governors recommended that the majority should normally be tested **on the floor of the Assembly**, not through subjective satisfaction of the Governor. .
- Courts have repeatedly held that **the House-not the Governor-is the proper forum to determine majority**.
- Key cases:
  - Goa (2017): Manohar Parrikar proved majority quickly.
  - Karnataka (2018): B. S. Yediyurappa resigned before the test.
- Safeguards: **time-bound test, transparency, no manipulation**.
- Criticism: Insisting on **letters instead of floor tests** undermines democratic process.
- **Way Forward:** Ensure **time-bound mandatory floor tests**, **clear limits on Governor's discretion**, and **codified constitutional conventions (as per Sarkaria Commission)** to uphold democratic legitimacy and prevent misuse.

What is India's first orbital data centre satellite?

Prelims: General Studies Paper - 1
Current events of national and international importance

Mains: General Studies - 3
Achievements of Indians in science & technology; indigenization of technology and developing new technology.

1. Context

- On May 4, Pixxel announced a partnership with Sarvam to launch India's first **'orbital data centre' satellite** named **Pathfinder**.
- The satellite will be a **200 kg-class** spacecraft, targeted for launch in **Q4 2026**.
- It will carry **datacentre-grade GPUs (Graphics Processing Units)** along with Pixxel's **hyperspectral imaging camera**.
- The mission aims to act as a **single-satellite demonstrator** to test feasibility of **space-based computing** in low Earth orbit.

2. Orbital Data Centre: Concept

- An orbital data centre is a **constellation of satellites equipped with GPUs**, similar to terrestrial data centres.
- It enables **AI model training and processing directly in orbit**, rather than just transmitting data to Earth.
- Goes beyond low-power **"edge computing" satellites**, enabling **high-performance computing in space**.
- Applies the logic of **edge computing (processing near data source)** to space-based systems.
- Pathfinder will test whether **ground-grade hardware can function in harsh orbital conditions**.

3. Global Interest and Drivers

- **Resource constraints on Earth**: Data centres face limits of **energy, land, water, and regulation**, intensified by AI demand.
- **Solar energy advantage**: Space offers **near-continuous solar power**, seen as a major benefit.
- **Data bottleneck solution**: Earth observation satellites generate **large datasets**, making downlink expensive → **in-orbit processing reduces transmission load**.

Earth observation satellites send **large raw data** to Earth, which is costly and slow to transmit.
With in-orbit processing, they **analyze data in space and send only useful results**, reducing transmission load and cost.

- **Strategic competition**:
  - Elon Musk suggested scaling **Starlink V3 satellites with laser links** for such capabilities.
  - Jeff Bezos through Blue Origin, along with **Microsoft Azure Space** and **Lonestar Data Holdings**, are pursuing pilot projects.
- However, **no commercial-scale orbital data centre exists yet**.

4. Challenges and Pixxel–Sarvam Collaboration

- **Thermal management challenge**:
  - Space vacuum prevents **heat dissipation via convection**.
  - Requires **radiative cooling using ammonia loops and infrared panels**.
- **Radiation risks**:
  - Cosmic rays cause **bit flips and semiconductor degradation**.
  - **Radiation-hardened chips lag behind commercial GPUs**.
- **Power and maintenance issues**:
  - Need **energy storage during eclipse periods**.
  - **No direct maintenance**, requiring built-in redundancy.
- **Pixxel–Sarvam roles**:
  - Pixxel: Design, build, launch, and operate the satellite.
  - Sarvam: Provide **AI backbone and full-stack language models** for training and inference.
- **Use case**:
  - Hyperspectral images captured by Pixxel will be **processed in orbit**, with only **analysed outputs sent to Earth**.
- Pixxel team includes experts with **Indian Space Research Organisation experience**, especially in **thermal management systems**.

- **Way Forward:** Develop **advanced thermal and radiation-resistant technologies**, promote **public-private collaboration (e.g., Indian Space Research Organisation partnerships)**, and establish **clear regulatory frameworks** to enable scalable and reliable orbital data centres.

Why is hantavirus drawing global attention?

Prelims: General Studies Paper - 1
General Science.

Mains: General Studies - 2
Issues relating to development and management of Social Sector/Services relating to Health, Education, Human Resources.

1. Hantavirus Outbreak on MV Hondius

- A **hantavirus outbreak** occurred on the cruise ship **MV Hondius**.
- The ship was travelling from **Argentina** towards **Cape Verde** and the **Canary Islands**.
- **Eight cases** were reported, including **three deaths**.
- **Passengers travelled to different countries before the outbreak was detected**, leading to international monitoring.

2. What is Hantavirus?

- **Hantaviruses** are mainly spread by **rodents** like rats and mice.
- Humans get infected through contact with **rodent urine, saliva, or droppings**.
- The virus can affect the **lungs** or **kidneys**.
- Some strains cause **Hantavirus Pulmonary Syndrome (HPS)**, while others cause **Haemorrhagic Fever with Renal Syndrome (HFRS)**.
- WHO states that most **hantaviruses** do not spread from one human to another.
- However, the **Andes virus strain** found in parts of **South America** has shown limited **human-to-human transmission**, mainly among close contacts.

3. Symptoms and People at Risk

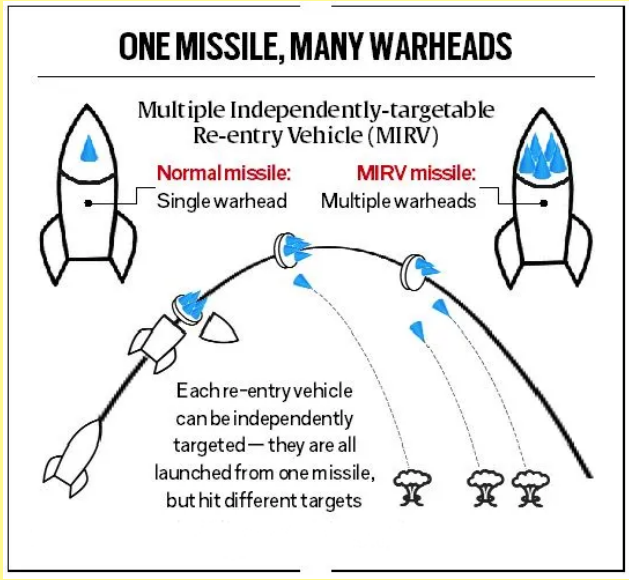
- Symptoms usually appear **1-8 weeks** after exposure.
- Early symptoms include **fever, headache, muscle pain, fatigue, nausea, and vomiting**.
- Severe cases can cause **breathing difficulty, pneumonia, kidney problems, and bleeding issues**.
- High-risk groups include **farmers, forestry workers, campers, construction workers, and people cleaning abandoned buildings**.
- People exposed to **rodent-infested areas** are especially vulnerable.

4. Treatment, Prevention, and Pandemic Risk

- There is **no specific cure or vaccine** for hantavirus infection.
- Treatment mainly includes **supportive care**, oxygen therapy, and intensive medical support.
- Prevention focuses on **rodent control, sanitation, and safe cleaning practices**.
- WHO says hantavirus is **far less transmissible than COVID-19** and the overall public risk remains **low**.
- The outbreak highlights the importance of monitoring **zoonotic diseases** and improving global surveillance systems.

KEYWORDS

MIRV Technology



- MIRV (Multiple Independently Targetable Reentry Vehicle) technology **enables a single**

ballistic missile to carry multiple warheads, each capable of striking different targets independently.

- India **conducted the successful flight-trial of an Advanced Agni missile with Multiple Independently Targeted Re-Entry Vehicle (MIRV) system** from Dr APJ Abdul Kalam Island.
- Development of MIRV systems requires advanced technologies such as nuclear warhead miniaturisation, precise re-entry vehicle separation, and atmospheric spin stabilisation.
- **Before India,** MIRV capability was **possessed only by the five recognised nuclear weapon states: the United States, Russia, China, France, and the United Kingdom.**
- **Integration of MIRV technology into the Agni-5 missile significantly strengthens India's nuclear deterrence capability** by allowing one missile to engage multiple strategic targets.

Waguw

- **Waguw** refers to traditional **reed mats** made in **Kashmir** using dried grass collected from lake waters. Grass and **rice straw** are woven together to create these mats.
- The mats provide warmth during **winter** and have **long supported the livelihood of many artisan families in Kashmir's villages.**
- The **Jammu and Kashmir Government** recently introduced incentives for craftsmen to preserve and continue this traditional craft.
- The **Karkhandar Scheme** has been launched to promote and develop the **handicraft sector** in the region.

Species in News

Protosticta sanguinostigma

- Protosticta sanguinostigma, commonly called the **Red Spot Reedtail, is a damsel fly endemic to the Western Ghats.**
- It belongs to **the family Platystictidae and is mainly seen near forest streams with dense vegetation.**
- The species is easily recognized by its blood-red pterostigma and slender dark body.
- It has been **recorded only from a few localities, making it a rare species in India.**
- Due to habitat loss and restricted distribution, it is **classified as Vulnerable by the IUCN.**

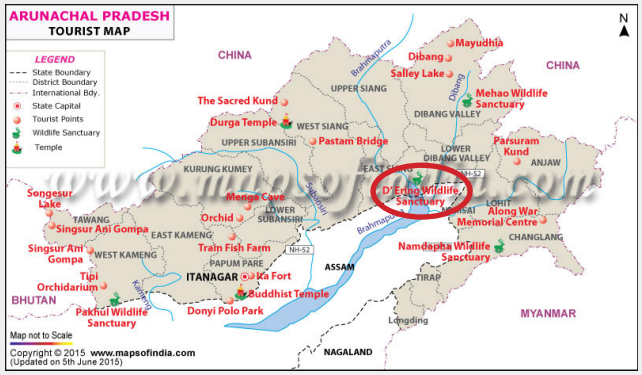
Cyclogomphus ypsilon

- Cyclogomphus ypsilon is a **species of dragonfly belonging to the family Gomphidae.**
- It is commonly **known as the Y-marked Clubtail** because of the distinct markings on its body.
- The species is **found near freshwater streams and rivers in forested regions.**
- Like other clubtail dragonflies, it has widely separated eyes and a strong elongated abdomen.
- It is classified as **Vulnerable (VU) on the International Union for Conservation of Nature Red List of Threatened Species**.

- Cyclogomphus ypsilon is **considered a relatively rare odonate species in India.**

Places in News

D'Ering Memorial Wildlife Sanctuary



- The D'Ering Memorial Wildlife Sanctuary is **located in the East Siang district of Arunachal Pradesh along the floodplains of the Siang River** and its tributaries.
- It was **established in 1976 and was earlier known as Lali Wildlife Sanctuary before being renamed** in 1986.
- The **sanctuary lies along the Assam–Arunachal Pradesh border** and experiences a tropical climate influenced by both north-east and south-west monsoons.
- Its **vegetation mainly consists of riverine plains, tall grasses, thatch,** and scattered tree species such as Bombax ceiba and Dillenia indica.
- Recently, a **tiger was sighted in the sanctuary after nearly two decades**, highlighting its ecological significance and rich biodiversity.

Cabo Verde

- **Cabo Verde** is an island country located about **500-620 km off the west coast of Africa**.
- Its capital city is **Praia**, situated on **Santiago Island**.
- A former **Portuguese colony**, Cabo Verde consists of **10 islands** and several **islets**, most of which are mountainous.
  - ➲ Out of the 10 islands, **nine are inhabited** while **one remains uninhabited.**
- The archipelago **once served as an important hub** in the **trans-Atlantic slave trade**.

- During the **20th century**, severe **droughts** caused the deaths of nearly **200,000 people** and led to large-scale emigration.
- Today, **more people with origins in the islands live outside the country than inside it.**
- The **remittances** sent by these emigrants are an important source of **foreign exchange** for the economy.