Prelim Bits 21-01-2022 | UPSC Daily Current Affairs

Saraswati River

Haryana and Himachal Pradesh are about to sign an MoU on plan to revive Saraswati river.

> The revival of the Saraswati River will be done by building the Adi Badri Dam at the starting point of the river in order to maintain a round-the-year flow.

- The 'Lost Saraswati River' in North-Western India is the holiest and mightiest river of the Vedic Period (8000-5000 BP).
- The Saraswati River is mentioned between the east of Yamuna and west of Sutlej in the early Rigvedic 'Nadistuti' hymn.
- This river is a trans-boundary to India as well as to Pakistan.
- Vedic Saraswati River originated in the Himalayas and flowed between Indus River in the west and Ganges River in the east through Punjab, Haryana, western Rajasthan and Gujarat.
- It is finally drained into Gulf of Kachchh in Arabian Sea.
- **Significance** - The name 'Saraswati' has been used in most of the ancient literatures like Vedas, Manusmriti, Mahabharata and Puranas.
- The sites of Harappan civilization were discovered along the banks of the Saraswati River.
- This River disappeared around 5000 BP due to climatic and tectonic changes.
- It is believed that River Saraswati is still flowing below the Thar desert and its Himalayan connectivity is alive.
- The relict of this lost river is preserved as palaeochannels under the cover of aeolian sand / alluvium.

Reference

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2. https://bhuvan-app1.nrsc.gov.in/saraswati/
3. https://www.mapsofindia.com/history/sarasvati-river.html

Vikas Rocket Engine

Indian Space Research Organisation (ISRO) successfully conducted a 25-second qualification test for its liquid propellant-based Vikas engine to be used under the Gaganyaan mission.

- The Vikas (VIKram Ambalal Sarabhai) is a family of liquid fuelled rocket engines conceptualized and designed by the Liquid Propulsion Systems Centre in the 1970s. The design was based on the licensed version of the Viking engine with the chemical pressurisation system.
- The primary difference being that the Vikas is rated for a longer burn time.
- The Vikas Engine is the workhorse liquid rocket engine powering
    1. The second stage of India's Polar Satellite Launch Vehicle (PSLV),

2. The second stage and the four strap on stages of Geosynchronous Launch Vehicle (GSLV) and
3. The twin engine core liquid stage (L110) of GSLV Mk-III.

- The engine uses up about 40 metric tons of Unsymmetrical dimethylhydrazine (UDMH) as fuel and Nitrogen tetroxide (N_2O_4) as oxidizer with a maximum thrust of 725 kN.

Reference

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2. https://www.isro.gov.in/update/15-jul-2018/successful-qualification-of-high-thrust-vikas-engine

Genetic Risk Factors for Heart Failure

Scientists at the CSIR-Centre for Cellular and Molecular Biology (CCMB) identify genetic mutations that cause dilated cardiomyopathy, a common cardiovascular disease that often results in heart failure.

> The mortality rate due to cardiovascular diseases is very high in India, compared to western countries. Severe cardiomyopathy is one of the cardiovascular diseases, where heart failures are common.

- Cardiomyopathy changes the integral structure of the heart muscle, and as a result, the heart is unable to pump blood efficiently.
- This increases the risk of heart failure leading to sudden cardiac death.
- There are many types of cardiomyopathies. Dilated cardiomyopathy is the most common form.
- A gene called beta myosin heavy chain gene (β-MYH7) is one of the major genes implicated in cardiac diseases globally.
- The researchers sequenced this gene from dilated cardiomyopathy patients along with ethnically matched healthy controls to identify the mutations that are associated with the disease in Indian patients.
- The study revealed 27 variations, of which 7 were novel and were detected exclusively in Indian dilated cardiomyopathy patients.
- These included four which were what are called missense mutations.
- They were predicted to be pathogenic by bioinformatics tools.
- This study can help in developing gene-editing methods that may rescue cardiac contractility of failing hearts among Indians with the novel mutations.

Reference

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2. https://delhipostnews.com/study-identifies-genetic-risk-factors-for-heart-failure/
3. https://www.thehindubusinessline.com/news/science/novel-genetic-risk-factors-cause-heart-failures-in-india-ccmb/article64906514.ece

Carbon found in Mars

Newly discovered carbon in Mars by the NASA's Curiosity rover may yield clues to ancient Mars.

- Since the NASA's Curiosity rover landed on Mars in 2012, it has roamed Gale Crater that has

exposed layers of ancient rock.
- The rover drilled into the surface of these exposed layers and recovered samples from buried sedimentary layers. It has sent these results back home for researchers to interpret.
- By looking at the amounts of the carbon isotopes in a substance, the researchers can determine specifics about the carbon cycle that occurred, even if it happened a very long time ago.

  The amounts of carbon 12 and carbon 13 in our solar system are the amounts that existed at the formation of the solar system.

  Both exist in everything, but because carbon 12 reacts more quickly than carbon 13, looking at the relative amounts of each in samples can reveal the carbon cycle.

- **Process** - Curiosity heated the samples in the absence of oxygen to separate any chemicals.
- Spectrographic analysis of a portion of the reduced carbon produced by this pyrolysis showed a wide range of carbon 12 and carbon 13 amounts depending on where or when the original sample formed.
- Some carbon was exceptionally depleted in carbon 13 while other carbon samples where enriched.
- **Analysis** of carbon isotopes 12 and 13 in sediment samples leave the researchers with 3 plausible explanations for the carbon's origin,
  1. Cosmic dust from galactic dust cloud,
  2. Ultraviolet degradation of carbon dioxide to organic compounds like formaldehyde, or
  3. Ultraviolet degradation of biologically produced methane.
- All these three scenarios are unconventional, unlike processes common on Earth.
- But we need more data to figure out which of these is the correct explanation.

Reference

https://www.sciencedaily.com/releases/2022/01/220117165551.htm

Epstein-Barr Virus - Leading Cause of Multiple Sclerosis

A new study suggests that most Multiple Sclerosis (MS) cases could be prevented by stopping Epstein-Barr virus (EBV) infection, and that targeting EBV could lead to the discovery of a cure for MS.

- Multiple sclerosis (MS) is a potentially disabling disease of the brain, spinal cord and optic nerves (Central Nervous System).
- In MS, the immune system attacks the protective sheath (myelin) that covers nerve fibers and causes communication problems between your brain and the rest of your body.
- Eventually, the disease can cause permanent damage or deterioration of the nerves.
- **Symptoms** of MS vary widely and depend on the amount of nerve damage and which nerves are affected.
- Numbness or weakness in one or more limbs that typically occurs on one side of your body at a time, or your legs and trunk
- Electric-shock sensations that occur with certain neck movements, especially bending the neck forward (Lhermitte sign)
- Tremor, lack of coordination or unsteady gait

- Both males and females may lose interest in sex (Sexual dysfunction)
- Some people with severe MS may lose the ability to walk independently or at all, while others may experience long periods of remission without any new symptoms.
- **Treatment** - There's no cure for multiple sclerosis.
- However, treatments can help speed recovery from attacks, modify the course of the disease and manage symptoms.
- **Related Links** - Epstein-Barr Virus

Reference

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