Prelim Bits 18-08-2021 | UPSC Daily Current Affairs

Blood Clotting - Root Cause of Long Covid

A new study has reported evidence that patients with long Covid syndrome continue to have higher measures of blood clotting.

- This evidence helps to explain their persistent symptoms, such as breathlessness, reduced fitness and fatigue.
- In long Covid syndrome, symptoms can last weeks to months after the initial infection has been resolved.
- Even though markers of inflammation had all returned to normal levels, increased clotting potential was still present in long COVID patients who required hospitalisation.
- But, they also found that even those who were able to manage their illness at home still had persistent clotting.
- **Significance** - Understanding the root cause of a disease (clotting) is the first step towards developing effective treatments.

Drought in Colorado River Basin

The US government has declared the 1st water shortage for the Colorado River basin due to a historic drought.

- This will lead to water cuts in some south-western US states and some parts of north-western Mexico starting October 2021.
- Due to this historic drought, the release of water from Lake Mead and Lake Powell will be affected that will impact the entire Colorado basin.
- But even with a great water storing capacity, over the years the demand for water from the basin has increased whereas supply is restricted.
- Governors of 10 western US states have requested the US President to declare a Federal Emergency Management Agency (FEMA) drought disaster in these states.
- This will provide more assistance to thousands of farmers in these states.

Flow of Colorado River

- The Colorado River flows from the Rocky Mountains and it is fed by snowmelt from the Rocky and Wasatch mountains.
- It flows a distance of over 2,250 km across 7 south-western states and into Mexico.
- Because of its intensive development it is often referred to as the “Lifeline of the Southwest.”
- The Colorado River Basin is divided into,
    1. Upper Basins (Wyoming, Colorado, New Mexico, Utah and northern Arizona) and
    2. Lower Basins (parts of Nevada, Arizona, California, south-western Utah and western New Mexico).
- In the Lower Basin, the Hoover Dam, Davis Dam, Parker Dam and the Imperial Dam controls floods and regulates water delivery and storage.

Agro-Automatic Weather Stations

India Meteorological Department (IMD) has undertaken installation of Agro-Automatic Weather Stations (Agro-AWS).

- These stations will provide exact weather forecast to the people, especially the farmers.
- Agro-AWS are installed at 200 District Agromet Units (DAMUs) located in the Krishi Vigyan Kendras (KVKs) under Indian Council of Agricultural Research (ICAR) network.
- They are installed at DAMUs to augment block level Agromet Advisory Services (AAS) under Gramin Krishi Mausam Sewa (GKMS) scheme.

Gramin Krishi Mausam Sewa

- Under this scheme, weather-based operational AAS will be rendered by IMD jointly with ICAR and State Agricultural Universities.
- **Ministry** - Ministry of Earth Science
- This is a step towards weather-based crop and livestock management strategies and operations for the benefit of farming community.
- Based on the **medium range weather forecast** at district and block level generated under the scheme, Agromet Advisories are prepared.
- These **Agromet Advisories** are communicated by Agromet Field Units (AMFUs) co-located with State Agricultural Universities, and DAMUs at KVKs to the farmers on every Tuesday and Friday.
- IMD also monitors rainfall situation & weather aberrations and issues alerts & warnings to the farmers and the State Department of Agriculture from time to time under GKMS scheme.
- SMS-based alerts for extreme weather events and suitable remedial measures are issued to take timely operations by the farmers.
- Agromet Advisories are communicated to the farmers through multichannel dissemination system including SMS through,
    1. Kisan Portal launched by Agriculture Ministry and
    2. Private companies under Public Private Partnership (PPP) mode.

Meghdoot

- It is a mobile App launched by the Ministries of Earth Sciences have and Agriculture.
- It was developed by Indian Institute of Tropical Meteorology, IMD and ICAR.
- It will provide location, and crop and livestock-specific weather-based agromet advisories to farmers in local languages.

Wilful Control of Dopamine

A new study reveals that impulses of dopamine chemical can be wilfully controlled.

- **Dopamine** is the neurological messenger or neurotransmitter that carries signals between brain cells.
- It has been popularly described as the "feel good" chemical of the brain related to reward and pleasure.
- It is involved in multiple aspects of cognitive processing - unique human ability to think and plan.
- Previously, dopamine was thought to occur only when presented with pleasurable or reward-based expectations.

- In the study, the mice learned to anticipate and wilfully act upon a portion of the dopamine.
- Mice learned to reliably elicit dopamine impulses prior to receiving a reward. These effects reversed when the reward was removed.

Junk DNA

A Study has identified the NTR2-1 DNA region (Junk DNA) that appears to drive the activity of the telomerase gene.

Telomerase gene has been shown to prevent aging in certain types of cells.

- Knowing how the telomerase gene is regulated and activated and why it is only active in certain cell types could be the key to understanding how humans age and how to stop the spread of cancer.
- The study describes that one of the 'junk DNA' units enhances the activity of the telomerase gene.

About 50% of our genome has repetitive DNA that doesn’t code for protein. These are called 'junk DNA' or dark matters of genome.

- Their finding is based on a series of experiments that found that deleting the DNA sequence from cancer cells caused telomeres to shorten, cells to age, and tumors to stop growing.
- The length of the sequence ranged from as short as 53 repeats or copies of the DNA to as long as 160 repeats.
- The study actually shows that the telomerase gene is more active in people with a longer sequence.
- But, having a shorter sequence doesn’t necessarily mean shorter lifespan.
- It means the telomerase gene is less active and your telomere length may be shorter, which could make you less likely to develop cancer.
- These findings tell that this VNTR2-1 sequence contributes to the genetic diversity of how we age and how we get cancer.

Telomerase Gene

- This gene controls the activity of the telomerase enzyme, which helps produce telomeres, the caps at the end of each strand of DNA that protect the chromosomes within our cells.
- In normal cells, the length of telomeres gets a little bit shorter every time cells duplicate their DNA before they divide.
- When telomeres get too short, cells can no longer reproduce, causing them to age and die.
- However, in certain cell types - reproductive cells and cancer cells - the activity of the telomerase gene ensures that telomeres are reset to the same length when DNA is copied.
- This is what restarts the aging clock in new offspring but is also the reason why cancer cells can continue to multiply and form tumors.

Source: PIB, The Indian Express, Science Daily, Hindustan Times



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