Prelim Bits 22-12-2021 | UPSC Daily Current Affairs

Sickle Cell Anaemia

- Sickle cell anaemia is an autosomal recessive disease or Mendelian disorder (Genetic Disorder).
- It is caused by a mutation in the hemoglobin-β gene found on chromosome 11. This mutation results in defective haemoglobin (Hb).
- After giving up oxygen, these defective Hb molecules cluster together resulting in formation of rod like structures.
- The red blood cells become stiff and assume sickle shape.
- The defect is caused by the substitution of Glutamic acid by Valine at the sixth position of the beta globin chain of the haemoglobin molecule.
- **Genotypes** - The disease is controlled by a single pair of allele, HbA and HbS.
- Out of the three possible genotypes, only homozygous individuals for HbS (HbSHbS) show the diseased phenotype.
- Heterozygous (HbAHbS) individuals appear apparently unaffected but they are carrier of the disease as there is 50% probability of transmission of the mutant gene to the progeny, thus exhibiting sickle-cell trait.
- **Commonality** - The disease is mostly common among people whose ancestors originated from sub-Saharan Africa, South America, Cuba, Central America, Saudi Arabia, India, and Mediterranean countries.
- In India, it is common among people of the Deccan plateau of central India with a smaller focus in the north of Kerala and Tamil Nadu.

Reference

1. https://indianexpress.com/article/world/sickle-cell-nigeria-7683045/
2. https://ncert.nic.in/textbook/pdf/kebt108.pdf
3. https://ncert.nic.in/ncerts/l/lebo105.pdf

Chillai Kalan

With the winter solstice, the 'chillai kalan' has started in the Kashmir Valley.

- 'Chillai Kalan' is a Persian term which means 'major cold'.
- Chillai Kalan is the 40-day harshest spell of winter of the Kaashmir Valley.
- It is the coldest part of winter, starting from December 21 to January 29 every year. The cold wave is triggered by the sub-zero temperature.
- The ongoing cold wave is said to reach its peak with Kashmir's mountains covered in snow for weeks.
- It is said the snow during the period lasts longer and replenishes the streams, rivers and lakes of Kashmir.
- The bone-chilling cold condition is followed by a 20-day-long 'Chillai Khurd' and 10-day-long 'Chillai Bacha'.
- **Impacts** - The number of heart attack and stroke patients at Kashmir hospitals doubles in

winter due to the chilly weather.
- Not only the elderly, but young and healthy people come to hospitals with heart problems, and some of them are even brought dead.

Reference

1. https://www.thehindu.com/todays-paper/tp-national/chillai-kalan-puts-kashmir-in-a-deep-freeze/article38008523.ece
2. https://indianexpress.com/article/lifestyle/life-style/chillai-kalan-harshest-40-days-winter-kashmir-interesting-facts-winter-solstice-7682873/

Genomic Sequencing

Scientists detect new variants of the virus that causes COVID-19 using the process called DNA sequencing.

- Genomic Sequencing or DNA Sequencing determines the order of the four chemical building blocks ('bases') or nucleotides that make up the DNA molecule - Adenine, thymine, cytosine and guanine.
- These nucleotides pair up together collectively to make up a genome that contains all the genetic information an organism needs to survive.
- When an organism replicates, it makes a copy of its entire genome to pass on to its offspring.
- Sometimes errors in the copying process can lead to mutations in which one or more building blocks are swapped, deleted or inserted.
- This may alter genes, and can affect the physical characteristics of that organism.

Types of Sequencing

- There are three generations of sequencing technologies -
    1. First-generation sequencing (used in the 1970s and 1980s) - Maxam-Gilbert method, and Sanger method (or dideoxy method),
    2. Next-generation sequencing or NGS (used since the late 1990s)
        - Second-generation sequencing and
        - Third-generation sequencing.
- Comparatively, the Next-generation sequencing technologies are able to process much higher volumes of DNA at the same time, significantly reducing the amount of time it takes to sequence a genome.
- **Sanger sequencing** involves cutting up DNA into short fragments and adding radioactive or fluorescent tags to identify each nucleotide. The fragments are then put through an electric sieve that sorts them by size.
- Compared with newer methods, Sanger sequencing is slow and can process only relatively short stretches of DNA.
- But it provides highly accurate data, and some researchers are still using this method to sequence SARS-CoV-2 samples.
- **Second-generation sequencing** marks each nucleotide with a specific colour. These technologies are able to read DNA directly.
- After DNA is cut up into fragments, short stretches of genetic material called adapters are added to give each nucleotide a different colour.
- Finally, these DNA fragments are fed into a computer and reassembled into the entire genomic sequence.

- **Third-generation sequencing** technologies like the Nanopore MinIon detect changes in an electrical current to identify nucleotides.
- As each pair of nucleotides disrupts the electrical current in a particular way, the sequencer can read these changes and upload them directly to a computer.
- This allows clinicians to sequence samples at point-of-care clinical and treatment facilities. However, Nanopore sequences smaller volumes of DNA compared with other NGS platforms.

Reference

1. https://www.downtoearth.org.in/blog/science-technology/genomic-sequencing-here-s-how-researchers-identify-omicron-and-other-covid-19-variants-80780
2. https://www.genome.gov/about-genomics/fact-sheets/DNA-Sequencing-Fact-Sheet
3. https://www.britannica.com/science/DNA-sequencing

Cut on Basic Customs Duty

Concerned over high prices of cooking oils, the Central Board of Indirect Taxes and Customs (CBIC) has cut the basic customs duty (BCD) on refined palm oil from 17.5% to 12.5% till March 2022.

> Basic Customs Duty is a type of duty or tax imposed under the Customs Act, 1962. It varies for different items and the Central government has the power to reduce or exempt any goods from the charges.

- This cut is done by the government to boost domestic supplies and bring down rates in the domestic retail markets.
- With the reduction in the BCD, the effective levy (including social welfare cess) on both refined palm oil and refined palmolein will come down from 19.25% to 13.75%
- All these measures have been put in place at a time when inflation is ruling high.

Other Types of Customs Duty

- **Countervailing duty** (CVD) is also known as the additional duty.
- It is equal to the excise duty imposed on a product manufactured or produced in India. It is implemented under Section 3 (1) of the Indian Custom Tariff Act.
- **Special CVD** - In order to equalise imports with local taxes which are imposed from time to time, a special CVD is imposed on imported goods.
- **Anti-Dumping duty** - Often companies in developed countries sell their goods at a lower rate in developing countries.
- This may be done to dispose off their excess goods or to damage the domestic economy. Hence, every government imposes an anti-dumping duty to ensure that the product being sold is not below the normal rate.
- **Protective duties** - Whenever the Central government feels the need to protect the interests of Indian industry, it imposes protective customs duty at recommended rates as per Section 6 of Customs Tariff Act, 1975.
- **Related Links** - Difference between Customs duty & Anti-Dumping Duty

Reference

1. https://www.thehindu.com/todays-paper/tp-business/govt-cuts-import-duty-on-refined-palm-oil-to-125/article38008443.ece

2. https://www.business-standard.com/article/economy-policy/govt-cuts-import-duty-on-refined-palm-oil-to-12-5-121122100022_1.html
3. https://www.news18.com/news/india/custom-duty-meaning-and-definition-what-is-custom-duty-what-are-the-different-types-2213797.html

Project 15B

Warship Mormugao (D 67) sails for maiden sea trials.

- Mormugao is Indian Navy's second indigenous stealth destroyer of the Project 15B being built at Mazagon Dock Shipbuilders Ltd (MDSL).
- Project 15B class of guided missile destroyers (Visakhapatnam, Imphal and Surat) are an improved variant of the Kolkata-class destroyers.
- Project 15B ships retain the hull design of the Kolkata-class destroyers but incorporate advanced stealth features & a high degree of automation.
- Designed indigenously by the Directorate of Naval Design, the vessels will offer improved survivability, sea keeping and high manoeuvrability.
- These warships are propelled by 4 gas turbines to achieve excess speed.
- The first ship of Project 15B is a guided missile destroyer christened 'Visakhapatnam (D 66)'. It was launched in 2015.
- **Related Links** - INS Vela

Reference

1. https://www.newindianexpress.com/nation/2021/dec/19/mormugao-second-ship-of-the-project-15b-of-indian-navy-sails-for-maiden-sea-trials-on-goa-liberatio-2397357.html
2. https://www.naval-technology.com/projects/project-15b-guided-missile-destroyers/

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