Prelim Bits 21-08-2022 & 22-08-2022| UPSC Daily Current Affairs

Stem Cell Harvesting

Stem Cell Harvested from Gum tissue promising results in treatment of nerve-related disorders

- Till now bone marrow has been the single most common source of stem cells.
- But extract cells from the bone marrow is very difficult and time consuming.
- Also these cells are likely afflicted with arthritis or such condition related to the bone.
- To overcome these challenges other sources such as the umbilical cord or adipose tissue are being tapped too.
- A recent study by Savitribai Phule Pune University shows that, stem cells from gingival tissue were effective in regenerating neuronal cells.
- Gum tissue were extracted from healthy patients undergoing root canal treatment, teeth extraction or crown implants.
- Under lab conditions the growth of the stem cell culture from these gum tissues was uniform, irrespective of the donor's age.
- Typically, with age, stem cells tend to develop tumours over time.
- This was not observed in the lab growth derived from gingival tissue.
- These stem cells were effective in regeneration of neuronal cells irrespective of age on account of their retained neuronal differentiation ability.
- For this autologous therapy is more preferred to Allogeneic therapy.

    - Allogeneic therapy involves the use of donated stem cells.
    - Autologous therapy involves the use of one's own stem cells.

- However they were less effective for elderly people when induced to develop osteoblasts or bone cells, or adipose tissue.
- It will help in help in the treatment of nerve-related disorders such as Parkinson's and Alzheimer's.
- It was also effective in reversing the lung damage due to Covid-19 infection.
- Mice were injected lipopolysaccharides (LPS) a bacterial infection that affects lungs similar to Covid-19 infection.
- For Mice injected with stem cells the of degeneration lungs was less by 50-60 per cent.

References

1. https://www.thehindubusinessline.com/business-tech/a-toothy-solution-for-stem-cell-harvesting/article65792273.ece

NAFIS - National Automated Fingerprint Identification

System

India has inaugurated a National Automated Fingerprint Identification System

- National Automated Fingerprint Identification System was launched at the at the two-day National Securities Strategies (NSS) Conference.
- It was developed by the National Crime Records Bureau (NCRB) at the Central Fingerprint Bureau (CFPB).

Advantages –

- It will help in the quick and easy disposal of cases with the help of a centralised fingerprint database.
- The project is a country-wide searchable database of crime- and criminal-related fingerprints.
- The web-based application functions as a central information repository by consolidating fingerprint data from all states and Union Territories.
- The law enforcement agencies to upload, trace, and retrieve data from the database in real time on a 24×7 basis.

NFN Number –

- A unique 10-digit National Fingerprint Number (NFN) will be assigned to each person arrested for a crime.
- It will be used for his lifetime. Different crimes registered under different FIRs will be linked to the same NFN.
- The unique identifier is also available for CCTNS (Crime and Criminal Tracking Network & Systems) database as both are connected at the backend.

History of Fingerprint identification –

- The uniqueness of every individual's fingerprints was first proposed in Europe by the German anatomist Johann Mayer in 1788
- Late it was confirmed through detailed studies by the Scottish doctor Henry Faulds.
- The system was tested by British in India before it spread to Europe and beyond.
- Initially it was used for administrative rather than criminal purposes.
- William Herschel the chief administrator of the Hooghly used it to ensure that the correct person was receiving government pensions, signing land transfer deeds, and mortgage bonds.
- Later it was used to differentiate criminal tribes from the ordinary criminals.
- The world's first Fingerprint Bureau was established in Calcutta by the Bengal Police.
- Identifying a single fingerprint from the database was troublesome process.
- To overcome this Haq a sub-inspector under Edward Henry devised a system of primary classification called "Henry System of Classification".

References

1. https://indianexpress.com/article/explained/explained-what-is-nafis-and-the-story-of-how-fingerprinting-began-in-india-8102544/
2. https://www.thehindu.com/news/national/amit-shah-inaugurates-national-security-strategies-conference/article65780732.ece

Forever Chemicals

Per- and polyfluoroalkyl substances(PFA) used in making products that products that resist grease, water and oil are contaminating rainwater globally

- Rainwater from different places across the globe is contaminated with “per- and polyfluoroalkyl substances.
- They are called “forever chemicals” because of their tendency to stick around in the atmosphere, rainwater and soil for long periods of time.

Uses –

- They are used to make nonstick cookware, water-repellent clothing, stain-resistant fabrics, cosmetics, firefighting forms and many other products that resist grease, water and oil.

Environmental impact –

- PFAs can migrate to the soil, water and air during their production and use.
- Since most PFAs do not break down, they remain in the environment for long periods of time.
- They also build up in people and animals who are repeatedly exposed to the chemicals.

Health risks –

    - Decreased fertility
    - Developmental effects in children
    - Interference with body hormones
    - Increased cholesterol levels
    - Increased risk of some cancers

Removal process –

- PFA in rainwater can be removed using a filtration system with activated carbon.
- The activated carbon will need to be removed and replaced regularly. Also, the old contaminated material must be destroyed.
- A research by United States Environmental Protection Agency (EPA) showed that PFA treated with dimethyl sulfoxide (DMSO) and then mixed with sodium hydroxide began to degrade.
- However, this method doesn’t work for all PFAs and only works for certain PFA subsets.

References

1. https://indianexpress.com/article/explained/explained-health/explained-forever-chemicals-contaminating-rainwater-globally-8102861/
2. https://www.thehindu.com/sci-tech/science/scientists-find-simple-safe-method-to-destroy-forever-chemicals/article65787410.ece

Himachal Pradesh prone to natural disasters

The recently released State of Environment report throws insights on natural disasters in Himachal Pradesh.

Key findings –

- Himachal Pradesh is vulnerable to 25 out of 33 identified types of hazards.
- Himachal Pradesh experiences the fury of nature in the form of landslides, cloud bursts, flash floods, snow avalanches and droughts year after year.
- The increase in natural hazards have become a matter of immediate concern.
- Notwithstanding, the continuous efforts made by the Government to cope with natural hazards through relief and rehabilitation measures, landslides and snow avalanches continue to inflict widespread harm and damage to human life as well as property.
- Recently the incidence of cloudbursts has become unprecedented.
- About 58% of the land is subjected to intense soil erosion.
- The roads that are the State's lifeline are repeatedly damaged, blocked or washed away by one or other acts of nature.
- In the circumstances, the Government has to divert the already scarce resources of the state for relief and rehabilitation measures.
- The State is also confronting the emerging threats of climate change, and man and animal conflict.
- **Causes -** Increased pressure on the mountain environment
- The area is environmentally fragile and ecologically vulnerable.
- Large variations in physio-climatic conditions.

Vulnerability matrix –

- A vulnerability matrix has been developed for the State as a whole.
- It classifies the districts based on risk status as
    - Very high vulnerable risk status.
    - High vulnerable risk status.
    - Moderate vulnerable risk status
- The districts of Chamba, Kinnaur and Kullu, and parts of Kangra and Shimla falls under very high vulnerable risk status.
- The districts of Kangra, Mandi, Una, Shimla, and Lahaul and Spiti, fall in "high" vulnerable risk status.
- The districts of Hamirpur, Bilaspur, Solan and Sirmour fall in the "moderate" vulnerable risk status.

Disaster Specific vulnerability matrix –

- A qualitative weightage was given on a scale of 0-5 for different hazards such as earthquakes, landslides, avalanches, industrial hazards, construction type, and density of population.
- A district-wise matrix was prepared by evaluating the risk severity.
- The evaluation also gave weightage to the density of the population likely to be affected.
- The matrix includes the evaluation of hazards likely to be induced on account of developmental works such as hydel projects, roads, and industries.

Earthquake vulnerability –

- Very High Vulnerability Category - The districts of Kangra, Hamirpur and Mandi fall in this category.
- High earthquake vulnerable districts - The districts of Chamba, Kullu Kinnaur, and a part of the Kangra and Shimla districts
- Moderate and low vulnerable districts - Una, Bilaspur, Sirmour and Solan, Shimla, and Lahaul-Spiti.

Landslide vulnerability –

- High landslides vulnerable districts - Chamba, Kullu, Kinnaur, and parts of Kangra and Shimla districts.
- Moderate landslides vulnerable districts - Kangra, Mandi, Bilaspur, Shimla, Sirmour, and Lahaul-Spiti districts.
- Low landslides vulnerable districts - Una, Hamirpur, and Solan districts.

Avalanche hazard vulnerability –

- very high vulnerable districts - Lahaul-Spiti and Kinnaur
- moderate vulnerable districts - Chamba, Kullu, and part of Kangra and Shimla.

Flood hazard vulnerability –

- very high vulnerable districts – Chamba, Kullu Una, and Kinnaur
- moderate & low vulnerable districts - Lahaul-Spiti, Mandi, Shimla, Kangra, Hamirpur, Bilaspur, Solan, and Sirmour.

References

1. https://www.thehindu.com/sci-tech/energy-and-environment/annual-trysts-with-natures-fury-reveal-himachal-pradeshs-reckoning-with-fragile-ecology/article65790936.ece

EU's Enhanced Surveillance Framework

Greece has announced that it has exited the European Union's enhanced surveillance framework.

Enhanced surveillance framework

- Enhanced surveillance is a post-programme framework adapted to Greece in view of the longstanding crisis and challenges faced.
- It will support the continuation, completion, and delivery of reforms agreed under the programme, in line with the commitments made by the Greek authorities through a close monitoring of the economic, fiscal and financial situation and its evolution.
- **Monitoring**- Monitoring will be undertaken by the Commission, in liaison with the European Central Bank (ECB), and where appropriate, with the IMF.
- Enhanced surveillance provides for quarterly reports, which will be the basis for the activation of policy-contingent debt measures agreed in the Euro group statement.
- The funds provided by the ESM are linked to progress in implementing the policy conditions agreed in the MoU.
- **Four pillars of the policy**:
    - Restoring fiscal sustainability
    - Safeguarding financial stability
    - Growth, competitiveness and investment
    - A modern State and public administration
- Greece's economic performance and policies have been closely monitored under the framework since 2018 to ensure it implemented reforms promised under three international bailouts.
- **Significance of Greece’s exit-** Greece's emergence from the enhanced surveillance will bring closer the country's goal of regaining an investment grade credit rating.

A new chapter for Greece

- **2009**- Greece informed the Euro group that the 2009 deficit could reach 12.5% of gross domestic product.
- **2010**- The Euro group agreed to provide bilateral loans through the Greek Loan Facility to help Greece meet its financing needs.
- **2012**- Euro group agreed that the European Financial Stability Facility will provide additional credit to help Greece meet its financing needs.
- **2015**- European Financial Stability Facility programme for Greece expired. So the Greek authorities requested a European Stability Mechanism stability support programme.
- The Council of the EU granted Greece short-term financial assistance ('bridge financing') under the European Financial Stability Mechanism.
- Commission signed MoU on behalf of the European Stability Mechanism with Greece and published assessment of the programme's social impact.
- **2022-** Greece has announced that it has exited the European Union's enhanced surveillance framework.

References

1. https://www.thehindu.com/business/Economy/greeces-exit-from-enhanced-eu-scrutiny-ends-12-years-of-pain-pm/article65791373.ece
2. https://economy-finance.ec.europa.eu/eu-financial-assistance/euro-area-countries/financial-assistance-greece_en#taskforceforgreece
3. https://economy-finance.ec.europa.eu/system/files/2018-08/05_timeline_of_events_2.pdf