

## Prelim Bits 14-08-2023 | UPSC Daily Current Affairs

### CATCH DNA

*Researchers used CRISPR to engineer bacteria to detect colorectal cancer in mice.*

#### The technology

- **Tumour DNA** - Researchers working at the frontiers of advanced biological sensors have engineered bacteria that can detect the presence of tumour DNA in a living organism.
- **Biosensors** - This new technology, which detected cancer in the colons of mice, can pave the way for new biosensors that can be used to detect cancers, infections and other diseases.
- In the past, researchers have used bacteria for many medical purposes, but this is the first time they have engineered it to identify specific DNA sequences and mutations outside of cells.

### CATCH

- CATCH or the Cellular Assay for Targeted CRISPR-discriminated Horizontal gene transfer has been described in a research article published in the journal Science.
- **Tumours** - They often disperse their DNA into their surroundings.
- This DNA can be purified and analyzed in labs but it is difficult to detect in the environments where it is released.
- To develop CATCH, the researchers engineered bacteria using CRISPR technology to test free-floating DNA sequences and compare them with predetermined cancer sequences.

*Many bacteria have a skill called natural competence where they can take up DNA from the environment.*

### Acinetobacter baylyi

- The researchers employed *Acinetobacter baylyi*, a bacteria with this skill, to detect cancer.
- *A. baylyi* was engineered using CRISPR technology to detect a mutated KRAS gene which helps colorectal cancer grow.
- **Resistance Gene** - When the engineered bacteria detect any of the mutated tumour DNA, it turns on an antibiotic resistance gene, which makes them resistant to a specific drug.
- Once researchers find bacteria that are resistant to the drug, they know that cancer

has been detected.

## Reference

1. [The Indian Express - Scientists engineer bacteria to detect cancer DNA](#)

## Pradhan Mantri Uchchatar Shiksha Abhiyan (PM-USHA) Scheme

*Around 14 States yet to join Centre's flagship education scheme.*

- **New name** - PM-USHA is the new name for the Ministry of Education's scheme to improve the quality of higher education in State Universities.
- **Aim** - To improve quality through curricular & programme changes, teacher training, physical and digital infrastructure, accreditation, and enhancing employability, while ensuring equity, access, and inclusion.
- States are required to sign a MoU with the Centre.
- The MoU mandates the implementation of the National Education Policy in order to avail funds for the next 3 years, under the Centre's flagship scheme for State-run higher education.

*Kerala, Tamil Nadu and West Bengal are among 14 States and Union Territories, which are yet to sign a crucial Memorandum of Understanding (MoU) with the Union Education Ministry.*

- Nearly 40% of the PM USHA budget must be borne by the States themselves, and no extra funds have been earmarked for NEP reforms.
- The MoU makes it mandatory for States to undertake the administrative, academic, accreditation, and governance reforms detailed in the NEP.
- These include an academic credit bank, entry and exit flexibility, and the Samarth e-governance platform.
- PM-USHA carries forward the vision of the earlier Rashtriya Uchstar Shiksha Abhiyan (RUSA), to improve the access, equity and quality of higher education in States.
- PM-USHA reduces the fragmentation of resources by streamlining the number of (scheme) components to six.

## References

1. [The Hindu - 14 States yet to join Centre's flagship education scheme](#)
2. [Education.gov - Pradhan Mantri Uchchatar Shiksha Abhiyan \(PM-USHA\)](#)

## Manuscripts

*India has a large collection of ancient manuscripts, a part of the country's cultural heritage, but over the years many have been lost or lie in museums abroad.*

## The Bill

- The government is planning to introduce the National Manuscripts Bill, 2023, in the

Winter Session of Parliament.

- The Bill is still being worked out, and the primary aim is to document and catalogue Indian heritage texts wherever they may be, in India or abroad.
- It also aims to maintain accurate and up-to-date information about them, and detail the conditions under which they may be consulted.
- The Bill envisages setting up a 10-member National Manuscripts Authority (NMA).
- The National Manuscripts Authority would be the apex policy making body with regard to digitisation, conservation, preservation, editing, and publication work of manuscripts.

*75% of the existing manuscripts are in Sanskrit, 25% are in regional languages.*

## Manuscripts

- A manuscript is a handwritten composition on paper, bark, cloth, metal, palm leaf or any other material dating back at least seventy-five years that has significant scientific, historical or aesthetic value.
- Lithographs and printed volumes are not manuscripts.
- Manuscripts are found in hundreds of different languages and scripts.
- Often, one language is written in a number of different scripts.
- For example, Sanskrit is written in Oriya script, Grantha script, Devanagari script and many other scripts.
- Manuscripts are distinct from historical records such as epigraphs on rocks, firmans, revenue records which provide direct information on events or processes in history.
- Manuscripts have knowledge content ranging from history and religion to literature, astrology, and agricultural practice.

*India possesses an estimated 10 million manuscripts in 80 ancient scripts like Brahmi, Kushan, Gaudi, Lepcha, and Maithili.*

- **National Mission for Manuscripts (NMM)** - It is an autonomous body under the Culture Ministry, which is mandated with preserving the vast manuscript wealth of India.
- **The Bakhshali manuscript** - It is an ancient Indian mathematical text written on birch bark, is considered to be the earliest recorded example of the use of zero.
- The seminal text, dating back roughly to the third or fourth century A.D., is in one of the Bodleian Libraries of the University of Oxford.
- Many other Indian manuscripts lie in libraries across the globe or are with private collectors, both in India and abroad.

## References

1. [The Hindu - Government plans law on protection of Indian manuscripts](#)
2. [NMM - Manuscripts](#)

## **National Syllabus and Teaching Learning Material Committee (NSTC)**

*NCERT forms 19-member panel for textbooks revision and the committee will formulate new textbooks for grades 3 to 12, under the NEP.*

- In an internal note circulated in the Ministry of Education, the high-powered committee is named, The National Syllabus and Teaching Learning Material Committee (NSTC).
- National Curriculum Framework for School Education (NCF-SE 2023) was initiated with the constitution of National Steering Committee, as a follow up to the National Education Policy (NEP).
- The NCF-SE is now in the advanced stages of development and shall act as the reference point and guiding roadmap for the syllabus and textbook developers for School Educational over the country.
- The NSTC will be assisted by Curricular Area Groups (CAGs) to develop textbooks and other teaching learning materials for each of the subjects included in the syllabus.
- The Chairperson and Co-chairperson of NSTC will constitute the CAGs with appropriate experts and with the support of NCERT.
- The NSTC will be free to invite other experts for advice, consultation, and support as and when required.
- The NSTC will be assisted by a Programme Office set-up by the NCERT and NCERT shall provide all necessary expertise and support as per the needs of the INSTC.

### **References**

1. [The Hindu - NCERT forms 19-member panel for textbooks revision](#)
2. [Times of India - NCERT forms committee to develop school syllabus](#)

## **India-made MRI scanner**

*First India-made MRI scanner to be launched for clinical work in October.*

### **Helium**

- Since 2006, the world has been battling a shortage of helium, which despite being the second most abundant element in the universe, is a rare commodity on earth.
- The only way to source helium is to extract it from natural gas reserves.
- Helium is used in a variety of applications, from electronic components to rocket propulsion.
- Helium's most common use is as a coolant in large superconducting magnets powering Magnetic Resonance Imaging (MRI) scanners.
- The Russia-Ukraine war has further squeezed liquid helium supply with ripple effects on diagnostic facilities around the world, including India, thus unable to fully utilize their MRI scanners.

### **Indian MRI**

- The indigenously developed machine is characterized by several innovations, including avoiding reliance on scarcely available liquid helium, bottom-up software design, and

customized hardware.

- This MRI scanner is designed in a way to avoid reliance on liquid helium.
- If at all there is a need to rapidly cool the scanner's magnets, the far cheaper and more abundant liquid nitrogen can be used to get the job done.
- These and other innovations characterize the first made-in-India MRI scanner developed by the Bangalore-based Voxel grids Innovations Private Limited.
- MRI, the definitive tool to provide three-dimensional images of tissues, and the best bet for warning of nascent Tumours, continues to be inaccessible to several Indians who require it.
- The Voxel grids scanners, is not different from the conventional doughnut-shaped machines into which people, shorn of any metal on their persons, must lie perfectly immobile while they are scanned.

## Reference

1. [The Hindu - First India-made MRI scanner to be launched for clinical work](#)

