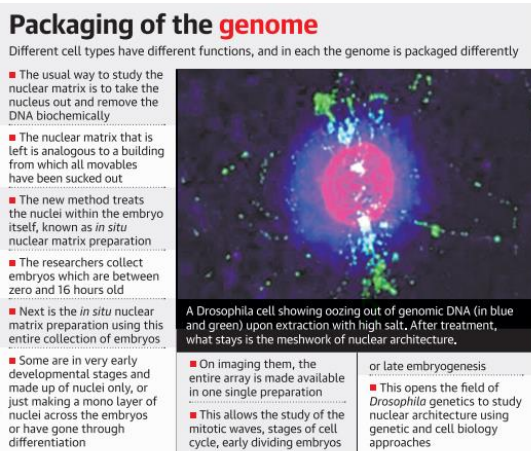


## Nuclear matrix

- Every cell that makes up an organism contains a copy of its genome.
- This genome is packaged in special ways with the help of a structure known as the nuclear matrix.
- The nuclear matrix gives an organization and architecture to the nucleus.



THE HINDU

### (DEET) and mosquitoes

- Mosquito repellents work on the principle of obfuscating the insect's sense of smell.
- The most common chemical in repellents, diethyltoluamide (DEET) for instance, confuses the mosquito's antennae that's sensitive to sweat and carbon dioxide from the human body.

- However, this and several other ingredients such as picaridin, IR3535, and eucalyptus oil are not fool proof.
- The reason for this, a study this month in the journal Cell reports, is that mosquitoes have evolved resilient backups in their olfactory system that make sure they can always smell our scents.
- 1-octen-3-ol, is a chemical secreted in human sweat that can be detected only by specific set of neurons in people and mosquitoes.
- In these insects, however, these neurons are also stimulated by amines, another type of chemical mosquitoes use to look for humans.

THE HINDU

### Study of mars and earth evolution

- The rover Perseverance landed in the Jezero Crater, a spot chosen partly for the crater's history as a lake and as part of a rich river system.
- But what the rover found once on the ground was startling.
- Rather than the expected sedimentary rocks washed in by rivers and accumulated on the lake bottom many of the rocks are volcanic in nature.

- The rocks and lava the rover is examining on Mars are nearly 4 billion years old.
- Rocks that old exist on Earth but are incredibly weathered and beaten, thanks to Earth's active tectonic plates as well as the weathering effects of billions of years of wind, water, and life.
- On Mars, these rocks are pristine and much easier to analyse and study.
- Understanding the rocks on Mars, their evolution and history, and what they reveal about the history of planetary conditions on Mars helps researchers understand how life may have arisen on Mars and how that compares with early life and conditions on ancient Earth.
- Scientists can use conditions on early Mars to help extrapolate the environment and conditions on Earth at the same time when life was beginning to arise.
- What is more concerning is that these microbes are evolving faster than we can invent drugs to tackle them.
- Our stash of antimicrobials is drying up while more drug resistant 'superbugs' are evolving and taking over the world.
- Antimicrobial resistance (AMR) is a growing health crisis and tackling it needs a multi-pronged approach.
- We need newer, more effective antimicrobial drugs, improved access to life-saving antimicrobials across the globe; better diagnostics to identify drug-resistant infections and treat them with drugs that work, and robust surveillance systems to monitor the spread of drug resistant infections.
- India is projected to have 1.6 million multi-drug resistant infectious cases in 2040, which is significantly higher than any country.
- One way to prevent the reckless overuse of antimicrobials is to diagnose what's causing an infection early, which helps determine the right course of drugs
- Lack of funding in pharmaceutical research, clinical trial and supply chain challenges, and regulatory hurdles have slowed down new antibiotics development.

## **THE HINDU**

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### **Growing antibiotic resistance**

- Our reckless use of antibiotics, including penicillin, has given rise to bacteria, viruses, fungi, and parasites that have become resistant to commonly used antimicrobials.

- In India, where 80% urban healthcare providers are private, resource-starved hospitals struggle to procure pricey antibiotics.
- Innovative pricing models, bulk procurement of such antibiotics and guaranteed purchase commitments from hospitals could not only reduce cost but also imbibe confidence in pharma companies that have invested in antibiotics research.
- The rollout of universal health coverage in India could improve access to antibiotics for more than 100 million families by reducing out-of-pocket spending for individuals while also easing procurement for the government with bulk orders.
- AMR is an emerging pandemic, and India is the AMR capital of the world a distinction that calls for swift action from policymakers and the scientific community.
- NASA's Orion spacecraft is built to take humans farther than they've ever gone before.
- Orion will serve as the exploration vehicle that will carry the crew to space, provide emergency abort capability, sustain the crew during the space travel, and provide safe re-entry from deep space return velocities.
- Orion will launch on NASA's new heavy-lift rocket, the Space Launch System.

## **THE HINDU**

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### **Herpes simplex virus**

- DNA extracted from ancient human teeth indicates that herpes simplex virus 1 (HSV-1) the cold-sore virus was first seen in what is now Europe around 5,000 years ago.
- Changing cultural practices during the Bronze Age including the emergence of romantic kissing could have factored into HSV-1's meteoric rise.

### **About the herpes simplex virus (HSV)**

- The herpes simplex virus (HSV) is categorized into 2 types: HSV-1 and HSV-2.

## **THE HINDU**

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### **Orion**

- The most powerful rocket ever built will soon launch, carrying the Orion capsule that NASA hopes will soon transport astronauts back to the Moon

- HSV-1 is mainly transmitted by oral-to-oral contact, causing oral herpes (including symptoms known as cold sores), but it can also lead to genital herpes.
- HSV-2 is a sexually transmitted infection that causes genital herpes.
- An estimated 3.7 billion people under age 50 (67%) have HSV-1 infection globally.
- An estimated 491 million people aged 15–49 (13%) worldwide have HSV-2 infection.
- Most HSV infections are asymptomatic, but symptoms of herpes include painful blisters or ulcers that can recur over time.
- Infection with HSV-2 increases the risk of acquiring and transmitting HIV infection.

**THE HINDU**

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