



Obelisks

Source: TH

Why in News?

Scientists at Stanford University have identified a new, remarkably simple form of life, which they have named "**obelisks**."

- These obelisks bridge the **gap between viruses and viroids** in terms of complexity, adding a new category to the existing spectrum of life forms.
- Obelisks were identified through an extensive analysis of RNA sequences from bacteria in the human gut, using **next-generation sequencing (NGS) technology**.

Note

- NGS is a **Deoxyribonucleic acid (DNA) sequencing technology** that uses parallel sequencing to determine the **sequence of multiple small fragments of DNA**. It is used to determine the **order of nucleotides** in entire genomes or targeted regions of DNA or RNA.
 - Nucleotides are organic molecules that are the basic building blocks of nucleic acids DNA and Ribonucleic acid (RNA).

What are Obelisks?

- Obelisks are a new class of virus-like entities. They are composed of diverse RNA molecules that reside within the human body and the global microbiome.
- Obelisks exhibit **highly symmetrical, rod-like structures** resembling the iconic **monuments (Obelisk)**.
- Their genetic sequences are approximately 1,000 nucleotides long, with no detectable similarities to known biological agents.
- The new study analyzed RNA data from gut and oral bacteria but couldn't determine which bacteria hosted a given obelisk.
 - While initial findings suggest a possible link to the bacterial species **Streptococcus sanguinis**, commonly found in the human mouth.
- The discovery of obelisks raises questions about their genome replication, transmission, pathogenicity, evolution, and potential roles in human health and disease.
 - Further research is needed to unravel the mysteries surrounding Obelisks, shedding light on their ecological significance and impact on human health.

Feature	Viruses	Viroids
Discovery	Dmitry Ivanovsky was the first to discover viruses at the end of the 19 th century.	Discovered by Theodor Diener in 1971 while studying the pathogen causing potato spindle tuber disease.

Composition	Each virion contains a nucleic acid (DNA or RNA) core surrounded by a protein coat , sometimes with a lipid layer outside.	Consists of naked RNA without a lipid layer or protein coat, primarily composed of a single-stranded circular RNA molecule .
Size	Varied in size, generally smaller (30-50 nm).	Smaller compared to viruses.
Host Range	Can infect a wide range of organisms , including plants and animals.	Primarily infect plant cells , causing various diseases characterized by stunted growth, leaf distortion, and other symptoms.
Replication Method	Depends on host cells to replicate and propagate themselves.	Enter a cell as RNA, force the cell to produce more copies of itself, and then infect other cells, primarily through mechanical transmission, seed transmission, pollen, and insect vectors.
Genetic Material	Contains either DNA or RNA, which may code for proteins.	Contains RNA, but does not code for any protein.
Examples	Influenza virus , rabies virus , Herpes virus , SARS-CoV-2 .	Potato spindle tuber viroid (PSTVd), Citrus exocortis viroid (CEVd), Coconut cadang-cadang viroid (CCCVd).

UPSC Civil Services Examination, Previous Year Question:

Prelims

Q. Consider the following statements: (2017)

1. In tropical regions, Zika virus disease is transmitted by the same mosquito that transmits dengue.
2. Sexual transmission of Zika virus disease is possible.

Which of the statements given above is/are correct?

- (a) 1 only
 (b) 2 only
 (c) Both 1 and 2
 (d) Neither 1 nor 2

Ans: (c)