



# Obelisks

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## 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	<b>Dmitry Ivanovsky</b> was the first to discover viruses at the end of the 19 <sup>th</sup> century.	Discovered by <b>Theodor Diener</b> in 1971 while studying the pathogen causing potato spindle tuber disease.

<b>Composition</b>	Each virion contains a nucleic acid (DNA or RNA) core surrounded by a <b>protein coat</b> , sometimes with a lipid layer outside.	Consists of <b>naked RNA without a lipid layer</b> or protein coat, primarily composed of a single-stranded <b>circular RNA molecule</b> .
<b>Size</b>	Varied in size, generally smaller (30-50 nm).	Smaller compared to viruses.
<b>Host Range</b>	Can infect a <b>wide range of organisms</b> , including plants and animals.	Primarily <b>infect plant cells</b> , causing various diseases characterized by stunted growth, leaf distortion, and other symptoms.
<b>Replication Method</b>	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.
<b>Genetic Material</b>	Contains either DNA or RNA, which may code for proteins.	Contains RNA, but does not code for any protein.
<b>Examples</b>	<a href="#">Influenza virus</a> , <a href="#">rabies virus</a> , <a href="#">Herpes virus</a> , <a href="#">SARS-CoV-2</a> .	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)**