

Hydrogels with tunable bacterial activities

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Why in news?

Recently, researchers at the Indian Association for the Cultivation of Science (IACS), Kolkata has fabricated Hydrogels which can be tuned with different bacteria-killing properties.

The concept

- These hydrogels were manufactured or mixed in the **presence of silver acetate and phenylboronic acid**, when the natural nucleoside molecule cytidine assembled in an hydrogel.
- This hydrogel is **found against Gram-negative bacterial strains such as E.Coli** to show antibacterial activity.
- The antibacterial activity of Silver Acetate is known, but due to its toxicity it can not be used.
- However the toxicity was reduced and thus suitable to treat bacterial infections when silver acetate is incorporated in the hydrogel.
- As the **hydrogel decreases the cell size of the E.coli by the inclusion of metal, its cell membrane gets disrupted, allowing the cellular material to spill.**
- The silver-acetate hydrogel was not shown to be harmful to natural kidney and red cells.
- A large number of hydrogels with various bacterial killing properties can be produced by **changing the boronic acid component in Hydrogel.**
- The property of certain gels or liquids which are dense or viscous and become fluid (thin, less viscous) at time when they are shaken, agitated, sheared or otherwise stretched is called **thixotropy**. For eg, painting quickly

disappears and the surface is set as water (or oil)
instantly evaporates.