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Development of Synthetic Flavonoids

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Why in News

Recently, scientists from **Agharkar Research Institute (ARI)**, Pune have found the first **synthetic route for producing flavonoids molecules** related to the treatment of tuberculosis and chikungunya.

ARI is an **autonomous institute of the Department of Science and Technology (DST)**, Government of India.

Key Points

- It is for the **first time that scientists have been able to synthesize the flavonoid molecules** such as **rugosa flavonoids, podocare flavone and isoflavone** in a lab.
 - These three molecules have so far been isolated from plants only and are found to **inhibit tuberculosis and chikungunya**.
- **Flavonoids:**
 - Flavonoids are part of the **polyphenol class of phytonutrients (plant chemicals)** found in almost all fruits and vegetables. Along with **carotenoids** (organic pigments), they are **responsible for the vivid colours** in fruits and vegetables.
 - Polyphenols have historically been used in **Chinese and Ayurvedic medicine** and are associated with skin protection, brain function, blood sugar and blood pressure regulation.
 - These are **powerful antioxidants with anti-inflammatory and immune system benefits** as well. A diet rich in flavonoids can protect from diseases related to heart, liver, kidney, brain and other infectious diseases.

- **Significance of the Research:**
 - **Availability:** It will ensure their **availability at all seasons** without the dependence on natural timings of the plantations.
 - **Uniformity:** Inconsistency in natural products can occur in different seasons, places and species. Man-made molecules will have a **uniform structure and medicinal properties** similar to the natural product.
 - **Less-exploitative:** Acquiring them from labs will **solve the problem of over-exploitation of medicinal plants** which puts an extra burden on the environment.
 - **Cost-effective:** The development method in labs is **simple and cost-effective** as well.
- **Other Possible Use of Flavonoids:**
 - Flavonoids can **ease the lives of women who face problems in the premenopausal stage** because its chemical structure is similar to the female hormone **17-beta-estradiol**.
 - **Estradiol** is an estrogen steroid hormone and the major female sex hormone which is involved in the regulation of the estrous (oestrous) and menstrual female reproductive cycles.
 - **Premenopausal stage** refers to the time when female bodies make the natural transition to menopause, marking the end of the menstrual cycles and reproductive years.
 - Preliminary indications and computational analysis show the **capacity of these molecules to inhibit Covid-19** by targeting spike protein and proteases (an enzyme that catalyzes proteolysis, the breakdown of proteins). Since flavonoids boost-up immunity, a **flavonoid-rich diet is recommended to stay safe from Covid-19**.

Source: PIB