Bacteria to Solve Math Problems

Source: TH

The recent advancements in **synthetic biology**, particularly the **engineering of bacteria** to perform mathematical computations at the **Saha Institute of Nuclear Physics in Kolkata**, represent a significant breakthrough in the field.

- Researchers have engineered ***Escherichia coli bacteria*** to act as **biological computers capable of solving mathematical problems**, such as determining whether a number is **prime or whether a letter is a vowel**.
    - This was achieved by introducing **genetic circuits** that can be activated by chemical inducers, allowing these bacteria to behave like **artificial neural networks (ANNs)**.
    - The team developed **bactoneurons**, engineered bacteria that function like **neurons** in a neural network.
        - These bactoneurons process **chemical inputs and produce fluorescent proteins** based on specific computations.
    - By converting **mathematical problems into binary code** represented by the presence or absence of chemical compounds, the bacteria could respond to queries with **fluorescent signals indicating "yes" or "no."**
- The **engineered bacteria were capable of** more than just simple tasks; they could also solve optimization problems, like calculating the number of pieces **a pie could be divided into with a given number of straight cuts.**
    - This capability suggests that bacterial computers can handle progressively more complex computational tasks, potentially leading to applications in various fields**.**

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