

Bacteria 'talk' to each other to coordinate their actions, research says

Single-celled organisms found to use electrical signals to communicate like human nerve cells

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We may never be able to look at “germs” with quite the same disdain again.

Scientists have discovered that bacteria – commonly reviled as primitive single-cell organisms that make us ill – can communicate with each other in a similar way to nerve cells in the human brain.

Researchers in the US found that – like human nerve cells – bacteria could use electrical signals to “talk” to each other. In this way, the seemingly primitive organisms can synchronize the actions of a colony of billions of microscopically small individuals to function “like a microbial brain”. It was even speculated that separate colonies could communicate with each other and co-ordinate their actions. The discovery came after the scientists noticed that once “biofilms” – slimy colonies of bacteria – reached a certain size, they grew in a series of periodic cycles.

By examining the colonies using a voltage-sensitive fluorescent dye, they discovered that the bacteria were sending signals to each other by releasing waves of electrically charged potassium particles called ions.

The tactic effectively allowed bacteria in the center of the colony to tell those on the outer edge that they were “hungry”. This prompted the bacteria at the colony’s outer “frontier” to stop using nutrients to divide to form new cells and increase the size of the group. Instead they let nutrients flow to their “hungry” colonists in the middle. To confirm the communication mechanism, the scientists removed from the bacteria the channel that allowed the electrically charged potassium particles to flow in and out of the organisms. The electrically-based communication stopped.

The research team’s lead scientist, Dr Gurol Suel, from the University of California in San Diego, said: “Just like the neurons in our brain, we found that bacteria use ion channels to communicate with each other through electrical signals. The community of bacteria within biofilms appears to function much like a ‘microbial brain’.”

By sending out electrical signals in the form of potassium ions, seemingly isolated communities of bacteria living in a liquid environment might be able to co-ordinate the way their metabolisms operated. “It is conceivable,” the researchers wrote, “that even physically disconnected biofilms could be capable of synchronizing their metabolic oscillations.”

Dr Suel said the discovery might help humans fight germs, especially the increasing number resistant to antibiotics. The way the bacterial communication was triggered was similar to a process in the human brain known as “cortical spreading depression” linked to migraines and epileptic seizures. “This suggests that many drugs for epilepsy and migraines may also be effective in attacking bacterial [colonies],” he added.

"New and Improved" Science In The News

Name:

Per:

Date:

1. READ and ANNOTATE (mark- up) the article on the reverse
2. WRITE a PARAGRAPH using the following sentence starters/prompts

SAY: (choose a quote that embodies the main argument of the article)

| | |
|---|---------------|
| To introduce quote How to imbed quote: X states, "_____" According to X, "_____" In the article, _____, X maintains that | Passage Quote |
|---|---------------|

MEAN: (Interpret what the quote/argument means)

| | |
|---|---|
| In other words... What the author means This passage suggests This passage implies Basically, x is saying X's point is that The essence of X's argument is that... | Paraphrase the author words Interpret the passage Read between the lines Explain what the author means |
|---|---|

MATTER: (Explain why this argument/new concept is important for us to know, use evidence from the text to prove your point. This should be several sentences)

| | |
|---|---|
| This is important/matters because.. Although___ may seem trivial, it is in fact crucial in terms of today's concern over___ Ultimately, what is at stake here is The findings/documents have important consequences for broader issues of.. The discussion of X is in fact addressing the larger matter These conclusions have significant applications in___ as well as in... | Tie back to your thesis Connect back to topic/theme When compared to....this idea holds true/false This is a weak point because _____ raised a good point ... People who _____ can relate |
|---|---|
