An eye on bacterial communication FREE

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Oscillations in biofilm growth reveal the role of ion channels in single-cell organisms.

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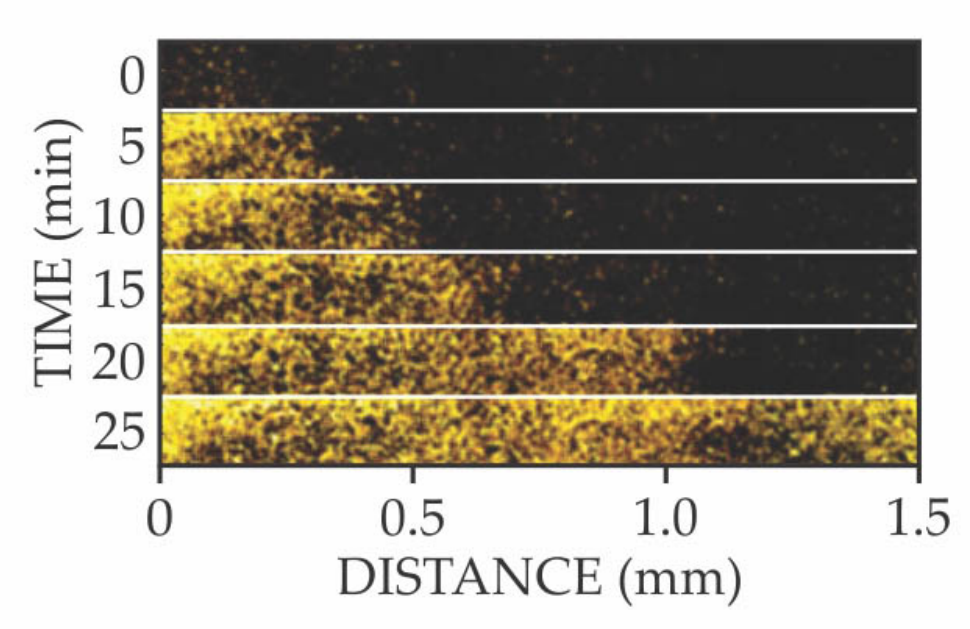
The membranes of all living cells contain proteins called ion channels that selectively allow specific ions to move in and out of the cells. In multicellular organisms, ion-specific channels help regulate electrochemical signaling between cells. Single-cell organisms like bacteria also have various ion-specific channels, but why they do has long been a puzzle. By studying bacterial biofilms —densely packed communities of cells attached to a surface—Gürol Süel (University of California, San Diego) and his colleagues have shown for the first time that bacteria also communicate via ion channels. In biofilms of *Bacillus subtilis*, the researchers observed that bacterial growth cyclically slowed down and sped up. Further, they found a correlation between those oscillations and the propagation of extracellular potassium ions from the film's interior to its periphery. They deduced that when peripheral cells overconsume the nutrient glutamate, the starved interior cells open a potassium-specific ion channel to release K^+. As shown in the fluorescence microscopy image, the K^+ signal (yellow) propagates across the length of the film. Crucially, the signal doesn't decay, a sign that neighboring cells actively amplify the K^+ signal by releasing their own K^+. The added extracellular K^+ changes the electrical potential across the peripheral cells' membranes and hinders them from absorbing glutamate. The cells in the interior can thus receive their share of nutrients. (A. Prindle et al., *Nature* **527**, 59, 2015.)



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