Bacteria produce aphrodisiac that sets off protozoan mating swarm

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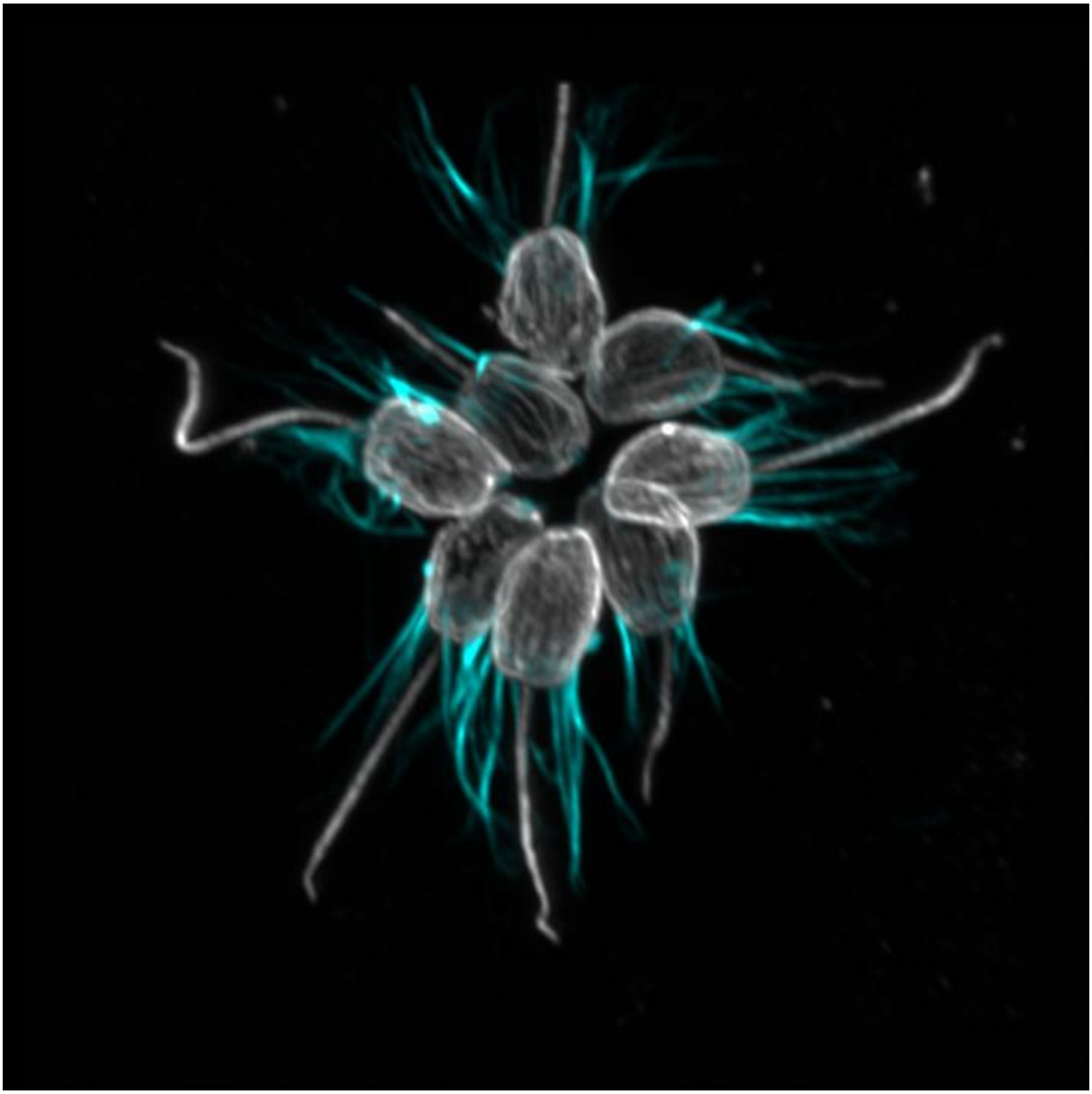

A chemical released by the bacterium, *Vibrio fischeri*, sends this protozoan, *Salpinogoeca rosetta*, into a mating swarm, demonstrating that bacteria can drive mating in eukaryotes. Credit: Arielle Woznica, University of California, Berkeley

Researchers seeking the evolutionary roots of the animal kingdom have discovered a bacterium, *Vibrio fischeri*, that acts as an aphrodisiac by releasing an enzyme that sends the choanoflagellate, *Salpinogoeca rosetta*, one of the closest living relatives of animals, into a full mating frenzy. Choanoflagellates are eukaryotes. Their cells have a membrane-bound nucleus containing their genetic material, and they live free as single cells and in multicellular colonies.

The scientists, Nicole King and Arielle Woznica of the University of California, Berkeley, with collaborators Jon Clardy and J.P. Gerdt at Harvard Medical School in Boston, discovered that within minutes after exposure to a chonodroitin sulfate (CS) lyase produced by *V. fischeri*, *S. rosetta* cells aggregate into mass mating swarms, entering into cell and nuclear fusion while duplicating and recombining their genetic material.

This is one of the first demonstrations that bacteria can drive mating in eukaryotes, say the authors who will present their work at the Annual Meeting of the American Society for Cell Biology (ASCB) in San Francisco on December 6. They add that this discovery "raises the possibility that environmental bacteria or bacterial symbionts may influence mating in animals as well."

The King lab at Berkeley has pioneered the exploration of the origins of multicellularity by looking at choanoflagellates for shared characteristics and behaviors conserved by evolution in animals. In recent years, the study of human biology has been shaken up by discoveries of how the

bacteria that live in the gut, the so-called microbiome, affect metabolism, the immune system, and disease progression. The tangled symbiotic and pathogenic relationships between bacteria and multicellular animals go back into deep evolutionary time where fossils of ancestral microscopic soft-bodied eukaryotes are unlikely to have survived. But in living choanoflagellates, King believes researchers have a model organism to compare with animals and dissect the roots of animal multicellularity.

Provided by American Society for Cell Biology

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