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Heat a turn-on for algae

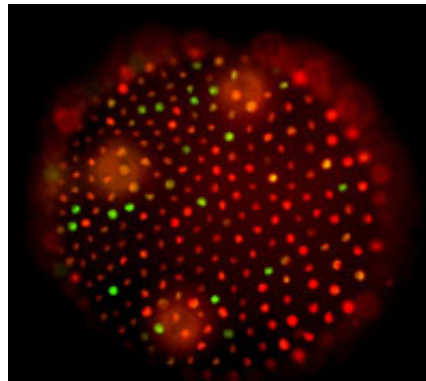
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FREDERICTON - Heat turns on sex genes in algae, Canadian and American researchers have found.

The multicellular algae *Volvox carteri* normally spend their lives in ponds reproducing asexually as either male or female colonies.

When summer heats up and their ponds dry out, though, the tiny balls start producing eggs and sperm that merge their DNA in sexual reproduction.

Aurora Nedelcu, a biology professor at the University of New Brunswick, and her colleagues thought the algae may become sexual in response to heat stress.



Juvenile algae during heat stress with reactive oxygen in green
 (Courtesy: Oana Marcu)

To simulate the conditions of late summer, Nedelcu put culture plates of the algae in water baths for two hours.

After 10 minutes at 42.5 C, the colonies had twice as many "reactive oxygen species," or free radicals, as the unheated colonies.

When the amount of reactive oxygen doubled, six genes were

EXTERNAL LINKS

- [Abstract of algae sex study](#): Proceedings of the Royal Society of London, B
- [Proceedings of the Royal Society of London, B](#)
[Volvocales Information Project](#): University of New Brunswick

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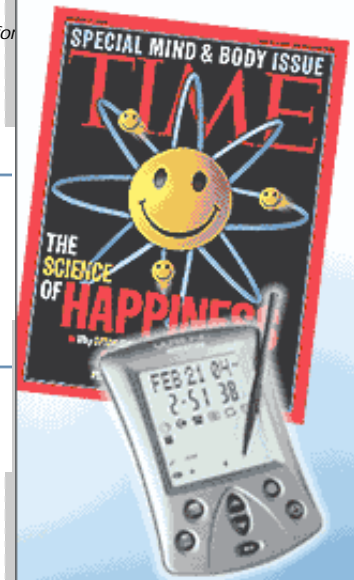
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turned on to change the algal lifestyle from asexual to sexual, the team reported in the June 9 issue of the Proceedings of the Royal Society of London, B.

"This is the first demonstration that stress turns on sex-inducer genes," said Richard Michod, a professor of ecology and evolutionary biology at the University of Arizona, and a co-author of the study.

Why sex evolved is a source of heated debate among biologists, with genetic variation being one common explanation. About 15 years ago, Michod and his colleagues proposed an alternative DNA-repair hypothesis.


According to the DNA-repair hypothesis, the process of dividing up parental genes during sexual reproduction also repairs any DNA damage in the sperm and eggs. That way, any damage to the parents' DNA isn't passed on.

Proponents were looking for evidence from multicellular organisms like the algae.

"For algae, sex is a way to get a double set of chromosomes," Nedelcu told CBC News Online.

With two copies of chromosomes, the algae produce spores with much stronger cell walls that can survive being eaten by birds, she said. An orange, carrot-like pigment also protects the spores from UV radiation.

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