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The world's first animal was probably a carnivore

Today’s meat eaters may be carrying on an 800-million-year tradition

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Carnivores today may be carrying on an ancestral diet pattern that emerged hundreds of millions of years ago, a new study suggests. [ISTOCK.COM/VERONIKA DVOŘÁKOVÁ](#)

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The ancestor of all animals was most likely a carnivore, according to a new study that examines animal diets dating back 800 million years. The research also finds that there are many more meat eaters out there than scientists would expect.

To analyze how diets evolved across the animal kingdom, John Wiens, an evolutionary biologist at the University of Arizona in Tucson, and his colleagues compiled a data set of more than 1000 extant species. These included vertebrates from humans to ducks and nearly 140 species of beetles, and encompassed detailed information about their eating habits. The researchers then created a phylogeny—a huge family tree—of all the creatures to determine what their ancestors likely ate.

The first multicellular animal was probably a meat eater, the team reports this month in *Evolution Letters*. The finding contradicts prior studies based on fossil data, which suggested early animals were probably herbivores. Whatever the "meat" was, it looked very different from what we consider meat today, the researchers note. Wiens defines "carnivore" as a creature

that eats other heterotrophs (organisms that do not create their own energy from sunlight), and said the ancient animal might have eaten protists, a catch-all term for tiny one-celled organisms that are not plants, animals, or fungi.

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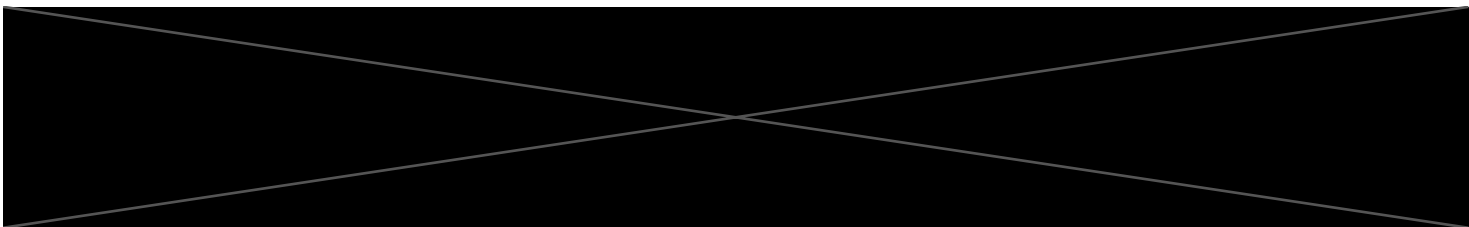
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What's less clear is what this creature, which probably arose more than 800 million years ago, looked like. "There's a little bit of debate," Wiens said. Some argue the first multicellular organism was probably a sedentary filter feeder, like a microscopic sponge. Others say it likely evolved from a tiny teardrop-shaped protist called a choanoflagellate, which swam around eating bacteria like a "minicarnivore," Wiens says.

The researchers' finding is "provocative," simply because so little is known about this mysterious ancestor, says Duncan Irschick, an evolutionary ecologist at the University of Massachusetts in Amherst who was not involved in the work. More research with larger data sets is needed to establish a firmer conclusion he says.

After animals became more complex, plant eating likely evolved separately several times, Wiens says. And once some animals started to eat plants, the behavior stuck, at least among close relatives, the family tree reveals.



Of all the present-day animals Wiens and colleagues surveyed, 63% were carnivores, 32% were herbivores, and 3% were omnivores. (The rest were ambiguous.) The smaller proportion of herbivores and omnivores may seem surprising, Wiens says, because plants are such a plentiful resource. "In some ways the question might be, why doesn't everything eat plants?"

The answer probably lies in the specialized adaptations animals need to eat greens, according to the team. Cows, for instance, which can build their bulky bodies on a diet of only grass and leaves, have four-part stomachs and a thriving collection of gut microbes that help them break down plant cells.

Even humans, textbook omnivores, can't really break down the cell walls of leaves and grasses. "The only way you can be a vegan is by basically eating seeds and fruits, which is the protein that the plants are putting out," Wiens says. Herbivory as a diet system, he says, is "relatively hard to evolve."

Because of the evolutionary hurdles involved in being a vegetarian, "it seems intuitively reasonable that [the first animal] was a carnivore," says V. Louise Roth, an evolutionary biologist at Duke University in Durham, North Carolina, who was not involved in the study.

For some groups of animals such as insects, evolving the specializations needed to live only on plants opened doors and allowed them to diversify more quickly than before. This may be why there are so many species of insects—several million, at last count—around today, many of whom feast on plants. This diversification took place over millions of years, though, so humans that can only eat plants won't branch off as a separate species any time soon.

**Clarification, 3 September, 12:40 p.m.: This story has been updated to clarify that the researchers defined "carnivores" as animals that ate other heterotrophs, such as protists.*

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