

# How we evolved into male and female



**Faye  
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Knowledge*

**A**ccording to scientists, the very first organisms to dare engage in sex were more like Adam and Steve than Adam and Eve.

That's because sex was invented before heterosexuality — before males or females for that matter.

The first sexual beings to emerge perhaps 2.5 billion years ago were what biologists call isogamous — which is a little like being gay, except everyone is somewhere between male and female.

Many organisms, including some fungi, algae and single-celled pond-swimmers, still practice isogamy. In doing so they offer clues to the mystery of why and how the sexes ever evolved.

To understand life before the advent of males and females, you need a universal definition of each: Males produce a smaller sex cell (sperm or pollen) than their female counterparts.

See **INVENTION** on C3

# Look at cells to see how sexes evolved

**INVENTION** from C1

Isogamous algae, on the other hand, still have sex but instead of mixing sperm and eggs they mingle sex cells of roughly the same size — generically known as gametes.

What scientists find puzzling is that most of them still use a system of two sexes — in their case plus and minus rather than male and female. Though plus and minus create the equal-sized sex cells, plus mates only with minus and minus with plus.

Such pickiness is an enormous paradox, says Laurence Hurst, a biologist at the University of Bath. Without sexes, you wouldn't have to limit your choice of a mate to half the population. Anyone else would be fair game.

Some organisms do expand their sexual options by having many sexes — 100 for some pond-swimming protozoans. Mushrooms use 30,000 and can mate with any but their own.

Oddly, however, most sexual beings have just two sexes — the loneliest number when it comes to finding a mate. Why restrict our options?

One leading theory goes back to the bizarre nature of certain machinery we all carry around in our cells — little engines known as mitochondria that help convert food to energy.

It's become clear in recent years that mitochondria are no mere built-in features but a sort of friendly parasitic bacteria living with us in a symbiotic relationship. They propagate as your cells divide and, in animals, pass from mothers to offspring through eggs.

And while they seem to be

working for us, they have no binding contract to continue to do so. Because they carry their own DNA, they can mutate, the scientists say, so you could in theory get a new strain of mitochondria that's very good at replicating, but not very good for you.

These new unfriendly mitochondria could start to spread through the human population at our expense.

One way to prevent such a spread is to avoid mixing mitochondria when you have sex.

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That's not a big problem for us, since males simply shed most of their mitochondria when they make sperm. That way you only get them from your mother.

But if you're isogamous, you're exchanging same-sized gametes instead of sperm and eggs. So to keep mitochondria in check many organisms kill the ones from their mates.

"It's a little like using a condom," says Hurst. Killers only mate with non-killers and you end up with two mating types.

For some, that situation set the stage for that great seismic shift when living things began to emerge as male and female, thus ushering in everything from the Age of Chivalry to divorce court. But that's another story.

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