

## Re: Why did eukaryotes evolve?

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Henkka <[hronkko@hytti.uku.fi](mailto:hronkko@hytti.uku.fi)> wrote or quoted:

- > *Would anyone happen to have speculations as to why eukaryotes evolved?*
- > *In short, what can single-celled eukaryotes (with all of that*
- > *complicated machinery) do that prokaryotes can't? Engulfing other*
- > *microbes is one such often-mentioned thing. Any other possibilities?*
- > *Many protoctists do their living differently – the single-celled*
- > *algae, for instance. Possibly they are doing something differently*
- > *from prokaryotes, with whose reproductive efficiency eukaryotes can't*
- > *compete.*

Eukaryotes seem to be a lot more successful as social organisms than most prokaryotes.

It may be that they can handle the necessary complexity better – perhaps by having better insulated DNA, more orchestrated sex, and lower error rates.

In simulations of evolution, the game is often to the small, fast, rapidly-reproducing organisms. They can grow faster than larger, more sluggish organisms – and can more rapidly expand to utilise new resources.

In many respects, the mystery is how sociable eucaryotic organisms managed to get much of a foothold in the first place. It's easy to see advantages to cooperation retrospectively, but for the pioneers in the area, it probably seemed like they needed a lot of ad-hoc infrastructure before the process could get off the ground.

As well as asking why it took so long, it's quite reasonable to ask why it happened at all.

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