

How octopuses reprogram their brains as they move back and forth between chilly and warm water

Too hot (with a fever) or too cold (with hypothermia) and our brains sputter and begin to fail — and that's just several degrees off the norm. So our bodies keep everything at a steady temperature. Octopuses don't have that luxury.

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Octopuses have overcome that challenge with a [unique trick hidden inside their cells](#). It has to do with a molecule called RNA, which is used to help translate DNA into the proteins that make up our bodies. To use an analogy, let's say you want to make a loaf of bread and you walk into a library filled with cookbooks.

"That cookbook itself, it's already printed and I can't change the book," says [Matthew Birk](#), a biologist at Saint Francis University. "But what I can do is make a copy, take it home to my kitchen," and bake the bread there.

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In the lab, Birk placed half his octopuses in cooler water and half in warmer water. After a few weeks, he collected RNA from their brains.

"We found that there were over 20,000 different locations on various different proteins that were edited," says Birk, with more tweaking in the cooler conditions.

That is, in response to changing temperatures, the octopuses remodeled their brains, presumably to keep them functioning properly.

[This is an excerpt. Read the full article here](#)