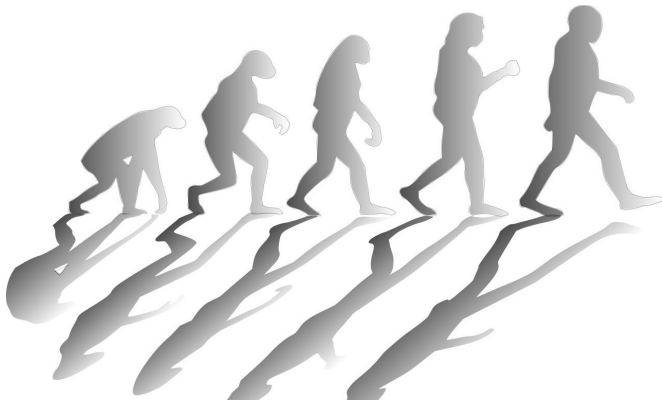


New study suggests humans evolved to run on less water than our closest primate relatives

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When you think about what separates humans from chimpanzees and other apes, you might think of our big brains, or the fact that we get around on two legs rather than four. But we have another distinguishing feature: water efficiency.

That's the take-home of a new study that, for the first time, measures precisely how much water humans lose and replace each day compared with our closest living animal relatives.

Our bodies are constantly losing water: when we sweat, go to the bathroom, even when we breathe. That water needs to be replenished to keep blood volume and other [body fluids](#) within normal ranges.

And yet, research published March 5 in the journal *Current Biology* shows that the [human](#) body uses 30% to 50% less water per day than our closest animal cousins. In other words, among primates, humans evolved to be the low-flow model.

An ancient shift in our body's ability to conserve water may have enabled our hunter-gatherer

ancestors to venture farther from streams and watering holes in search of food, said lead author Herman Pontzer, associate professor of evolutionary anthropology at Duke University.

"Even just being able to go a little bit longer without water would have been a big advantage as [early humans](#) started making a living in dry, savannah landscapes," Pontzer said.

The study compared the water turnover of 309 people with a range of lifestyles, from farmers and hunter-gatherers to office workers, with that of 72 apes living in zoos and sanctuaries.

To maintain fluid balance within a healthy range, the body of a human or any other animal is a bit like a bathtub: "water coming in has to equal water coming out," Pontzer said.

Lose water by sweating, for example, and the body's thirst signals kick in, telling us to drink. Chug more water than your body needs, and the kidneys get rid of the extra fluid.

For each individual in the study, the researchers calculated water intake via food and drink on the one hand, and water lost via sweat, urine and the GI tract, on the other hand.

When they added up all the inputs and outputs, they found that the [average person](#) processes some three liters, or 12 cups, of water each day. A chimpanzee or gorilla living in a zoo goes through twice that much.

Pontzer says the researchers were surprised by the results because, among primates, humans have an amazing ability to sweat. Per square inch of skin, "humans have 10 times as many [sweat glands](#) as chimpanzees do," Pontzer said. That makes it

possible for a person to sweat more than half a gallon during an hour-long workout—equivalent to two Big Gulps from a 7-Eleven.

Add to that the fact that the great apes—chimpanzees, bonobos, gorillas and orangutans—live lazy lives. "Most apes spend 10 to 12 hours a day resting or feeding, and then they sleep for 10 hours. They really only move a couple hours a day," Pontzer said.

But the researchers controlled for differences in climate, body size, and factors like activity level and calories burned per day. So they concluded the water-savings for humans were real, and not just a function of where individuals lived or how physically active they were.

The findings suggest that something changed over the course of human evolution that reduced the amount of water our body uses each day to stay healthy.

Then as now, we could likely still only survive a few days without drinking, Pontzer said. "You probably don't break that ecological leash, but at least you get a longer one if you can go longer without water."

The next step, Pontzer says, is to pinpoint how this physiological change happened.

One hypothesis, suggested by the data, is that our body's thirst response was re-tuned so that, overall, we crave less water per calorie compared with our ape relatives. Even as babies, long before our first solid food, the water-to-calories ratio of human breast milk is 25% less than the milks of other great apes.

Another possibility lies in front of our face: Fossil evidence suggests that, about 1.6 million years ago, with the inception of *Homo erectus*, humans started developing a more prominent nose. Our cousins gorillas and chimpanzees have much flatter noses.

Our nasal passages help conserve water by cooling and condensing the water vapor from exhaled air, turning it back into liquid on the inside of our nose

where it can be reabsorbed.

Having a nose that sticks out more may have helped early humans retain more moisture with each breath.

"There's still a mystery to solve, but clearly humans are saving [water](#)," Pontzer said. "Figuring out exactly how we do that is where we go next, and that's going to be really fun."

More information: "Evolution of Water Conservation in Humans," Herman Pontzer, Mary H. Brown, Brian M. Wood, David A. Raichlen, Audax Z.P. Mabulla, Jacob A. Harris, Holly Dunsworth, Brian Hare, Kara Walker, Amy Luke, Lara R. Dugas, Dale Schoeller, Jacob Plange-Rhule, Pascal Bovet, Terrence E. Forrester, Melissa Emery Thompson, Robert W. Shumaker, Jessica M. Rothman, Erin Vogel, Fransiska Sulisty, Shauhin Alavi, Didik Prasetyo, Samuel S. Urlacher, and Stephen R. Ross. *Current Biology*, March 5, 2021. [DOI: 10.1016/j.cub.2021.02.045](https://doi.org/10.1016/j.cub.2021.02.045)

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