Researchers find cardiovascular health similarities between chimpanzees, humans

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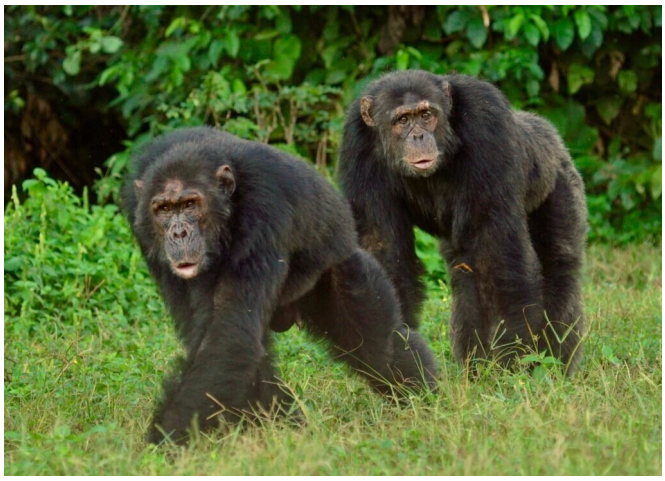

A pair of chimpanzees at Ngamba Island Chimpanzee Sanctuary in Uganda. Credit: Innocent Ampeire

Doctors like to remind patients not to monkey around with their health, suggesting that a good diet and regular exercise improve longevity.

A new study on health in chimpanzees, which are the closest species to humans genetically, showed the benefits in what they eat and how they can travel and climb.

When chimpanzees have a plant-based diet and substantial opportunities to exercise, they fall into "healthy" human ranges. Lab chimpanzees, whose diet and exercise were limited, showed conditions indicative of cardiovascular disease risk, more like sedentary people.

Chimpanzees are critical for understanding the evolution of human health and longevity. Cardiovascular disease—a major source of mortality during aging in humans—is a key issue for comparative medicine.

Prior data indicated that compared to humans, chimpanzees have high levels of blood lipids that can promote cardiovascular disease in humans. However, most work on chimpanzee heart health comes from the animals living in laboratories where lifestyles diverge from a wild context.

Researchers from the University of Michigan and University of New Mexico partnered with wildlife veterinarians in Uganda and Congo to examine cardiovascular profiles in chimpanzees living in African sanctuaries. These chimpanzees occupy large rainforest enclosures, consume a diet of fruits and vegetables, and generally experience conditions more similar to a wild chimpanzee lifestyle.

They measured blood lipids, body weight and body fat in 75 sanctuary chimpanzees during annual veterinary health check-ups, and then compared them to published data from laboratory-living chimpanzees.

Free-ranging chimpanzees in sanctuaries exhibited lower body weight and lower levels of lipids, both risk factors for human cardiovascular disease. Some of these disparities increased with age, indicating that the free-ranging chimpanzees stayed healthy as they got older.

"Our findings support the hypothesis that lifestyle shapes health in chimpanzees, similar to effects in humans, and contribute to an emerging understanding of cardiovascular health in evolutionary context," said Alexandra Rosati, U-M assistant professor of psychology and anthropology.

This is the first evidence that chimpanzees show differences in blood lipids related to their lifestyle, such as diet and ranging opportunities, and indicates that these health effects in humans are rooted in our evolutionary past, said Megan Cole, a researcher at the University of New Mexico and the study's lead author.

Prior work suggested that chimpanzees have very high levels of blood lipids that are cardiovascular risk factors—higher than humans in post-industrial societies in some cases. The work also showed that chimpanzees living a naturalistic life have much lower levels even as they age, providing a new reference for understanding human health. In biomedical research labs, chimpanzees have more limited space and often consume a processed diet (food such as primate chow), unlike wild chimpanzees.

"These results show how the high-quality, natural conditions that chimpanzees experience in African sanctuaries fosters their long-term health," Rosati said.

The findings appear in a special issue of *Philosophical Transactions B* on "The evolution of the primate aging process."

More information: Melissa Emery Thompson et al. Insights from evolutionarily relevant models for human ageing, *Philosophical Transactions of the Royal Society B: Biological Sciences* (2020). DOI: 10.1098/rstb.2019.0605

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