Tree-dwelling mammals climb to the heights of longevity

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Milena Shattuck and Scott Williams, doctoral candidates in anthropology, have found that tree-dwelling mammals live longer than those who live on the ground. Humans are an exception, but tree-dwelling ancestors may explain that. Credit: Photo by L. Brian Stauffer

The squirrels littering your lawn with acorns as they bound overhead will live to plague your yard longer than the ones that aerate it with their burrows, according to a University of Illinois study.

Scientists know from previous studies that flying birds and bats live longer than earthbound animals of the same size. Milena Shattuck and Scott Williams, doctoral candidates in anthropology, decided to take a

closer look at the relationship between habitat and lifespan in mammals, comparing terrestrial and treetop life. They published their findings in the Proceedings of the National Academy of Sciences.

The two hypothesized that, like flight, treetop or arboreal dwelling reduces a species' extrinsic mortality - death from predation, disease and environmental hazards; that is, causes other than age.

"One of the predictions of the evolutionary theory of aging is that if you can reduce sources of extrinsic mortality, you'll end up exposing some of the late-acting mutations to natural selection, and therefore evolve longer lifespans," Williams said.

Williams and Shattuck found that for arboreality, the theory holds. Mammals who spend the majority of their time up a tree enjoy longevity over those who scurry along the ground. The pattern holds consistent both on the large scale among all mammals, and also in specific classes the pair studied, such as tree squirrels versus ground squirrels.

However, the pair also uncovered two classes of mammals that buck the longevity trend - marsupials, such as kangaroos, and primates, including ground walkers such as gorillas and humans and their branch-swinging counterparts. Aloft or not, these groups show no significant difference, although primates in general tend to lead long lives.

"These are the exceptions that prove the rule," Shattuck said. "The defining feature that seems to connect those two groups is a long history of arboreal ancestors. Other mammals started out terrestrially, and separate groups developed arboreality independently. Marsupials and primates seem to have started off in the trees, and then the terrestrial marsupials and primates have descended from arboreal ancestors."

This arboreal ancestry may partially explain why humans have such a

long lifespan relative to other mammals. As primates descended from the trees, they had to develop new strategies for survival on the ground. Terrestrial primates, including humans, tend to be larger and more social, providing some security from predators and environmental obstacles.

"It's interesting to think that humans, at least in part, live so long and do well because we had this evolutionary history when we were in the trees," said Shattuck. "And now, we have the intervention of culture and medicine to help extend that further."

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