

New study traces the evolutionary history of what mammals eat

16 April 2012



This is an elk cow browsing. Elk are herbivores. Credit: Photo by Win McLaughlin

The feeding habits of mammals haven't always been what they are today, particularly for omnivores, finds a new study.

Some groups of mammals almost exclusively eat meat -- take lions and tigers and other [big cats](#), for example. Other mammals such as deer, cows and [antelope](#) are predominantly plant-eaters, living on a [diet](#) of leaves, shoots, fruits and bark. But particularly for omnivores that live on plant foods in addition to meat, the situation wasn't always that way, finds a new study by researchers working at the National [Evolutionary Synthesis](#) Center in Durham, North Carolina.

Past studies have shown that animals with similar diets tend to share certain characteristics. But this study is the first of its kind to look across all mammal groups, including omnivores, to reconstruct how mammal diets have changed over [evolutionary time](#).

To do that, the researchers compiled previously published diet data for more than 1500 species representing more than one third of mammals alive today, including [primates](#), ungulates, bats, rabbits and rodents.

By mapping that data onto the mammal family tree, the researchers were able to trace backwards in time and infer what the ancestors of each species most likely ate.



These are big-horn sheep grazing (*Ovis canadensis*). Big-horn sheep are herbivores. Credit: Photo by Samantha Price

They found that while some groups of mammals maintained steady diets, others changed their feeding strategies over time.

Today's omnivores in particular - a group that includes primates, bears, dogs and foxes - came from ancestors that primarily ate plants, or animals, but not both, said co-author Samantha Price of the University of California Davis.

While omnivorous mammals weren't always that way, plant-eaters and meat-eaters have diversified within a more well-worn path. Radical shifts were unlikely for these animals. Mammals that eat meat for a living, for example, never gave up their taste for flesh without transitioning through an omnivorous stage first.

"Direct transitions from carnivory to herbivory were

essentially nonexistent," said co-author Louise Roth *Proceedings of the National Academy of Sciences* of Duke University. "It's an intuitive result because it the week of April 16, 2012.

takes very different kinds of equipment to have those kinds of diets," she added.

"Plant- and animal-based foods require different digestive chemistries and different processing mechanisms in the mouth and stomach," explained co-author Samantha Hopkins of the University of Oregon. The kinds of teeth adapted for tearing and slicing meat, for example, are remarkably different from the large, flat-topped molars adapted for grinding nuts and roots.

More information: "Tempo of trophic evolution and its impact on mammalian diversification." Price, S., S. Hopkins, et al. *Proceedings of the National Academy of Sciences*. (2012).

Provided by National Evolutionary Synthesis Center (NESCent)



A golden-mantled ground squirrel (*Spermophilus lateralis*) munches on an insect. Golden-mantled ground squirrels are omnivores. Credit: Photo by Win McLaughlin

"[Given these differences] it makes sense that you couldn't easily transition from one to the other in one step," Price added.

The researchers found that diet is also linked to how fast [mammals](#) spawn new species. As new species arise and others go extinct, on balance the plant-eaters proliferate faster than their meat-eating counterparts, with omnivores lagging behind both groups.

"If there was an evolutionary race to evolve 100 species, it would take three times longer for omnivores compared to herbivores, and carnivores would be in the middle," Price said.

The study will appear in the online early edition of

APA citation: New study traces the evolutionary history of what mammals eat (2012, April 16) retrieved 16 September 2019 from <https://phys.org/news/2012-04-evolutionary-history-mammals.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.