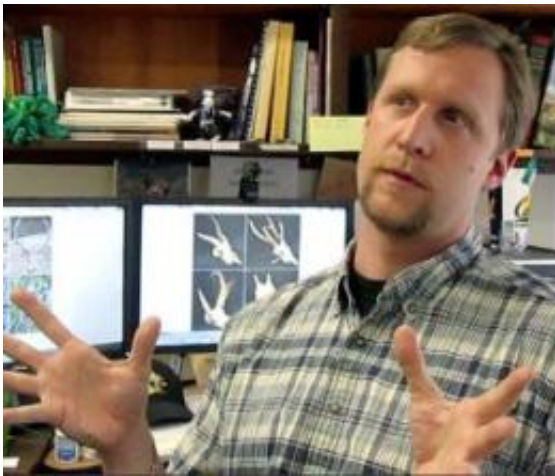


# Ruminant headgear: A mystery awaiting unraveling

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(PhysOrg.com) -- Emerging from the heads of most cud-chewing mammals, headgear inspire an almost mystical and certainly majestic aura. But, scientists say, we know shockingly little about them.

In a paper appearing online ahead of regular publication in the [Proceedings of the Royal Society B](#), a London-based international journal dedicated to biology, a three-member scientific team spells out what is known -- and not known -- about antlers, horns, pronghorns and ossicones.

For antlers, think deer, moose and elk. Horns are worn by cattle, sheep

and goats; ossicones by giraffes and okapi. Pronghorns are found on pronghorn antelope, a strictly North American mammal. They represent the cervid, bovid, giraffids and antilocaprid families, respectively.

In addition to their perplexing [evolutionary origins](#), major questions surround how a better biological understanding of these animals' headgear might lead to innovations in medical treatments for such conditions as [skin damage](#) from burns, [bone cancer](#) and osteoporosis, says lead author Edward Byrd Davis, a paleontologist in the department of geological sciences at the University of Oregon.

"Antlers, for example, are the fastest growing bones of any living vertebrate today," said Davis, who also is fossil collection manager at the UO Museum of Natural and Cultural History and affiliate of the Robert D. Clark Honors College. "They are shed at the end of each season and replaced by new racks every year.

"This is one of those things where you'd think we'd know more, but we don't," said Davis, who became interested in pronghorn [antelopes](#) while a doctoral student at the University of California, Berkeley. "Scientists get a lot of press coverage for dark matter or the [Higgs boson](#) because they are among deep mysteries that we are still unlocking. A lot of people assume that most of biology is understood, yet something as fundamental as the age-old question 'how did the cow get its horns?' is still not well understood."

Among assumptions only recently overturned was the idea that pronghorn antelope were related to antler-wearing deer or horned cattle, goats and sheep. In fact, a mitochondrial DNA study co-authored by Spain's Manuel Hernandez Fernandez and Yale University's Elisabeth S. Vrba, published in Biological Reviews in 2005, determined that pronghorn antelope are more closely related to giraffes.

It turns out the origin and evolution of headgear was probably messy, with a shared origin among some lineages and independent origins of form and development in others, concluded Davis and co-authors Katherine Brakora, a doctoral student at the University of California, Berkeley, and Andrew Lee, a professor at Midwestern University in Glendale, Ariz.

The hope is, Davis said, that his team's review of the literature will inspire a renewed exploration by biologists of the various headgear found in both living and fossil species.

"We need to be looking more closely at the early development of horns, antlers, ossicones and pronghorns and be making comparisons between fossils and modern animals," he said. "We hope to develop collaborations to better interpret what we find in the fossil record and to better understand the biological development of these headgear. Achieving that, we should be able to uncover a number of applications for human medicine."

Provided by University of Oregon

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