Teeth: A Very Short Introduction

By Peter S. Ungar

Questions for Thought and Discussion

- How can we define teeth? Do animals other than vertebrates (fish, amphibians, reptiles, and mammals) have them?

- Why are teeth so important to paleontologists? What can they teach us about evolution?

- Why don't we grow new teeth when they become broken or diseased, like fish, amphibians, and reptiles do?

- We learn in school that *heterodont*, front teeth different in form and function from the back ones, distinguishes mammals from other vertebrates. This is not true. What are some examples of fishes, amphibians, or reptiles with a dental division of labor?

- Our teeth are crooked and crowded. We get cavities and periodontal disease. These things aren't nearly as common in other animals as in us. Why are we so different?

- Mastication requires so many different specialized anatomical features, from a distinctive jaw joint and precisely controlled chewing muscles, to opposing cheek teeth that fit together like a hand in a glove. How could such a complex system have evolved?

- What different kinds of evidence do paleontologists use to reconstruct the diets of animals that lived millions of years ago? Be sure to consider both traits passed from generation to generation, and "foodprints" in your discussion.

- There are two major groups of vertebrates today that are endothermic, or heat their bodies from within, the mammals and the birds. What are the costs and benefits of endothermy? How do these vertebrate groups differ in their approaches to meeting the need for fuel to power their energy-hungry bodies?

- Your teeth are an extraordinary feat of engineering. They must concentrate and transmit the forces needed to break foods over-and-over again, up to millions of times, without being broken in the process. What makes our teeth so strong and durable?

- Paleontologists have traditionally looked to teeth to assess relationships between fossil species. If two of three share a common bump or groove on a biting surface, those two have been considered more closely related by virtue of the shared trait. Is this a reasonable assumption given our new understandings of genetics and tooth development? Why, or why not?

- Some types of teeth appear over and over again in unrelated groups, and others give us unique and bizarre examples of what nature can accomplish. Provide a few examples of both common and unusual teeth and describe how they work.

- Teeth are a big deal to researchers that study human evolution. Compare and contrast the three main types of early hominin and their teeth. What do they teach us about how each made use of their surroundings to earn a living?

- Can our understandings of the oral environments in which our teeth evolve help inform clinical practice today? How might we use this knowledge to improve disease prevention and treatment?

- Studying teeth has led engineers to many bio-inspired designs. What are the practical implications to understanding tooth structure, at both microscopic levels and larger scales?

- Describe evolution to and from the tribosphenic molar. How did this form contribute to the diversity and myriad types of mammals alive today?

Other books by Peter S. Ungar
Evolution's Bite: Teeth, Diet, and how a Changing World Made us Human (Princeton University Press, Forthcoming [2015])
Mammal Teeth: Origin, Evolution, and Diversity (Johns Hopkins University Press, 2010)
Evolution of the Human Diet: The Known, Unknown, and Unknowable (Ed.) (Oxford University Press, 2007)
Human Diet: Its Origin and Evolution (Ed., with Mark F. Teaford) (Bergin & Garvey, 2002)