The Role of Hunting in Anthropogeny

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Chairs:
***James Moore,** UC San Diego & **Richard Wrangham,** Harvard University*

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ABSTRACTS

Nutritional Significance of Meat

Alyssa Crittenden, University of Nevada, Las Vegas

Are we inherently vegetarian or carnivorous? Despite the robust data that suggests that we are, in fact, omnivorous, the debate rages on. Almost every discussion on the links between diet and human origins comes back to this central question. For well over a century, anthropologists have argued that meat eating was likely a catalyst for critical watershed moments in human evolution – such as pair bonding, tool making, neural expansion, cooperation, and even increased longevity. While the specific role that meat might have played in human evolution remains hotly contested – it certainly changed the playing field for our earliest ancestors. Meat, particularly that of mammals (so called “red meat”), is a high quality protein, is easy to digest, and provides many key micronutrients and essential fatty acids. Red meat consumption is now a major feature of most diets in the post-industrialized west and, increasingly, is becoming a key component of diets in the developing world. The average American consumes approximately 200 pounds of meat a year, which is estimated to be more than twice the global average. With this increase in consumption comes an increased contribution to the epidemic of metabolic diseases (e.g. cancer, obesity, and type 2 diabetes) and is also contributing to environmental degradation and climate change. Here, I address the nutritional significance of meat and discuss how, during the course of human evolution, red meat has been transformed from a blessing to a potential curse.

Why Foragers Hunt

Rebecca Bliege Bird, Pennsylvania State University

The idea that women have evolved to be plant gatherers and men hunters has dominated evolutionary thinking and the popular imagination for decades. Many have suggested that the origins of a distinctly human form of social organization known as the nuclear family lie in women depending on a man's hunting production to provide high energy foods in the form of meat and fat to her children. This model is commonly invoked to explain patterns of human hunting both past and present, and while there are some societies around the world where this might hold, there are others that warrant a different explanation. Australia is one of the places that challenges our understanding of who hunts and why. Across Australia prehistorically, women were active hunters, with a primary focus on the hand-capture of small to medium sized animals. In many locations, women skillfully used fire and hunted with dogs to improve their efficiency. Today, women in remote communities still hunt extensively and share meat with both children and other women in ways that create bonds of trust and support strongly cooperative social networks. Women's high investment in hunting is likely linked to the fact that small animal hunting is particularly predictable and productive in this environment,

especially when modified by fire. The most active hunters are older women who engage their skills in hunting not only to support their grown daughters and grandchildren, but also to build their social status and bring groups together through their generosity with meat.

Pan the Hunter: Ecological Explanations for Chimpanzee Predation
Ian Gilby, Arizona State University

As frequent predators (relative to other apes), and one of our closest living relatives, chimpanzees are a valuable point of reference for investigating why meat consumption increased so dramatically throughout human evolution. Although chimpanzees primarily eat plant-source foods, they consume vertebrate prey with great excitement, attesting to its nutritional value. Indeed, meat is a concentrated source of easily-digestible macro- and micro-nutrients that chimpanzees should consume whenever they can. However, meat comprises a small percentage of chimpanzee diet. What limits predation frequency in this species? In a discussion of how habitat, party size, diet quality and individual differences in risk aversion affect chimpanzee hunting decisions, I argue that the considerable variation in predation frequency within and between social groups is driven by the energetic costs and physical risks that hunting entails. Chimpanzees take advantage of low-cost opportunities to capture prey.

Social Explanations for Chimpanzee Hunting
David Watts, Yale University

Chimpanzees hunt vertebrates more often and eat more meat than do any other nonhuman primates, and meat from captured prey is typically distributed among multiple individuals. Also, they and bonobos are our closest living relatives. For these reasons, they have received much attention in discussions of the ecological and social importance of hunting and meat eating in human evolution. The fundamental importance of hunting and meat eating to chimpanzees lies in the fact that meat has high nutritional value. This value introduces possibilities that, as has been documented or proposed for humans and some earlier hominins, chimpanzees increase their nutritional gains by hunting cooperatively and that males share meat tactically to develop and maintain social bonds with each other and/or to increase their mating success. However, evidence adduced in support of each of these possibilities has been the subject of controversy. I will briefly review the controversies and summarize new data from research at Ngogo, in Uganda, relevant to the social bonding hypothesis. Resolving the debate about cooperation depends partly on how we define that term; it also depends on identifying a proper ecological "currency" and on experimental investigation of chimpanzee cognitive abilities. No compelling evidence in support of the "mating success" hypothesis exists. However, Ngogo data provide some support for the "social bonding' hypothesis. They also highlight the fact that, as with many other aspects of chimpanzee behavior, variation exists within and among chimpanzee populations in the social importance of hunting and meat eating.

Hunting by Savanna – Living Chimpanzees
Jill Pruetz, Texas State University

Chimpanzees living at the Fongoli, Senegal site are the only nonhuman apes thus far that routinely hunt vertebrate prey with tools, with more than 500 cases now recorded. These chimpanzees hunt the Senegal *Galago* with tools, systematically making "spears" to stab at and rouse these nocturnal primates from their sleeping cavities during the day. I review research on these apes' hunting behavior collected over the course of more than 10 years (2006-2017) and focus on their tool-assisted hunting in particular. I also contrast male and female hunting behavior. While male chimpanzees here hunt monkeys similarly to the way these apes hunt at other sites, tool-assisted hunting is exhibited more frequently by female chimpanzees at Fongoli. Chimpanzees in this hot, dry and open environment appear to rely on tool use during foraging to successfully combat the pressures they face in the savanna-woodland mosaic of southeastern Senegal, the northernmost extent of the species' range. However, the behavior of their main prey species, the Senegal *Galago*, seems to influence this particular aspect of their hunting behavior, and I discuss new research focused on this hypothesis.

How We Determine What Food Fueled Human Evolution

Margaret Schoeninger, UC San Diego

Humans can and do eat anything and everything. If we cannot eat it directly, we give it to an organism (from yeast to cattle) to eat it for us by transforming it into something that we can eat such as beer, bread, and meat. Humans are also unique within the primate order because most human populations eat meat across all ecological zones inhabited by humans. In contrast, other nonhuman primates, e.g., capuchins, baboons, and chimpanzees, eat meat under restricted conditions and in limited areas. Today, we can determine the caloric, protein, micronutrient, and social benefits of eating meat; but the identification of meat-eating in the human fossil record is not an easy task. Often, there are no accompanying cultural items that signal meat-eating. Stone tools can be used for other tasks than cutting meat or pounding bones, and may carry no identifying scratch marks. Therefore, isotopic evidence has become a critical source of data signaling that meat is included in the diet of our fossil relatives. Here I present those data and discuss the constraints surrounding their interpretations.

The Ecology of Hominin Scavenging

Briana Pobiner, Smithsonian Institution

Evidence for meat eating in the form of butchery marks on animal bones made by hominins dates back to at least 2.6 million years ago. Ancient tools from the same period suggest that these hominins used simple sharp stone knives to slice meat off of animal bones and rounded rocks to pound the bones open to access the fat and calorie rich marrow inside. But at this time, hominins were barely over three feet tall and hadn't developed hunting technology like spears or bows and arrows. So how did they take down large, dangerous animals like elephants and hippos? Perhaps they didn't hunt them, but instead scavenged the leftovers from carnivore kills and took advantage of naturally dead animals on the landscape. To test the hypothesis that hominins could have scavenged meat and marrow from the remains of kills of carnivores, I spent several months in a modern nature preserve in central Kenya. After waiting for predators like lions to finish consuming their prey, I found that most carcasses, especially those of the bigger prey animals, were abandoned with a lot of meat still on the bones. This suggests that scavenging could have been a worthwhile food procurement strategy for hominins.

How Control of Fire Changed Hunting

Richard Wrangham, Harvard University

When meat first became a nutritionally significant food item for *Homo,* it is classically regarded as having been eaten raw. In support, other primates eat meat raw; and archaeological signals of hunting long precede confident evidence of fire control. However, two kinds of problems suggest that any large role for meat-eating by early *Homo* would have depended on their cooking their food, especially plant foods. First, since the meat products of tropical animals are relatively protein-rich and fat-poor, starch-rich plants must have remained an important component of the diet; but the digestive anatomy of early *Homo* indicates that starch-rich plants could not have provided adequate energy without being cooked. Second, the time taken to chew foods if they were eaten raw would have been so large as to prevent significant effort being put into hunting (or scavenging). Ways to reconcile the conflicting evidence include the idea that fat-rich marrow and brains were especially important in the diets of *Homo erectus*.