Scavenger hunt yields hominid diet clues

Modern hunter-gatherers in Africa are, in a sense, mislabeled. An unappreciated part of their food gathering involves driving carnivores away from freshly killed prey to scavenge the remains, according to a new study. The data, although preliminary, add an important perspective to the heated scientific debate over the amount of hunting and scavenging practiced by human ancestors nearly 2 million years ago.

Hunting and scavenging are closely linked among Hadza hunter-gatherers in northern Tanzania, report anthropologists James F. O'Connell and Kristen Hawkes of the University of Utah in Salt Lake City and Nicholas Blurton Jones of the University of California at Los Angeles. Since the availability of scavenged meat varies greatly throughout the year for the Hadza, the researchers conclude in the April CURRENT ANTHROPOLOGY, "scavenged animal tissue was more likely a windfall resource [for human ancestors] — briefly, sometimes seasonally abundant but generally unavailable on a day-to-day basis."

Comments anthropologist Robert J. Blumenschine of Rutgers University in New Brunswick, N.J.: "This is the first systematic documentation of scavenging by modern hunter-gatherers. But while the Hadza seem to have few inhibitions in driving off carnivores from kills, there is no accepted way to test whether early hominids [the evolutionary family that includes modern humans] behaved similarly."

The analysis of what hominids ate and how they got it is a rapidly growing area of research. About a decade ago, anthropologists widely assumed hominids were meat-eating hunters who discarded animal bones and stone tools at "home bases." In the last several years other views have emerged. One investigator argues that hominids probably scavenged leftover bits of meat and marrow from carcasses already ravaged by predators and hyenas. In his view, big-game hunting became important only perhaps 40,000 years ago. Blumenschine surveyed available carcasses on the Serengeti Plain of northeastern Tanzania and suggests hominids may have consumed marrow, fat, brains and bits of flesh from abandoned kills (SN: 3/9/85, p.155). Another research team holds that human ancestors hunted small animals and possibly drove predators away from fresh kills to obtain more choice portions of meat (SN: 1/3/87, p.7).

Hadza scavenging practices provide a useful frame of reference for further investigations into the early hominid diet, O'Connell contends.

During 1985 and 1986, he and his co-workers spent 188 days over 14 months living among 200 Hadza. During the six-month dry season, Hadza men hunted with bows and arrows, mainly for zebra, impala, wildebeest and warthog. Women foraged for roots and fruit, and with the help of boys trapped an occasional tortoise or small bird. In the wet season, hunting was limited to chance encounters with prey, often during honey-collecting trips. Foraging assumed more importance with the rains.

But in the course of these activities, say the researchers, the Hadza were always poised to take advantage of scavenging opportunities. All Hadza monitor the flight of vultures and listen for nighttime calls of lions and hyenas. They drop everything to move in on a fresh kill and drive off feeding predators. Recalcitrant lions become hunting targets.

During the observation period, scavenging accounted for 20 percent of the 54 animal carcasses taken by the Hadza. Scavenged meat made up 14 percent of total carcass weight.

Scavenging success tends to increase during the late dry season, when more potential prey concentrate around fewer water sources, note the researchers. But even then, they say, the amount of available meat for scavenging fluctuates greatly.

Estimates of annual rainfall at early hominid sites are considerably greater than annual rainfall in Hadza country, suggesting there were more large mammals and available carcasses nearly 2 million years ago, O'Connell says. But so far, he adds, efforts to pinpoint the rate of hominid scavenging are "highly speculative."

Nevertheless, the Hadza study shows that scavenging opportunities are diverse and can yield large amounts of meat, Blumenschine says. If the Hadza lived on the Serengeti Plain, where large mammals are more abundant, the ratio of scavenged to hunted carcasses would probably be greater, he notes. Unfortunately, there are no hunter-gatherer groups now living on the Serengeti to provide a comparison. *— B. Bower*

HIV ancestry traced in family tree

The AIDS virus and its family tree are providing a new view of the virus' disease-causing ability.

Japanese researchers reported last week that an apparently harmless virus found in African monkeys is but a distant relative of the virus that causes AIDS in humans and probably is not to blame for the AIDS epidemic. Their findings, appearing in the June 2 NATURE, contrast with earlier assertions that the AIDS-causing human immunodeficiency virus (HIV) is the result of a recent evolutionary "jump" from the monkey virus. That assumption was based in part on evidence from contaminated laboratory specimens, scientists reported earlier this year (SN: 2/27/88, p.133).

Masanori Hayami of the University of Tokyo and his co-workers analyzed the entire DNA sequence of the simian immunodeficiency virus, SIV_{AGM}, that commonly infects African green monkeys. The virus stimulates production of antibodies in green monkeys but causes no overt symptoms. By comparing its genetic sequence with those of related immunodeficiency viruses, the researchers found that SIV_{AGM} is equally and distantly related to the two human immunodeficiency viruses, HIV-1 and HIV-2. This indicates the human AIDS viruses evolved independently for "a long time," the researchers say.

Indeed, says Carel Mulder of the University of Massachusetts Medical School in Worcester, "The fact that the SIV_{AGM} is so remarkably different from the human AIDS viruses indicates that the human viruses cannot have originated from African green monkeys in recent times, as had been predicted by many people."

In the June 9 NATURE, other scientists agree that a monkey origin is unlikely. But these researchers, led by Temple F. Smith at Dana-Farber Cancer Institute in Boston, dispute several of the Japanese conclusions. On the basis of his group's own sequencing experiments, plus their analysis this week of the virus used by the Japanese, Smith said in an interview that SIV_{AGM} is much more closely related to HIV-2 than to HIV-1. He also says all three virus groups appeared not later than 40 years ago, and probably are not more than a century old. Smith and his co-workers looked at thousands of data points in their tree construction.

However, some of the differences found by the Japanese may help reveal the mechanism behind HIV's extreme pathogenicity. For example, a small, supplementary "message" is encoded in the DNA of SIV_{AGM} in the region that codes for production of a protein component of the viral envelope. The presence and exact location of this "in-frame stop codon" may change significantly the structure of an envelope protein and may affect virulence, the researchers note.

Perhaps more intriguing, the Japanese researchers found that SIV_{AGM} lacks a gene — the so-called "R" gene — found in both HIVs and in a related simian immunodeficiency virus, SIV_{MAC}, which causes an AIDS-like disease in macaque monkeys. Scientists still don't know the function of the "R" gene, but it may prove critical to an understanding of what makes SIV_{AGM} nonpathogenic or what makes the African green monkey resistant to the virus. *— R. Weiss with D. D. Edwards*