



## Purdue News

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### **Cave men diets offer insights to today's health problems, study shows**

WEST LAFAYETTE, Ind. – Eat meat. That's the dietary advice given by a team of scientists who examined the dietary role of fat in a study that combined nutritional analysis with anthropologic research about the diets of ancient hunter-gatherer societies.

But there's a catch: To be as healthy as a cave man you have to eat certain kinds of fish, wild game such as venison, or grass-fed meat such as beef.

The research was conducted by [Bruce Watkins](#), professor and university faculty scholar at Purdue University and director of the [Center for Enhancing Foods](#) to Protect Health, and anthropologist [Loren Cordain](#), professor of health and exercise science at Colorado State University and author of "The Paleo Diet" (John Wiley & Sons, 2002). Watkins and Cordain conducted detailed chemical analysis of the meats people ate 10,000 years ago and compared those results to the most common meat people eat today.

They found that wild game, such as venison or elk meat, as well as grass-fed beef, contain a mixture of fats that are actually healthy for you, and, the researchers say, lower cholesterol and reduce other chronic disease risk.

Recent studies have indicated that a healthy diet should contain a balance of essential fats. The two types of most concern are omega-6 and omega-3, and both are essential for proper nutrition. Omega-3 fat, which is often found in high levels in certain fish, has been shown to reduce the risk of cardiovascular disease, but too much omega-3 can increase the risk of stroke. Omega-6 fat also is an essential fat, but too much omega-6 in the diet can contribute to inflammatory responses associated with of chronic disease.

According to Watkins, the analysis done at Purdue found that wild elk, deer and antelope from the Rocky Mountains region have greater amounts of omega-3 fatty acids and a lower – and therefore healthier – ratio of omega-6 to omega-3 fatty acids in muscle meats, compared to grain-fed beef.

"Both grass-fed steers and the wild ruminants have a ratio of omega-6 to omega-3 fatty acids slightly above two in meat. In other words, two parts omega-6 to one part omega-3," Watkins says. "That ratio is much lower than the ratios of 5-to-1 to 13-to-1 reported in previous studies for grain-fed steers."

Watkins says the low fat ratio of wild ruminants and grass-fed beef is good news for people who need to reduce their cholesterol.

"The fatty acid ratio in wild ruminants is consistent with the recent American Heart Association recommendation to increase the consumption of omega-3 fatty acids found in certain fish in order to reduce the risk of cardiovascular disease," he says.

The results of the study were published in the January issue of *European Journal of Clinical Nutrition*. The research was funded by the [National Science Foundation](#), the Purdue University Office of Research Programs and the [Pope & Young Club](#), a national conservation organization.

Analyzing the foods that people ate 10,000 years ago is not a flight of scientific esoterica. The researchers say this finding has important implications for what we eat today.

Although 10,000 years ago predates all modern civilizations, it is a small blip in the evolutionary timeline of humans. Some nutritionists believe that by studying what people ate in the Paleolithic Era, also known as the Old Stone Age, they can determine the proper mix of foods for modern man.

Cordain says anthropological nutritionists such as himself have studied the few isolated hunter-gatherer societies – such as the Nanamiut of Alaska, the Aborigines of Australia and the !Kung of Africa – that remained into the 20th century and found that modern maladies, such as heart disease, high cholesterol, obesity and diabetes, are rare in these populations.

"Over the past several decades, numerous studies have found that indigenous populations have low serum cholesterol and triglyceride levels," Cordain says.

This is despite the fact that their diets aren't going to reap praise from many modern nutritionists.

"Previous studies by myself and colleagues had found that nearly all – 97 percent – of the world's hunter-gatherer societies would have exceeded recommended guidelines for

fat," Cordain says.

Watkins says although this may be surprising to many people, it fits exactly with what research is showing about the importance of specific types of fat in the diet.

"Current research is showing that, with the decline of fat in the diet, the amount of fat isn't as important as the relative amounts, or ratio, of specific fats in your diet. It's a qualitative issue, not a quantitative issue," he says. "By eating more of the good fat you can lower your cholesterol and reduce your risk of cardiovascular disease."

This balance of fats has changed dramatically in the past century, he adds.

"Generally, our modern diets, especially in the past 100 years, have changed to where we're consuming excess amounts of omega-6 fat. Omega-6 is found in high levels in many of the oil seed crops that we consume," Watkins says. "It's also found in the meat of the livestock that eat these grains, as this study shows."

Watkins adds that this research suggests new ways for potential diversification in agricultural production.

"Our study points out that there are opportunities for ranchers and producers to develop niche markets for grass-fed beef that fit consumer interest in beef products that deliver special nutrients," Watkins says. "There may also be branding opportunities for products like the Laura's Lean Beef Products."

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**ABSTRACT**

**Fatty acid analysis of wild ruminant tissues:  
evolutionary implications for reducing diet-related  
chronic disease**

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**Hypotheses:** Consumption of wild ruminant fat represented the primary lipid source for pre-agricultural humans. Hence, the lipid composition of these animals' tissues may provide insight into dietary requirements that offer protection from chronic disease in modern humans.

**Method:** We examined the lipid composition of muscle, brain and subcutaneous adipose tissue (AT) from 17 elk (*Cervus elaphus*), 15 mule deer (*Odocoileus hermionus*), and 17 antelope (*Antilocapra americana*), and contrasted them to wild African ruminants and pasture and grain-fed cattle.

**Results:** Muscle fatty acid (FA) was similar among North American species with polyunsaturated fatty acids/saturated acids (P/S) values from 0.80 to 1.09 and n-6/n-3 FA from 2.32 to 2.60. Marrow FA was similar among North American species with high levels (59.3 percent to 67.0 percent) of monounsaturated FA; a low P/S (0.24—0.33), and an n-6/n-3 of 2.24—2.88. Brain had the lowest n-6/n-3 (1.20—1.29), the highest concentration of 22:6 n-3 (elk, 8.90 percent; deer, 9.62 percent; antelope, 9.25 percent) and a P/S of 0.69. AT had the lowest P/S (0.05—0.09) and n-6/n-3 (2.25—2.96). Conjugated linoleic acid (CLA) isomers were found in marrow of antelope (1.5 percent), elk (1.0 percent) and deer (1.0 percent), in AT (deer, 0.3 percent; antelope, 0.3 percent) in muscle (antelope, 0.4 percent; elk, trace) but not in brain.

**Conclusions:** Literature comparisons showed tissue lipids of North American and African ruminants were similar to pasture-fed cattle, but dissimilar to grain-fed cattle. The lipid composition of wild ruminant tissues may serve as a model for dietary lipid recommendations in treating and preventing chronic disease.

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