

Cooking as a biological trait, by Wrangham and Conklin-Brittain, in *Comparative Biochemistry and Physiology*, 2003

## The Review

### Introduction

The researchers explain that there are four main differences between the diets of human hunter-gatherers and those of the other great apes: humans eat more meat, they eat more roots, they tend to pursue a narrower diet breadth at any one time, and they use pre-digestive, food-processing techniques. In this review, the researchers consider the importance of cooking as a pre-digestive technique.

### The distribution of cooking

Other than modern raw foodists, the researchers note that they have not found any incidence of groups living without cooked foods. Although it is frequently noted that the Inuit ate? rate raw blubber, it is also the case that the meat, blubber and even blood were also cooked. The raw meat may have been useful in providing vitamin C, which is typically accessed through eating plants.

### The antiquity of cooking

The researchers note that cooking is often regarded as irrelevant to human evolutionary biology on the basis that it was only adopted relatively recently and therefore could not have had an effect. However, the researchers observe that a speciation event is generally regarded as being possible within 15,000 – 25,000 years and some studies have reported that mammalian species can evolve in as little as 5,000 years. The researchers note that there is widely accepted evidence that hominids used cooking techniques 250,000 years ago and other evidence that hominids even earlier, such as 400,000 – 600,000 years ago in what is now modern Hungary, more than 1 million years ago in what is now South Africa and 1.6 million years ago in what is now modern Kenya. The earliest use of fire for cooking suggested by any researcher is 1.9 million years ago, at which point the modern human form emerged in the lineage of *Homo ergaster*.

### Effects of a raw-food diet

The researchers reported that in a modern study of urban Germans who preferred to eat all of their food raw, it was found that 31% were suffering from Chronic Energy Deficiency. Additionally, 50% of the women were completely amenorrhoeic.

### Benefits of cooking plants

The researchers explain that it is beneficial to cook plants for several reasons. Cooking breaks down thick skins or husks by softening the cellulose, making them easier to eat; bursts cells, which makes cell contents easier to digest; modifies the physical structure of proteins and starches, making them easier to digest; reduces the chemical structure of indigestible molecules into forms that can be

fermented and denatures toxins. The researchers therefore argue that cooking wild plant foods would have significantly improved their nutritional value and increased their energy density.

### Benefits of cooking meat

Preparing meat to be eaten is not significantly effected by cooking. Additionally, the digestibility of meat is similarly unaffected by cooking. However, it may have helped defrost large kills during the Ice Ages and may also have assisted the rate of intake, through tenderization, as cooked meat is much easier to eat than raw meat. The researchers note that by examination of chimpanzees in the wild, it takes primates a long time to chew raw meat as they do not have any significant dental adaptations for slicing through flesh as obligate carnivores do. The researchers therefore propose that cooking would have enabled an increased use of meat as a food source.

### Cooking and the digestive system

The researchers observe that one effect of eating a higher quality diet was a reduction in tooth size and jaw size over evolutionary time. This switch to a high quality diet is typically considered to have occurred as a result of the increasing dependence upon animal foods but cooking may also have played a role. Researchers have long observed that reductions in human molar size around 100,000 years ago might have resulted from the increasing use of cooking. However, a significant reduction of tooth and jaw size also accompanied the evolution of *Homo ergaster* around 1.9 million years ago. The later reductions in human molar size may therefore relate to a refinement in cooking technique, such as boiling. In addition to the changes in tooth and jaw size, the researchers observe that human digestive anatomy adapted to display a smaller gut volume, longer small intestine, smaller cecum and colon and faster gut passage rate, indicating a higher quality diet. These adaptations again are generally ascribed to meat eating but could also have been enhanced by cooking.

### What did the researchers conclude?

The researchers concluded that while cooking gave humans more dietary flexibility, it also constrained them to consume only diets of high caloric density.

### Limitations

The review was limited by the availability of data in the archaeological record and by the fact that it was based on the authors' opinions, which may differ from those of other researchers working in the same field.

In context of using "similarly" the least sentence do you mean affected here?