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A taste of an elephant: The probable role of elephant meat in Paleolithic diet preferences

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ABSTRACT

Taste plays an essential role in human life and has a major impact on people's food preferences. Based on the recent discovery of taste-related genes in a Neanderthal and the assumption that taste preferences are likely to have existed in earlier Paleolithic times also, we believe that this is a potentially useful line of inquiry. Since taste preferences are embedded within social and cultural imprinting, we explore the very long nutritional, cultural and perceptional connection between humans and elephants in the Paleolithic period in order to examine the probable role of taste in decision-making regarding elephant procurement and consumption. The aim of this study is to explore the extent to which taste preference could be detected in relation to elephant consumption. We have compiled ethno-historical accounts of elephant consumption from Africa in an attempt to establish patterns based on taste preferences. We then investigated Paleolithic faunal assemblages that contained elephant remains in an attempt to detect preferences that might have influenced food selection in the deep past.

We suggest that early hominins might have had taste preferences and that elephant meat played a significant role in their diet, when available. Furthermore, the archaeological evidence coupled with ethnographic observations and the study of frozen mammoths suggest that juvenile elephants were specifically a delicacy and were hunted intentionally since their specific meat and fat composition seems to have had a better taste and a better nutritional value.

1. Introduction

Taste plays a central role in human life and has a major impact on our food preferences (Drewnowski, 1997, Garcia-Bailo et al., 2009). Taste perception is one of the most important factors in distinguishing good and healthy food from rotten or poisonous food. Our day is guided by decisions concerning taste preferences as this is correlated with different genetic interventions on our taste perception (Duffy and Bartoshuk, 2000). The development of individual flavor perception is linked to human life history and influenced by internal and external preferences (Birch, 1999). However, it is almost impossible to have any knowledge of prehistoric taste perception and preference. What did early hominins endeavor in their everyday life and what decisions did they have concerning food? Was taste an issue in finding and consuming food? Or was finding food only a matter of survival and basic nutrition? In an attempt to answer such questions, more aspects of food preference and consumption are always to be reviewed, such as social behavior interference or imprinting from childhood. The Paleolithic archaeological record is seldom used in order to tackle questions regarding the role of taste in prehistoric food preferences. It is no wonder that such questions have rarely been asked, and that we are lacking any information regarding taste preferences of early hominins. This paper presents a pivotal attempt to investigate these questions.

In this study we explored the possible role of Paleolithic taste preference. We represent a comprehensive time span occurring over hundreds of thousands of years where different hominins occupied the land living alongside elephants and using them as a major food source. Although this is a wide time frame, where different hominins lived and inhabited different sites, there is something in common which provides a worldwide perspective. We focus only on elephant meat consumption and in particular the meat of young elephants. The relationship between humans and elephants goes back hundreds of thousands of years ago, when they shared habitats and had a special way of interaction. Exploitation was not the only connection. Special tools were made out of elephant bones and the animal was many times honored and sacred, most probably occupying a very special place in human

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cosmology. Therefore there were added attributes except, perhaps, its great taste (Barkai and Gopher, 2013; Lev and Barkai, 2015; Zutovski and Barkai, 2015). Although nutrition and the diet of different hominin species is a fundamental component of their life and survival, very little is known of the taste perceptions and dietary preferences of prehistoric humans. A recent study discovered taste related genes in Neanderthals (Lalueza-fox et al., 2009) and raised the assumption that taste preferences are likely to have existed in earlier Paleolithic times than the Middle Paleolithic as well. We believe that this is a potentially useful line of inquiry.

Bitter taste is one of the important sensory perceptions, for it helps protect the body from ingesting toxic substances. Specifically, the taste of bitterness on the tongue is made possible by the G-protein-coupled receptors that are expressed in taste cells (Drayna, 2005). These proteins are concealed by the TAS2R (taste receptors type 2 members) family of genes. Variability among individuals in bitter taste perception is correlated with variability and change in the genes and other genetic influences. Along the signal transduction pathway of the bitter taste receptor in part of the human population there is a mutation in the G-protein-coupled receptors that basically blocks the signaling triggered by the bitter chemical called phenylthiocarbamide (PTC) and hence this population has no sensation for the bitter taste as long as this mutation appears in the two gene allele. The research conducted by Lalueza-Fox et al. (2009) revealed by analyzing the TAS2R38 gene in the El Sidron Neanderthal found in the north of Spain that this gene did exist and this specific Neanderthal had a single mutation in position 49 of the protein in one of the two alleles making it slightly taster less for the bitter perception. Mutations in the 49P site of the TAS2R38 are common in about 25% of modern human population. Therefore, the finding of the same mutation in Neanderthals can provide good evidence for the fixation of this mutation in the common ancestor of Neanderthals and modern humans. The existence of the TAS2R38 gene in Neanderthals is a proof that bitter taste perception is evolutionary conserved and favorably selected, thus suggesting that early hominins probably had some kind of taste perception and most likely have had taste preferences as well.

In the dental calculus of the El Sidron Neanderthal remnants of yarrow and chamomile were found. These plants are known to have a bitter taste and are not used as spices or as an addition to food. Their nutritional value is very low as well. These plants were probably consumed as medicinal plants according to the discovery of the TAS2R38 gene that enables the bitter taste perception on the tongue (Hardy et al., 2012; Hardy et al., 2013). From the stated above we know that the bitter taste receptor TAS2R38 existed in the El Sidron Neanderthal. This can show that the tongue was probably developed enough to have had other taste receptors and offers a wide perspective on plant eating and cooking and if so maybe collecting food according to taste preferences.

Taste buds exist in all vertebrates (except Hagfish). They begin to evolve in the gustatory system; there they are innervated by three cranial nerves and go through different pathways. They consist of four major different cell types among other cells which are less central. Among these four are the well-known stem cells and basal cells (Northcutt, 2004).

Since taste preferences are embedded within social and cultural imprinting as well as behavioral influences and genes, we explored the very long nutritional, cultural and perceptional connection between humans and elephants in Paleolithic times throughout the Old World. This is done in order to discuss the probable role of decision-making and preferences in elephant procurement and consumption.

Paleolithic nutrition was based on animal meat and fat in addition to plant based food (e.g. Barkai and Goper, 2013). Many Paleolithic sites have extensive evidence for large mammal consumption and it has been argued repeatedly that big game hunting was a principal procurement strategy for obtaining the necessary caloric demand (Bunn and Gurtov, 2013; Dominguez-Rodrigo et al., 2014). If referring to prey choices, it has been demonstrated in many cases that humans have focused their attention on Proboscideans for dietary purposes since this is most beneficial in terms of adaptation (e.g. Surovell and Waguespack, 2009) Evidence for elephant exploitation for dietary purposes are present at many Paleolithic sites around the old world over hundreds of thousands of years, revealing bones with cut and percussion marks and different articulations of bones alongside flint artifacts (Goren-Inbar et al., 1994; Rabinovich et al., 2012; Boschian and Saccà, 2014; e.g. Yravedra et al., 2010). We focus on elephant consumption and thus explore the question whether elephants were targeted only for their extraordinary amount of meat and fat they supplied (e.g. Ben-Dor et al., 2011) or could taste preference have played a role as well in the consumption patterns of these extraordinary nutritional sources?

2. Methodology

There is little evidence to how taste preference did evolve in the first place. It seems as though taste preference and its development is a matter of options and learning. Today, as research shows, the different taste preferences consist of our knowledge of what we like and dislike. Our early learning, the environment and its influence and genetic predispositions influence our taste buds and taste preferences and their developmental growth (Birch, 1999). By studying these recent researches of taste preference we tried to combine the evidence with other evidence from the field and from ethnographic studies and to shed some light on prehistoric taste preference and hunting in light of that preference if it did exist.

We have investigated the ethnographic literature for taste preferences related to eating elephant meat and fat. In relation to this, we surveyed Paleolithic faunal assemblages that contained elephant remains in an attempt to detect patterns of preference that might have influenced food selection. Recent discoveries concerning many sites that have yielded young elephant bones show that the special qualities of the meat and fat of the young are dominant and thus are incorporated here.

Our research consisted of studying recent ethnographic groups, learning their hunting patterns and focusing on their taste preference concerning elephant meat. Our research then turned to recent historical texts describing the taste of elephant meat and later on we combined these studies with bone assemblages of young and adult elephants at Paleolithic sites around the old world in an attempt to discover similar patterns in the procurement strategies.

3. Ethnographic evidence regarding taste preferences in elephant consumption

There are several ethnographic groups that were still relying on hunting and gathering while documented by anthropologists. In the case of taste related patterns, a complex picture emerges as, for instance, the Aborigines of Australia do have a taste preference and can afford to hunt accordingly while other groups do not have the liberty of choosing and hunt any available game whether it tastes better or worst (O'Dea et al., 1991; Koster et al., 2010).

A study of the Liangula hunters, a tribe living in East Kenya, reported that not only did these hunters hunt elephants for meat on a regular basis; they specifically preferred to prey upon juveniles because their meat tasted better (Holman, 1967).

Not only meat and flesh are optional for eating. Fat has a good texture, great taste and substantial caloric contribution. Even in times of stress and less resources when the animals are lean they