

Why We Cooked:

Food Preference, Accidental Discovery, and What the Evidence Cannot Yet Explain

<https://doi.org/10.13140/RG.2.2.15989.13280>

Anthony Vondoom 

Independent Researcher | Chef De Cuisine

anthony.vondoom@outlook.com

Abstract

Cooking is usually explained by what it gave hominins: more usable energy, smaller guts, and room for larger brains. Why hominins cooked at all receives less attention. This paper reviews the evidence in two parts: why hominins cooked once they had fire, and why cooked food was preferred. Captive apes prefer cooked food, which suggests the preference was in place before fire was controlled (Wobber et al., 2008), and chimpanzees will wait for and plan around cooking (Warneken & Rosati, 2015); together these make deliberate repetition of an accidental discovery plausible. The apes had prior exposure to some cooked food. Fire was reported at about one million years ago at Wonderwerk Cave (Berna et al., 2012), but no source reviewed here establishes when cooking began; habitual roasting has been argued at Qesem Cave from about 400,000 years ago (Barkai et al., 2017). Starch in Neanderthal dental calculus has been read as cooked, a reading that has been challenged. None of it shows why cooked food was preferred. The ape experiments that varied texture did not decide between flavor and softness. The paper sets out an experiment that varies flavor, aroma, and texture independently, and states what data a test of the link between cooked diets and brain size would need.

Keywords: cooking, hominin evolution, food preference, hearth, great apes, taste, texture, Palaeolithic diet

1. Introduction

The effects of cooking on human evolution are well argued. Wrangham (2009) proposes that the adoption of cooking was a transformative biological event, and the expensive-tissue hypothesis of Aiello and Wheeler (1995) links a smaller gut to a larger brain. Vondoom (2026) places the hearth at the center of an account of social organization and civilization. That work treats cooking as a given and follows what came from it.

The timing is disputed. Berna et al. (2012) reported in situ fire about one million years ago at Wonderwerk Cave, South Africa, and Davis et al. (2026) report fire-making, not only fire use, at Barnham, England, about 400,000 years ago. Wrangham (2017) sets out the problem for the cooking hypothesis: archaeological evidence of fire use is scarce before about 400,000 years ago, yet weak jaws and small teeth make a raw diet problematic for early Pleistocene Homo, and he concludes that no solution is satisfactory. Roebroeks and Villa (2011) find secure

evidence for habitual fire use in Europe only from about 400,000 years ago. Evidence of fire is not evidence of cooking, and the sources reviewed here do not establish when cooking began.

The question here comes earlier than any of these disputes: why did hominins cook? Wobber et al. (2008) review earlier proposals that fire first served for heat, light, and defense, not for cooking. Something made cooked food worth the trouble of making. This paper takes up that question and leaves the hearth and civilization argument to the earlier work.

This is a narrative review. Sources were found through open web searches of publisher, repository, and indexing pages in October 2026, not a systematic database search, so a statement that a study or measurement is absent means it is absent from the sources found. Dates for early fire are those given in the cited sources, and later work may have revised them.

2. Apes Prefer Cooked Food

Wobber et al. (2008) offered captive great apes a choice between raw and cooked versions of the same food. Fourteen chimpanzees chose cooked carrot and cooked sweet potato more often than raw, and showed no preference for white potato. In a later experiment, apes preferred cooked beef to raw beef and were indifferent between raw and cooked apple. Chimpanzees at a sanctuary in the Congo Republic, which were not fed cooked meat regularly, also preferred cooked beef: six of the ten showed a significant individual preference, and none preferred raw.

The apes were not naive to cooked food. The Yerkes chimpanzees had previously been fed cooked foods, including the test items. The Leipzig apes receive cooked beef and bread as part of their regular diet. The sanctuary chimpanzees were not fed cooked meat regularly but do receive cooked plantains and rice. The authors note that preferences stayed stable across sessions and populations, which suggests food choices were not strongly shaped by past experience, and that neophobia could not be excluded as a factor in some results. A contribution from learning in captivity cannot be ruled out.

The authors conclude that Palaeolithic hominids would have preferred cooked food before they could make it, carrying over a preference for high-quality, easily chewed foods, and that cooking would therefore have followed quickly once fire was controlled.

Warneken and Rosati (2015) extended the finding across nine studies with chimpanzees. The chimpanzees preferred cooked food, understood that cooking transforms raw food and applied that understanding to new contexts, paid a time cost to obtain cooked food, gave up raw food to have it cooked, and transported and saved raw food for later chances to cook. The authors conclude that the psychological abilities cooking requires may have been present in the last common ancestor of apes and humans, before the control of fire.

The energy side of the argument rests on mice. Carmody et al. (2011) fed mice meat and starch-rich tubers raw and whole, raw and pounded, cooked and whole, or cooked and pounded. Cooking substantially increased the energy gained from meat, with body mass rising in ways not explained by food intake or activity, and cooking outperformed pounding for both meat and tubers. Food preferences in fasted animals agreed with that result.

Mice are a distant model for hominins. The sources reviewed here contain no measurement of the energy apes gain from cooked food. The ape studies show what apes choose, and the mouse study shows what a mammal gains. Neither connects the two in a primate.

3. What the Preference Cannot Separate

Cooking changes several properties of food at once. Wobber et al. (2008) list higher sugar availability in the mouth as cooked starch is broken down, a greater supply of glutamate, which produces the umami taste, and reduced toughness and chewing effort.

Their second experiment tried to separate these. Twenty-three apes (14 chimpanzees, three bonobos, two gorillas, and four orangutans) chose between carrot pieces that were raw or cooked and whole, grated, or mashed. Three hypotheses gave different predictions: that apes prefer cooked taste, less tough food, or food that needs less chewing. Apes preferred cooked whole carrot to raw whole carrot and to raw grated carrot, and preferred cooked whole to cooked grated. They were indifferent between raw mashed and cooked whole, and they preferred mashed to grated when both were cooked. The authors judged that these results made it difficult to distinguish between the cooked-taste and softer-food hypotheses.

Other results point beyond texture. Apes were indifferent between raw and cooked apple even though cooked apple is softer, and the authors took this to mean that other factors were involved. For white potato and apple no group preferred the raw food; the apes were simply indifferent. The authors suggest the apes chose cooked food only when the change cooking made was large enough.

The ape evidence establishes that the preference exists and leaves its basis open. Flavor, texture, ease of chewing, and anticipated digestibility all remain possible, and the experiments did not manipulate aroma. The authors left the question of which property matters most to future work.

4. From Accident to Habit

Fire is not cooking. At Qesem Cave, Barkai et al. (2017) argue that habitual fire and roasting appeared together at about 400,000 years ago, and that Acheulian groups in the Levant thrived for more than a million years without commonly and continuously using fire and without roasting meat. They place earlier fire, as at Wonderwerk (Berna et al., 2012), among 'early fire' occurrences that preceded habitual use. On that reading the Qesem record offers no long period of habitual fire without cooking, and whether fire came first and cooking later depends on a dating question the evidence has not settled.

The first cooked food most plausibly came from natural fire. Vondoom (2026) offers this as an inference from behavioral ecology, since no site records the transition. Wobber et al. (2008) note a report that wild chimpanzees choose seeds heated by wild fires.

An accidental discovery needs nothing more than a preference to become a habit. If hominins already preferred cooked food, as the ape studies suggest, each accidental exposure would have

been rewarded. Repeating it on purpose draws on abilities chimpanzees already show: they wait for cooked food, give up raw food to have it cooked, and save raw food for later chances to cook (Warneken & Rosati, 2015). An accidental origin and deliberate repetition are compatible.

Planer (2018) offers a different route. He notes that Wrangham treats mechanical processing of food as the main alternative to cooking, and argues that the two may work together: regular processing of food with wooden implements may have led to the discovery of ignition, so that the ability to cook itself depended on earlier processing. That account does not require a natural-fire accident as the first step.

Two questions sit inside why hominins cooked. The first is why they cooked once fire was available, and the preference studies answer it: cooked food was preferred. The second is why cooked food is preferred, and the evidence does not answer it. Cooking changes flavor, texture, chewing effort, and digestibility, and the preference could track any of them.

These accounts do not have to compete. The preference could be the cue that led hominins to cook, with the energy gain as the benefit that kept the behavior in place. In Carmody et al. (2011), the food preferences of fasted mice agreed with the energetic advantage of cooking. That reading is a hypothesis, and no study reviewed here tests it in a primate.

5. Hunting, Hearths, and Food Processing

The archaeological record cannot reveal motive, but it shows what hominins hunted, how they handled it, and where fire stood in relation to both.

Thieme (1997) described wooden throwing spears from Schöningen, Germany, found with stone tools and the butchered remains of more than ten horses, and read them as evidence of systematic hunting involving foresight, planning, and appropriate technology. He put the site at about 400,000 years old. Later dating gave a maximum age of 337,000 to 300,000 years (Richter & Krbetschek, 2015) and, most recently, about 200,000 years, a date within the time of European Neanderthals (Hutson et al., 2025). Stahlschmidt et al. (2015) analyzed the purported hearths and burnt material at Schöningen and concluded that they present no convincing evidence for human use or control of fire. Planned hunting there appears without convincing evidence of fire.

At Qesem Cave in Israel, Shahack-Gross et al. (2014) identified a hearth about 300,000 years old that was used repeatedly. It covers roughly 4 m², contains two superimposed use cycles, stands in the center of the cave, and is associated with butchered animal remains and a dense flint assemblage. Fire was used habitually throughout the cave's 420,000 to 200,000 year sequence.

Barkai et al. (2017) argue that fire at Qesem was used primarily for roasting and cooking meat. Burning affects more than 30 percent of the bone fragments in every assemblage and rises to 63.95 percent at the central hearth. To identify roasting, they looked for bones burnt on the outer surface but not on the marrow surface, as would be expected with meat on the bone, and

report this pattern in a small share of the hearth-context specimens bearing differential burning. Tortoise bones burnt mainly on the dorsal surface fit roasting the whole animal upside down on the embers. The authors acknowledge that the roasting signal could be viewed as weak, and that cleaning waste, using bone as fuel, and burning after burial also burn bone.

Blasco et al. (2019) report the earliest evidence for storing bone marrow for later eating, also from Qesem. Marks linked to removing dried skin, combined with experiments on marrow preservation, showed that marrow fat degraded little over up to nine weeks of exposure, and the authors read the marks and experiments together as storage and delayed consumption.

These findings document planned hunting, hearth-centered activity, and deliberate handling of fat-rich food. Roasting at Qesem is argued from burnt bone but rests on a small share of the sample. Marrow storage is a nutritional strategy, and a hearth beside butchered bone does not say how the meat was prepared.

6. Cooked Plants and Flavor

Henry et al. (2011a) recovered phytoliths and starch grains from the dental calculus of Neanderthals from Shanidar Cave, Iraq, and Spy Cave, Belgium. They report direct evidence that Neanderthals ate a variety of plant foods in both a warm eastern Mediterranean and a cold northwestern European climate, and conclude that Neanderthals made those foods more digestible in part by cooking them.

The cooked-starch reading is contested. Collins and Copeland (2011) argue that the identifications lack statistical rigor and that the granules may simply be old, not cooked, and Henry et al. (2011b) replied that spontaneous gelatinization is not supported by evidence. The calculus therefore shows plant eating, and cooked plant eating only if the reading holds.

Flavor appears directly in a much later context. Saul et al. (2013) found phytoliths consistent with garlic mustard in charred food deposits on pottery from the western Baltic dated to about 6,100 to 5,750 years ago (cal BP). The seed has a strong flavor and little nutritional value, and the deposits also held residues of terrestrial and marine animals. The authors take this as the first direct evidence for the spicing of food in European prehistoric cuisine, and as a challenge to the view that hunter-gatherers and early farmers used plants only for energy.

The pottery postdates even the latest proposed onset of habitual fire use by hundreds of thousands of years. It shows that flavor shaped food preparation in later prehistory and says nothing about the first cooks.

7. What the Record Cannot Show

A burnt bone in a hearth does not show cooking. Alonso et al. (2024) note that intentional and accidental processes can burn bone without any link to consumption. Their experiments on rabbit bones separate roasting from discard through the differential damage between bones with and without meat on them. Barkai et al. (2017) list the same alternatives for the burnt bone at Qesem.

Brain size can be followed in the fossil record through endocranial volume, which Du et al. (2018) use as a proxy for brain size in fossils. They find a gradual increase across the hominin clade, produced mainly by change within lineages and supplemented by larger-brained *Homo* species appearing and smaller-brained *Australopithecus* and *Paranthropus* taxa disappearing. Within lineages, the change occurs on a timescale too fine for the current fossil record to resolve. That resolution is too coarse to match dietary layers to endocranial volumes one stratum at a time.

8. Proposed Research

8.1 A flavor, aroma, and texture experiment

The ape results leave the basis of the preference open, and a human version can separate it. Participants taste raw and cooked versions of the same foods in three conditions: texture matched across versions (both pureed, for example), aroma blocked (with nose clips), and both varied independently. If the preference for cooked food persists once texture is matched, flavor is doing at least part of the work. If it disappears, texture or digestibility is the more likely cause. Wobber et al. (2008) used grated and mashed carrot for the texture side in apes. The human design adds aroma, and participants can report what they taste. The sources reviewed here include no such study.

The design needs care in several places. Altering texture may alter how flavor is released, so the factors will not separate cleanly. Pureed raw and cooked food may still differ in viscosity and particle size, so texture should be measured and not assumed to match. Nose clips may not fully block aroma. Hunger, familiarity with each food, and neophobia can shift choices, as Wobber et al. (2008) suspected for neophobia in apes, so they need controlling. The foods should be safe to eat raw, which excludes raw meat, where the ape preference was clearest. Preference should be measured in more than one way, such as forced choice and rated liking, with the sample size set by a power analysis and ethical approval in place before testing. Adult participants also bring cultural experience of cooked food, which the sanctuary chimpanzees of Wobber et al. (2008) partly avoided, and a result in modern adults would not by itself show what Pleistocene hominins preferred.

8.2 Energy gain in apes

Carmody et al. (2011) measured energy gain in mice. A measurement in apes would tie the preference documented by Wobber et al. (2008) to a nutritional return. The sources reviewed here contain none.

8.3 A site-matched database

A dataset pairing dated fire and diet evidence with hominin remains from the same site or region and period would allow a coarse comparison. The endocranial volume dataset of Du et al. (2018) supplies the skull side. At Qesem, for example, the human remains are teeth only (Barkai et al., 2017), so the cave offers no endocranial data to pair with its hearth and marrow

evidence. The comparison would show overlaps and mismatches, not causation, because the fossil record cannot resolve change within lineages.

8.4 Burn patterns at hearth sites

Experiments of the kind Alonso et al. (2024) ran on rabbit bones, repeated for the large ungulates at sites such as Qesem (Shahack-Gross et al., 2014), would show whether meat was on the bone when it burned. That is a step toward separating cooking from discard.

8.5 Dating cooking itself

Every comparison above depends on when cooking became habitual. Fire was reported at about one million years ago (Berna et al., 2012) and fire-making at about 400,000 years ago (Davis et al., 2026). Wrangham (2017) sets scarce archaeological evidence of fire before about 400,000 years ago against anatomy that makes a raw diet problematic for early Pleistocene Homo, and Barkai et al. (2017) argue for habitual roasting at Qesem from about 400,000 years ago. The comparisons need evidence that dates cooking, not fire.

9. Conclusion

Apes prefer cooked food, chimpanzees understand and plan for cooking, and mice gain more energy from cooked meat and tubers. Fire was reported about a million years ago (Berna et al., 2012), but the earliest argued evidence for roasting, at Qesem about 400,000 years ago, rests on a small share of the burnt bone. Hominins hunted with planning, kept hearths, stored marrow, and ate plants that may have been cooked, though that reading is contested. If the preference for cooked food predates fire, as Wobber et al. (2008) argue, cooking would have followed quickly once fire was controlled, and an accidental first taste could have become a deliberate habit.

Flavor, softness, ease of chewing, and energy all fit the evidence, and the experiments that tried to separate them did not succeed. The experiment in Section 8.1 is designed to do so. The evidence supports a preference for cooked food. It does not yet support a reason.

Sustainable Development Goals (SDG) Relevance

This paper relates to the following United Nations Sustainable Development Goals.

SDG 2, Zero Hunger: Understanding why humans came to prepare food by cooking, and what that preparation provides nutritionally, informs the long history of how people secure and use food.

SDG 3, Good Health and Well-being: Evidence on how cooking changes the energy and digestibility of food, and on how food preference relates to nutrition, bears on the study of diet and health.

SDG 4, Quality Education: As a review that states what the evidence can and cannot show, the paper may support teaching on how claims about human evolution and diet are tested.

Funding

This research received no external funding.

AI Disclosure

This paper was developed with the assistance of Claude sonnet (Anthropic), used for literature searching, source checking, and drafting. The research direction and central ideas, including the accidental-discovery account and the argument that taste may explain cooking, are the author's. This disclosure is made in accordance with the author's standard practice of transparent AI use across all published work.

References

- Aiello, L. C., & Wheeler, P. (1995). The expensive-tissue hypothesis: The brain and the digestive system in human and primate evolution. *Current Anthropology*, 36(2), 199–221. <https://doi.org/10.1086/204350>
- Alonso, G., Rufà, A., & Blasco, R. (2024). Cooked or discarded? Experimental distinction of rabbit burnt bones and its application to the archaeological record. *Journal of Archaeological Science: Reports*, 56, Article 104541. <https://doi.org/10.1016/j.jasrep.2024.104541>
- Barkai, R., Rosell, J., Blasco, R., & Gopher, A. (2017). Fire for a reason: Barbecue at Middle Pleistocene Qesem Cave, Israel. *Current Anthropology*, 58(S16), S314–S328. <https://doi.org/10.1086/691211>
- Berna, F., Goldberg, P., Horwitz, L. K., Brink, J., Holt, S., Bamford, M., & Chazan, M. (2012). Microstratigraphic evidence of in situ fire in the Acheulean strata of Wonderwerk Cave, Northern Cape province, South Africa. *Proceedings of the National Academy of Sciences*, 109(20), E1215–E1220. <https://doi.org/10.1073/pnas.1117620109>
- Blasco, R., Rosell, J., Arilla, M., Margalida, A., Villalba, D., Gopher, A., & Barkai, R. (2019). Bone marrow storage and delayed consumption at Middle Pleistocene Qesem Cave, Israel (420 to 200 ka). *Science Advances*, 5(10), Article eaav9822. <https://doi.org/10.1126/sciadv.aav9822>
- Carmody, R. N., Weintraub, G. S., & Wrangham, R. W. (2011). Energetic consequences of thermal and nonthermal food processing. *Proceedings of the National Academy of Sciences*, 108(48), 19199–19203. <https://doi.org/10.1073/pnas.1112128108>
- Collins, M. J., & Copeland, L. (2011). Ancient starch: Cooked or just old? *Proceedings of the National Academy of Sciences*, 108(22), E145. <https://doi.org/10.1073/pnas.1103241108>
- Davis, R., Hatch, M., Hoare, S., Lewis, S. G., Lucas, C., Parfitt, S. A., Bello, S. M., Lewis, M., Mansfield, J., Najorka, J., O'Connor, S., Peglar, S., Sorensen, A., Stringer, C., & Ashton, N. (2026). Earliest evidence of making fire. *Nature*, 649(8097), 631–637. <https://doi.org/10.1038/s41586-025-09855-6>

- Du, A., Zipkin, A. M., Hatala, K. G., Renner, E., Baker, J. L., Bianchi, S., Bernal, K. H., & Wood, B. A. (2018). Pattern and process in hominin brain size evolution are scale-dependent. *Proceedings of the Royal Society B: Biological Sciences*, 285(1873), Article 20172738. <https://doi.org/10.1098/rspb.2017.2738>
- Henry, A. G., Brooks, A. S., & Piperno, D. R. (2011a). Microfossils in calculus demonstrate consumption of plants and cooked foods in Neanderthal diets (Shanidar III, Iraq; Spy I and II, Belgium). *Proceedings of the National Academy of Sciences*, 108(2), 486–491. <https://doi.org/10.1073/pnas.1016868108>
- Henry, A. G., Brooks, A. S., & Piperno, D. R. (2011b). Reply to Collins and Copeland: Spontaneous gelatinization not supported by evidence. *Proceedings of the National Academy of Sciences*, 108(22), E146. <https://doi.org/10.1073/pnas.1104199108>
- Hutson, J. M., Bittmann, F., Fischer, P., García-Moreno, A., Gaudzinski-Windheuser, S., Nelson, E., Ortiz, J. E., Penkman, K. E. H., Perić, Z. M., Richter, D., Torres, T., Turner, E., Villaluenga, A., White, D., & Jöris, O. (2025). Revised age for Schöningen hunting spears indicates intensification of Neanderthal cooperative behavior around 200,000 years ago. *Science Advances*, 11(19), Article eadv0752. <https://doi.org/10.1126/sciadv.adv0752>
- Planer, R. J. (2018). Cooking, mechanical processing, and the discovery of ignition technology. *Current Anthropology*, 59(2), 228. <https://doi.org/10.1086/696940>
- Richter, D., & Krbetschek, M. (2015). The age of the Lower Palaeolithic occupation at Schöningen. *Journal of Human Evolution*, 89, 46–56. <https://doi.org/10.1016/j.jhevol.2015.06.003>
- Roebroeks, W., & Villa, P. (2011). On the earliest evidence for habitual use of fire in Europe. *Proceedings of the National Academy of Sciences*, 108(13), 5209–5214. <https://doi.org/10.1073/pnas.1018116108>
- Saul, H., Madella, M., Fischer, A., Glykou, A., Hartz, S., & Craig, O. E. (2013). Phytoliths in pottery reveal the use of spice in European prehistoric cuisine. *PLOS ONE*, 8(8), Article e70583. <https://doi.org/10.1371/journal.pone.0070583>
- Shahack-Gross, R., Bernal, F., Karkanas, P., Lemorini, C., Gopher, A., & Barkai, R. (2014). Evidence for the repeated use of a central hearth at Middle Pleistocene (300 ky ago) Qesem Cave, Israel. *Journal of Archaeological Science*, 44, 12–21. <https://doi.org/10.1016/j.jas.2013.11.015>
- Stahlschmidt, M. C., Miller, C. E., Ligouis, B., Hambach, U., Goldberg, P., Bernal, F., Richter, D., Urban, B., Serangeli, J., & Conard, N. J. (2015). On the evidence for human use and control of fire at Schöningen. *Journal of Human Evolution*, 89, 181–201. <https://doi.org/10.1016/j.jhevol.2015.04.004>
- Thieme, H. (1997). Lower Palaeolithic hunting spears from Germany. *Nature*, 385(6619), 807–810. <https://doi.org/10.1038/385807a0>

- Vondoom, A. (2026). Before the monument: Cooking, cognition, and the social origins of civilization. *International Journal for Tourism, Archeology and Hospitality (IJTAH)*. <https://doi.org/10.21608/ijtah.2026.511445.1178>
- Warneken, F., & Rosati, A. G. (2015). Cognitive capacities for cooking in chimpanzees. *Proceedings of the Royal Society B: Biological Sciences*, 282(1809), Article 20150229. <https://doi.org/10.1098/rspb.2015.0229>
- Wobber, V., Hare, B., & Wrangham, R. (2008). Great apes prefer cooked food. *Journal of Human Evolution*, 55(2), 340–348. <https://doi.org/10.1016/j.jhevol.2008.03.003>
- Wrangham, R. (2009). *Catching fire: How cooking made us human*. Basic Books.
- Wrangham, R. (2017). Control of fire in the Paleolithic: Evaluating the cooking hypothesis. *Current Anthropology*, 58(S16), S303–S313. <https://doi.org/10.1086/692113>