Reply to Bar-Oz et al.: Commensalism and mutualism as early incentives for cat domestication

Our recent paper (1) draws attention to commensal and mutualistic processes of cat domestication, providing previously unidentified empirical evidence for these processes in an early agricultural village. Bar-Oz et al. (2) raise thoughtful questions regarding points that were not elucidated in detail in our paper. This gives us the opportunity to discuss some important issues in greater detail.

Bar-Oz et al. (2) suggest that our interpretations of cat isotope values are ambiguous, arguing that it is unlikely for the Quanhucun cats to have had more negative carbon isotope or lower nitrogen isotope values than humans, dogs, pigs, and rodents. This challenge is based on the interpretive ideal that cat diets were mainly comprised of rodents that consumed millet-based foods. However, cats are opportunistic predators preying on lagomorphs, birds, reptiles, amphibians, fish, and invertebrates (3). The more negative carbon isotope values of the Quanhucun cats indicate that their diets were diverse and not overwhelmingly dominated by rodents, which is also observed in modern feral cats (4). Although one cat had a low nitrogen isotope value (5.8‰), it was still higher than the herbivores (mean $\delta^{15}N$ value of 4.2 ± 0.8‰), indicating that it did not consume large quantities of plant foods. However, the high carbon isotope value (−12.3‰) suggests that this individual might have been fed or scavenged human food scraps depleted in ^{15}N and enriched in ^{13}C that were absent from the natural ecosystem (4). Such differences from the feeding ecology of wildcats are of particular interest in a study of domestication (ref. 5, p. 11). We think that the isotope values of the cats at Quanhucun reflect dietary variability that is consistent with commensal and mutualistic human–cat relationships.

Our paper supplies two alternatives to account for the presence of the cats at Quanhucun: originating from the local wild species or imported from the west. Bar-Oz et al. (2) suggest that a local wild species is the most parsimonious explanation. It is unclear which alternative is more parsimonious: separate domestication opportunities or transport of an already domesticated species. Unfortunately, the currently inadequate biometric data and morphological observations on skeletons from Chinese wildcats and domestic cats mean that only large-scale genetic and morphological studies of Asian cats will discriminate between these possibilities.

Finally, Bar-Oz et al. (2) note that commensalism does not always result in domestication and suggest that the Quanhucun cats may not be domestic. Our point, however, is that this situation was not merely commensal, but mutualistic. Isotopic and archaeological evidence shows that cats in Quanhucun preyed on rodents that ate stored grains, benefiting both the cats and the farmers. This study provides empirical evidence of early incentives for cat domestication and a starting point for considering the process as a whole. The later stages of cat domestication, over the last 5,000 y in China, Egypt, and in between, are likely to have been complex due to movement of people and cats and interbreeding among domestic, feral, and wild cat populations.

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Author contributions: Y.H. designed research; Y.H. performed research; Y.H. and F.B.M. analyzed data; and Y.H. and F.B.M. wrote the paper.

The authors declare no conflict of interest.

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