Cats in recent Chinese study on cat domestication are commensal, not domesticated

Recent archaeological research in China is rewriting the story of the origins of agriculture and plant and animal domestication. The study by Hu et al. (1) presents findings regarding early cat-human interactions with implications for domestication unearthed in Middle-Late Yangshao (6,000–5,000 B.P.) cultural levels at the site of Quanhucun, Shaanxi Province in the context of early Chinese Neolithic agriculture. Evidence provided by the authors includes morphometric, isotopic, and carbon-14 analyses of the cat skeletal remains.

We see significant ambiguity in interpretation of the isotopic data that suggest that the Quanhucun cats fed mostly on foods enriched with carbon from C_4 domesticated plants. Felids are obligate carnivores, requiring a diet comprised primarily of animal tissue. We would expect the carbon isotopic fingerprint of cats to be enriched relative to the carbon source of their diet (2, figure 6.3). However, the cat's $\delta^{13}C$ values in the study are depleted compared with those of the humans, dogs, pigs, and rodents whose diet was presumably based on C_4 plants. The nitrogen value for one of the cat bones is difficult to explain as it shows an isotopic signal within the trophic level of herbivores. This is highly unlikely given the known feeding ecology of cats. To substantiate these aberrant findings, further evaluation through analysis of stable isotopes in large samples of both

domestic and wild cats with variable diets in China is needed.

When dealing with microevolutionary changes as in domestication, detailed taxonomic identification is key. Hu et al. identify the cat remains as a small-bodied domestic-size *Felis* sp. by comparing their measurements to those of East European domestic and wild cats. *A Guide to the Mammals of China* lists four small-bodied cat genera and species in the Shaanxi Province region (3). In the absence of more detailed taxonomic identification (morphometric or genetic), a number of scenarios can account for the observations of Hu et al.: in situ commensalism or human expansion of the range of local wild cats and introduction of Near Eastern domestic cats. We contend that the most parsimonious explanation for these observations is that the *Felis* sp. remains represent a local wild species and therefore that the suggested link between the present finding and the trajectory of cat domestication is tenuous.

Commensalism among humans and animals is widespread and represents one of several pathways to domestication. Commensal animals benefit from changes in their environment engendered by humans and form a fairly stable, direct or indirect, bond with their human hosts. A most intriguing aspect of the history of human-animal interactions is that

by far the majority of animals entering commensal interactions with humans were never domesticated and consequently do not comprise a branch in the tree unfolding the story of animal domestication. Other less well-known trajectories in human cultural history can be revealed through research on commensalism. Earlier dates corresponding to cat taming in Egypt (4) and genetic data on the Near Eastern origins of domesticated cats (5) remain the most significant evidence to date the narrative of cat domestication.

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4 Linseele V, Van Neer W, Hendrickx S (2007) Evidence for early cat taming in Egypt. *J Archaeol Sci* 34(12):2081–2090.

5 Driscoll CA, et al. (2007) The Near Eastern origin of cat domestication. *Science* 317(5837):519–523.

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