Mammal domestication and the symbiotic spectrum

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In their paper in PNAS, Weissbrod et al. (1) conclude that mice adapted to the temporary sedentary lifestyle of humans during the Late Pleistocene and underwent a domestication process driven by a competitive advantage for commensal mice in the evolving, long-term human settlements. The authors expand the possibility of an early interaction between wild mammals and humans to other wild species, wild boars and wolves, as examples of "following commensal pathways before developing long-term mutualism characteristic of domestication" (1).

We wish to deliberate on both the process and its nature, with regard to these species.

During the Late Pleistocene, wild boars were captured and managed by humans for consumption. Fully domesticated pigs emerged only later, ∼9,000 y ago, after the transition to a sedentary agricultural lifestyle (2). Archeological records and genetic evidence suggest that dog domestication took place at least 15,000 y ago, or even as early as 33,000 y ago (3). However, the first domesticated grain crop, wheat, was domesticated 10,000 y ago (4). These two notions suggest that proto-dogs coexisted with humans thousands of years before the agricultural revolution (5). Nevertheless, fossils of domesticated mammals that evolved from wild herbivores were dated to only after the agricultural revolution (6, 7).

Domestication, as an accelerated evolutionary process, resulted from natural selection by a human-induced environment. The genetic tendency of wolves (8, 9) and wild mice to be less nervous of nearby humans probably enabled them both to get closer initially and to become our pets and pests, respectively, later. The process was driven by human waste, such as bones and skin, which was available in short-term mobile human settlements as well as in more sedentary ones. Similarly, after the agricultural revolution and the appearance of domesticated wheat/barley fields in the Fertile Crescent (10), the less fearful wild herbivores approached the grain fields and later became our sheep, goats, cows, camels, and horses (6, 7). Thus, domestication might have been independent (dogs/mice) or dependent (herbivores) on the agricultural revolution timeline.

It is highly plausible that mice, like dogs, followed humans as fully domesticated animals. Dogs, as sanitation agents, had a relationship with humans that can be described as mutualism whereas mice, on the symbiotic spectrum, were probably parasites, eating humans' food, damaging their belongings, and traveling hidden in their ancient luggage.

In conclusion, adjusting to the nomadic/semisedentary human niche was the first driving force of domestication. Both dogs and mice underwent this process, but they differ from each other in the initial nature of their relationship with humans: mutualism and parasitism, respectively, rather than commensalism.

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