

Origins of the domestic horse

In their recent article, Warmuth et al. (1) have misrepresented our 2002 publication (Jansen et al.) (2) on horse origins. We had in fact proposed the same scenario as they do now: an original restricted area of horse domestication, and, as domesticated horses spread, subsequent recruitment of local mares from further wild horse populations into the domesticated herds.

In detail, Warmuth et al. wrote: “Did the spread of horse domestication involve actual movement of herds (“demic spread”), as appears to have been the case in most other domestic animal species (3)? Or was it primarily the knowledge of horse domestication techniques that spread, thus enabling pastoralist societies throughout the steppes to domesticate locally available wild stock? Whereas a demic spread of small herds of domestic horses out of a single, geographically restricted area has been put forward as one possible explanation for the observed low Y chromosome diversity in modern horses (4), the multiple-origins scenario is commonly invoked to account for the large number of female lineages in the domestic horse gene pool (2, 5, 6).” [Their reference 6 is Jansen et al. (2).]

We concluded in Jansen et al. (2): “Assuming our interpretation of multiple genetic horse origins is correct, does it follow that the technique of horse domestication was developed independently by different human communities in different places? From an archaeological and ethological point of view, a single origin of the required human expertise cannot be ruled out. Modern breeding of the wild Przewalski’s horse initially encountered problems [. . .]. If [the domestic horse’s] wild

ancestors were similarly intractable, it is unlikely that the technique was mastered many times independently during prehistory [. . .]. Furthermore, if domestication had arisen independently multiple times, one would expect to find archaeological evidence for domestication at very different times and places. This may not be the case. Although there are claims for horse domestication as early as 4500 BC for Iberia and the Eurasian steppe, the earliest undisputed evidence are chariot burials dating to 2000 BC [. . .] on the Ural steppe. Burial, textual, and/or iconographic evidence shows that by 1250 BC, chariots were widespread from Greece to China. Such an expansion may suggest a diffusion of the knowledge of horse breeding, and possibly a concomitant spread of horses themselves, originally localized both temporally and spatially. In this reading of the archaeological record, the knowledge and the initially domesticated horses themselves would have spread, with local mares incorporated en route, forming our regional mtDNA clusters.”

Peter Forster^{a,1}, Matthew E. Hurles^b, Thomas Jansen^c, Marsha Levine^{a,2}, and Colin Renfrew^a

^aMcDonald Institute for Archaeological Research, Cambridge CB2 3ER, United Kingdom; ^bWellcome Trust Sanger Institute, Hinxton, Cambridge CB10 1SA, United Kingdom; and ^cCertagen GmbH, 53359 Rheinbach, Germany

1. Warmuth V, et al. (2012) Reconstructing the origin and spread of horse domestication in the Eurasian steppe. *Proc Natl Acad Sci USA* 109:8202–8206.
2. Jansen T, et al. (2002) Mitochondrial DNA and the origins of the domestic horse. *Proc Natl Acad Sci USA* 99:10905–10910.

Author contributions: P.F., M.E.H., T.J., M.L., and C.R. wrote the paper.

The authors declare no conflict of interest.

¹To whom correspondence should be addressed. E-mail: pf223@cam.ac.uk.

²Present address: Wolfson College, University of Cambridge, Cambridge CB3 9BB, United Kingdom.