

READER'S FORUM

The need to avoid over-simplifications in evolutionary biology

Leslea J. Hlusko¹  | Madeline G. McNelis²¹National Research Center on Human Evolution (CENIEH), Burgos, Spain²Ecology and Evolutionary Biology Department, University of California Santa Cruz, Santa Cruz, California, USA

Correspondence

Leslea J. Hlusko, National Research Center on Human Evolution (CENIEH), Paseo Sierra de Atapuerca 3, Burgos 09002, Spain.

Email: leslea.hlusko@cenieh.es

We are happy to respond to the concerns of Briceño Moya and colleagues¹ about our article drawing attention to an hypothesis derived from evolutionary biology.² In our article, we summarised the work by Hlusko and colleagues³ proposing a connection between a vitamin D-deficient environment and the effects of the *EDAR V370A* allele and the *FADS* gene cluster on mammary gland ductal branching and milk. We then proposed that these effects of *V370A* and the *FADS* gene cluster in that same vitamin D-deficient environment were also intertwined with epithelial inflammation.²

Evolutionary biology explores variation through time and across environments. Therefore, the environmental context is essential to keep in mind. Our hypotheses are specific to the Arctic, a geographical region with insufficient exposure to ultraviolet radiation (UV) to stimulate biosynthesis of vitamin D. In this environment, and in a population not experiencing migration—as occurred during the last ice age, a gene variant with even a small physiological effect could be strongly selected for. The point of our article was that such episodes of environmental selection, when physiology is under duress, provide new windows into physiological function.²

Briceño Moya and colleagues¹ raise two concerns. First, they cite research (on one of which Hlusko is a co-author) reporting an association between *EDAR V370A* and lower mammogram breast density readings from Latino women in the Southwestern United States. This result indicates that *V370A* is associated with increased breast adiposity in this population. While breast density reflects the amount of adipose versus fibroglandular tissue, it is unclear if density is also a good proxy for ductal branching specifically. Additionally, further research is needed to determine if variation in embryonic mammary gland development (i.e. the effects of *EDAR V370A* as observed in mice) influences later, hormonally induced stages of mammary gland

development and how this may vary when the surrounding adipose tissue is vitamin D-challenged, as would have been the case in the Arctic population.³

For their second point, Briceño Moya et al.¹ assert that breast milk composition is stable, and that levels of vitamin D do not vary according to maternal vitamin D intake. The research they cite to support this point actually reports the opposite, that higher levels of maternal supplementation do correlate with higher vitamin D levels in breast milk. But irrespective of the mix-up, this research was not designed to test hypotheses about variation in ductal branching (or breast density) and vitamin D levels in milk, though it does support the hypothesis that variation in maternal levels of vitamin D do alter milk composition.

As we described,^{2,3} the content of breast milk is highly adaptive, which is why lactational biology is a dynamic discipline within evolutionary biology. We hope that Briceño Moya and colleagues' over-simplification does not distract from the important insight that evolutionary biology brings to our understanding of the mother-infant relationship.

CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest to declare.

ORCID

Leslea J. Hlusko  <https://orcid.org/0000-0003-0189-6390>

REFERENCES

1. Briceño Moya J, Flores SV, Manríquez G. Questioning the evolutionary adaptation hypothesis of *EDARV370A* in breast milk composition.

Abbreviations: *EDAR V370A*, *V370A* human-specific allele of the Ectodysplasin A Receptor gene; *FADS*, Fatty Acid Desaturase gene cluster.

© 2024 Foundation Acta Paediatrica. Published by John Wiley & Sons Ltd

2. Hlusko LJ, McNelis MG. Evolutionary adaptation highlights the interconnection of fatty acids, sunlight, inflammation and epithelial adhesion. *Acta Paediatr.* 2022;111:1313-8. doi:[10.1111/apa.16358](https://doi.org/10.1111/apa.16358)
3. Hlusko LJ, Carlson JP, Chaplin G, et al. Environmental selection during the last ice age on the mother-to-infant transmission of vitamin D and fatty acids through breast milk. *Proc Natl Acad Sci USA.* 2018;115(19):E4426-E4432. doi:[10.1073/pnas.1711788115](https://doi.org/10.1073/pnas.1711788115)

How to cite this article: Hlusko LJ, McNelis MG. The need to avoid over-simplifications in evolutionary biology. *Acta Paediatr.* 2024;00:1-2. <https://doi.org/10.1111/apa.17477>