

Reply to JG Dórea

Dear Editor:

We appreciate and concur with the observations of Professor Dórea. He highlights yet another argument generally favoring plant over animal sources of dietary protein. Animals consumed by humans are effectively intermediaries, deriving the protein they provide, including essential amino acids, from plants or from other animals, which, in turn, derive their protein from plants (1). Animals concentrate that protein, which is potentially advantageous where total protein and specific amino acids are not routinely and reliably consumed in surfeit of need. Where protein intake is reliably adequate if not excessive, its relative dilution in plants is, in turn, advantageous, making way for fiber, antioxidants, diverse micronutrients, and satiating water volume (2).

Animals are intermediaries in just the same way with regard to diverse environmental toxins, concentrating them (3). While this bioconcentration does not necessarily expose people to toxins that they would avoid by eating plants, higher concentrations stress and potentially overwhelm the body's native detoxifying systems. Accordingly, the risk of adverse effects is elevated. As suggested by Dórea, pregnancy, lactation, and early childhood are times of special vulnerability.

We enumerated many reasons to modernize the definition of protein quality so that it reflects the overall quality and health effects of the food delivering that protein. We thank Dórea for appending yet another.

David L Katz
Christopher D Gardner

From the True Health Initiative, Hamden, CT, USA and the Prevention Research Center, Yale University/Griffin Hospital, Derby, CT, USA (DLK, e-mail: davkatz7@gmail.com); and the Prevention Research Center, Stanford University, Stanford, CA, USA (CDG).

The authors' responsibilities were as follows—DLK: drafted the letter; CDG: reviewed, edited, and approved the letter; and both authors read and approved the final version.

No funding was received for this letter.

Author disclosures: The authors report no conflicts of interest.

References

1. Gardner CD, Hartle JC, Garrett RD, Offringa LC, Wasserman AS. Maximizing the intersection of human health and the health of the environment with regard to the amount and type of protein produced and consumed in the United States. *Nutr Rev* 2019;77(4): 197–215.
2. Song M, Fung TT, Hu FB, Willett WC, Longo VD, Chan AT, Giovannucci EL. Association of animal and plant protein intake with all-cause and cause-specific mortality. *JAMA Intern Med* 2016;176(10):1453–63.
3. Jayaraj R, Megha P, Sreedev P. Organochlorine pesticides, their toxic effects on living organisms and their fate in the environment. *Interdiscip Toxicol* 2016;9(3-4):90–100.