Ultra processed foods and cancer-authors' reply

Heinz Freisling,[a,*] Reynalda Córdova,[b] Dagfinn Aune,[c,d,e] and Karl-Heinz Wagner[b]

[a]International Agency for Research on Cancer (IARC-WHO), Lyon, France
[b]Department of Nutritional Sciences, University of Vienna, Vienna, Austria
[c]Department of Epidemiology and Biostatistics, School of Public Health, Imperial College London, London, United Kingdom
[d]Department of Nutrition, Oslo New University College, Oslo, Norway
[e]Department of Research, The Cancer Registry of Norway, Oslo, Norway

The Lancet Regional Health - Europe 2024;38: 100865

Published Online xxx https://doi.org/10.1016/j.lanepe.2024.100865

We read with great interest the letter by Visioli et al.[1] in response to our publication on ultra-processed foods (UPFs) and the risk of multimorbidity of cancer and cardiometabolic diseases.[2]

Visioli et al. commented on the heterogeneity found in the association between the consumption of different subgroups of UPFs and the risk of multimorbidity. A specific concern expressed by Visioli et al. was that among the nine UPF subgroups investigated, only the consumption of foods of animal origin and sugary or artificially sweetened beverages were associated with such risk. And if we were to adjust for both of these UPF subgroups, the association of total UPF consumption with the risk of multimorbidity would disappear. In a post-hoc analysis as suggested by Visioli et al., the results shifted as expected to the null after adjusting for both of these UPF subgroups ($Multimorbidity_{direct}$ hazard ratio $(HR)_{1SD}$ 0.98; 95% confidence interval (CI): 0.90–1.06), and similarly in a second post-hoc analysis when excluding both animal-based foods and artificially and sugar-sweetened beverages from total UPF ($Multimorbidity_{direct}$ hazard ratio $(HR)_{1SD}$ 1.00; 95% confidence interval (CI):0.97–1.04).

They also state that the data presented do not fully support the conclusions. However, we acknowledged in the article that UPFs of animal origin and sugary or artificially sweetened beverages were associated with higher risk of multimorbidity, whereas other UPFs showed an inverse association, with a borderline certainty, or were not associated with risk. In the conclusion of the discussion, we suggest that more nuanced subgroup analyses of UPFs are warranted.

The points raised by Visioli et al. go beyond our study, and we take this opportunity to provide the reader with our view of the UPF concept, and why we investigated UPF subgroups.

In our analysis, we applied the Nova food processing classification system that differentiates four categories of foods based on the extent and purpose of processing.[3] The exposure of interest in our study was Nova group 4; i.e., UPFs. The group of UPFs encompass a broad range of products, which we acknowledged in our article, and necessarily vary considerably in terms of nutrient profile and processing characteristics; some UPF products may have a better nutrient profile than others.[4] As correctly pointed out by Visioli et al., these differences across UPF subgroups appear to impact health outcomes differentially, and not all UPF subgroups affect risk. However, UPFs are usually consumed in combination resulting in a dietary pattern characterized by a higher dietary share across all UPF subgroups. Differences among UPF subgroups are then possibly less important than the average quality of the whole UPF group.[4] Replacing UPFs with less processed foods should therefore be encouraged whenever feasible.[5]

Nevertheless, we and others[5–9] think that there is value in understanding which UPFs are driving most associations with health outcomes, and we would therefore welcome additional studies on UPF subtypes. This should facilitate identifying potential mechanisms of the relationship between UPF consumption and health outcomes, and perhaps provide more nuanced guidance for public health.

Contributors

All authors had full access to all the data in the study and had final responsibility for the decision to submit for publication. All authors contributed to the article and approved the submitted version. Writing original draft: HF, DA, RC. Writing–review & editing: HF, DA, RC, K-HW.

Disclaimer

Where authors are identified as personnel of the International Agency for Research on Cancer/World Health Organization, the authors alone are responsible for the views expressed in this article and they do not necessarily represent the decisions, policy or views of the International Agency for Research on Cancer/World Health Organization.

Declaration of interests

The authors declare no conflicts of interest.

Acknowledgements

Funding: No funding to declare.

References

1 Visioli F, Del Rio D, Fogliano V, Marangoni F, Poli A. Ultra processed foods and cancer. *Lancet Reg Health Eur*. 2024. https://doi.org/10.1016/j.lanepe.2024.100863.
2 Cordova R, Viallon V, Fontvieille E, et al. Consumption of ultra-processed foods and risk of multimorbidity of cancer and

DOIs of original articles: https://doi.org/10.1016/j.lanepe.2023.100771, https://doi.org/10.1016/j.lanepe.2024.100863
*Corresponding author.
E-mail address: freislingh@iarc.who.int (H. Freisling).

cardiometabolic diseases: a multinational cohort study. *Lancet Reg Health Eur*. 2023;35:100771. https://doi.org/10.1016/j.lanepe.2023.100771.
3 Monteiro CA, Levy RB, Claro RM, Castro IR, Cannon G. A new classification of foods based on the extent and purpose of their processing. *Cad Saúde Pública*. 2010;26:2039–2049. https://doi.org/10.1590/s0102-311x2010001100005.
4 Scrinis G, Monteiro C. From ultra-processed foods to ultra-processed dietary patterns. *Nat Food*. 2022;3:671–673. https://doi.org/10.1038/s43016-022-00599-4.
5 Tobias DK, Hall KD. Eliminate or reformulate ultra-processed foods? Biological mechanisms matter. *Cell Metabol*. 2021;33:2314–2315. https://doi.org/10.1016/j.cmet.2021.10.005.
6 Wang L, Du M, Wang K, et al. Association of ultra-processed food consumption with colorectal cancer risk among men and women: results from three prospective US cohort studies. *BMJ*. 2022;378:e068921. https://doi.org/10.1136/bmj-2021-068921.
7 Chen Z, Khandpur N, Desjardins C, et al. Ultra-processed food consumption and risk of type 2 diabetes: three large prospective U.S. Cohort studies. *Diabetes Care*. 2023;46(7):1335–1344. https://doi.org/10.2337/dc22-1993.
8 Zhong G-C, Gu H-T, Peng Y, et al. Association of ultra-processed food consumption with cardiovascular mortality in the US population: long-term results from a large prospective multicenter study. *Int J Behav Nutr Phys Act*. 2021;18:21. https://doi.org/10.1186/s12966-021-01081-3.
9 Canhada SL, Vigo Á, Levy R, et al. Association between ultra-processed food consumption and the incidence of type 2 diabetes: the ELSA-Brasil cohort. *Diabetol Metab Syndr*. 2023;15:233. https://doi.org/10.1186/s13098-023-01162-2.