Last Word on Viewpoint: Can elite athletes benefit from dietary nitrate supplementation?

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TO THE EDITOR: We thank the authors of the commentaries (see Ref. 1) on our Viewpoint (2) for further enlightening several interesting aspects concerning nitrate supplementation in the elite athlete, a topic that evidently carries great interest. Given the large number of commentaries we cannot address each of them separately. However, one of the pervading issues that deserves special attention is the ongoing discussion of potential “responders” and “nonresponders” to nitrate supplementation within the scope of recreational or elite athletes.

The term responder or nonresponder is often mistakenly used to define whether an individual athlete does or does not show greater performance capacity after a period of nitrate supplementation. It is evident that a scientific evaluation of ergogenic benefits of nitrate supplementation does not provide much insight in the magnitude of response in the individual athlete when using a more conventional study design. For an individual to be classified as a responder to nitrate supplementation, plasma nitrate and nitrite concentrations should show a substantial increase after nitrate supplementation. Additional analyses of salivary nitrate/nitrite as well as investigating individual oral bacterial flora may provide further insight in the pharmacokinetics after dietary nitrate ingestion as to understand why plasma responses may vary between individuals. For an individual athlete, such a “metabolic” response may not be translated to a potential performance benefit solely on the base of a single measurement, simply because day-to-day variation and chance statistics would deem half of the “metabolic responders” also as “performance responders.” Instead, we propose that individual athletes for whom exercise performance is improved after nitrate supplementation can only be identified by testing the same individual multiple times over a series of placebo-controlled nitrate supplementation trials.

Conducting these tests in a sport-specific setting, which is well-known to the athlete, is essential for ecological validity. This involves the utilization of a test that resembles the integrative (whole body) physiological effort and requirements of a match situation as closely as possible but may also include any environmental conditions that may affect the response to nitrate, such as altitude or ambient temperature. Individual testing in a sport-specific setting inherently involves maximizing homogeneity within the “population” studied and increases the sensitivity to detect within-individual effects. As such, individual testing encompasses many of the key aspects as highlighted in the commentaries to our Viewpoint that should be taken into account when further unraveling the potential benefits of nitrate for elite athletes, especially identifying those individuals that are likely to respond with a performance benefit.

DISCLOSURES
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AUTHOR CONTRIBUTIONS

REFERENCES