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Letter to the Editor

Creatine Deserves Recognition as a Nutrient

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To the Editor:

Creatine is indispensable to cellular bioenergetics, yet this compound remains largely absent from contemporary nutrition policy. Humans degrade and must replace approximately 1–2 g of creatine per day. Although endogenous synthesis contributes substantially, habitual intake, derived almost exclusively from animal-source foods, provides the remainder. Thus, in light of evolving dietary patterns, the nutritional relevance of creatine warrants closer attention.

Creatine is a central component of cellular energy buffering through the phosphocreatine system, which facilitates rapid adenosine triphosphate (ATP) regeneration in tissues with high and fluctuating energy demands, particularly skeletal muscle and the brain. Since preformed creatine is virtually absent from plant foods, vegetarian and especially vegan dietary patterns inherently provide negligible exogenous creatine. While endogenous synthesis from arginine, glycine, and methionine partially compensates for this dietary absence, the extent to which this pathway fully maintains optimal creatine availability under various physiological conditions remains unclear.

Recent analyses of plant-based food products have further highlighted important nutritional differences between animal-derived foods and the associated plant-based analogs. A detailed compositional assessment of commercially available vegan meat and dairy alternatives revealed substantial heterogeneity in nutritional profiles, with many showing lower overall protein content and inconsistent nutritional equivalence relative to the associated animal-based counterparts [1]. While fortification and reformulation may partially address some of these gaps, such strategies do not uniformly replicate the full spectrum of nutrients and bioactive compounds naturally present in animal-derived foods [1]. Although this work primarily focused on macronutrient and essential amino acid composition, this study underscores a broader limitation of plant-based approaches: replacing animal-derived foods may reduce exposure to conditionally essential and bioactive compounds that are largely absent from plant sources, most notably creatine.

Population-level dietary data indicate that a substantial proportion of individuals consume less than 1 g of creatine per day, with the lowest intakes observed among those following plant-based dietary patterns [2]. Although overt creatine deficiency is rare outside inherited disorders of creatine metabolism, accumulating epidemiological observations and mechanistic insights suggest that chronically low creatine availability may have functional implications. In addition to the classical role of creatine in muscle energetics, creatine participates in a broader metabolic network that influences neuromuscular performance, neurocognitive function, and systemic metabolic regulation [3].

Consistent with this concept, human intervention studies indicate that creatine supplementation can increase brain creatine concentrations and may influence cognitive performance and neuroenergetic resilience [4]. Meta-analytic evidence further suggests modest improvements in memory, attention, and information-processing speed following creatine supplementation, although larger and more definitive trials are still required [5]. These findings support the notion that creatine availability may influence physiological processes beyond skeletal muscle energetics.

Despite this expanding evidence base, creatine remains absent from nutrient reference value frameworks, dietary guidelines, and routine nutritional assessment. Regulatory recognition of the physiological relevance of creatine has begun to emerge; for example, the European Food Safety Authority authorizes a health claim linking creatine supplementation, when combined with resistance training, to improvements in muscle strength in adults aged 55 and older [6]. Nevertheless, formal dietary reference benchmarks for creatine have not been established.

As plant-forward dietary patterns continue to gain prominence, evaluating potential gaps in bioenergetic substrates such as creatine may become increasingly relevant. Thus, establishing population intake distributions, developing reliable biomarkers of creatine status, and identifying potentially vulnerable subgroups could help align modern dietary guidance with advances in human bioenergetics. Given the central role of creatine in cellular energy metabolism, the nutritional status of this compound merits more explicit consideration within contemporary nutrition science and policy.

Author Contributions

The single author was responsible for the conception of ideas presented, writing, and the entire preparation of this manuscript.

Ethics Approval and Consent to Participate

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Conflicts of Interest

SMO serves on scientific advisory boards related to creatine. SMO is an inventor on creatine-related intellectual property and has received research funding on creatine from public agencies and industry partners. SMO co-founded a venture developing creatine-enriched food products.

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