REVIEW | OPEN ACCESS

Medical Science

To Cite:
Krych G, Rusak-Sobolewska A. Creatine - is it really a great supplement? - Literature review. *Medical Science* 2026; 30: e162ms3963
doi:

Authors' Affiliation:
[1]Dr. Rafał Masztak Grochowski Hospital, ul. Grenadierów 51/59, 04-073 Warsaw, Poland
[2]The Nicolaus Copernicus Municipal Polyclinical Hospital in Olsztyn, ul. Niepodległości 44, 10-045 Olsztyn, Poland

***Corresponding author:**
Gabriela Krych,
Dr. Rafał Masztak Grochowski Hospital, ul. Grenadierów 51/59, 04-073 Warsaw, Poland.

ORCID List:
Gabriela Krych 0009-0005-6873-5358
Aleksandra Rusak-Sobolewska 0009-0006-7366-3368

Peer-Review History
Received: 15 May 2026
Reviewed & Revised: 30/May/2026 to 30/July/2026
Accepted: 12 August 2026
Published: 25 August 2026

Peer-review Method
External peer-review was done through double-blind method.

Medical Science
pISSN 2321–7359; eISSN 2321–7367

DISCOVERY SCIENTIFIC SOCIETY

Creatine - is it really a great supplement? - Literature review

Gabriela Krych[1]*, Aleksandra Rusak-Sobolewska[2]

ABSTRACT

Creatine is the most popular supplement worldwide. It is promoted for benefits ranging from muscle growth and performance to cognitive enhancement and weight management. This review assesses the mechanism of action, efficacy, and safety of creatine supplementation across multiple domains — muscle and exercise performance, dosing and timing strategies, body composition and weight, cognitive function, and neuroprotection in older adults — to critically evaluate whether creatine earns its standing as a "great" supplement. The results show that its usefulness is best established for muscle mass and exercise performance, particularly in resistance training. Its effect on weight is limited to modest increases in lean mass and water retention rather than fat loss. Cognitive benefits - especially under conditions of metabolic stress such as sleep deprivation and in older adults- are promising but inconsistent. There is not enough data to determine whether it is safe for those with impaired renal function or pregnant women to supplement. Overall, creatine supplementation is strongly supported by evidence in the context of exercise performance. Still, claims regarding cognitive enhancement and neuroprotection remain preliminary.

Keywords: creatine, sports medicine, neuroprotection, supplement

1. INTRODUCTION

Creatine (alpha-methylguanidinoacetic acid) is a dietary supplement that is the most researched in sports nutrition. It was isolated in 1832 by the French chemist Michel Eugène Chevreul. Firstly recognized for its ability to improve performance during intensive physical activity, emerging research has broadened our understanding of its properties (Buford et al., 2007). Most is stored in skeletal muscle as free creatine and phosphocreatine (PCr). PCr serves as a rapid energy buffer via the creatine kinase reaction to resynthesize adenosine triphosphate (ATP). Creatine's significant role in energy-supplying processes extends well beyond its use in muscles; therefore, many researchers underline the systemic importance of creatine in many physiological processes. For example, many recent studies have demonstrated the possibility of using creatine to improve cognitive functions, reduce neuromuscular fatigue and sarcopenia, and achieve neuroprotective effects in such neurological disorders as traumatic brain injury and chronic neurodegenerative processes (Pratt et al., 2026).

Although much research has been conducted regarding the safety and integrity of creatine supplementation, many clinical misconceptions remain. For instance, issues related to dosage, chemical formulations, drug responsiveness, possible interactions with other drugs, and renal safety parameters are widely discussed in scientific literature and in practice.

Aim of study

The purpose of the study is to give a thorough review of the effects of creatine. The effects of creatine on muscle mass, the brain, performance, and its safety record are examined. More specifically, the study seeks to summarize its characteristics and assess its effectiveness.

2. REVIEW METHODS

The review was completed using PRISMA 2020 guidelines and medical databases such as PubMed and Google Scholar. We searched for open-access systematic papers on creatine supplementation. Only English-language articles published between January 2000 and April 2026 were considered.

The search yielded 162 records; after removing 47 records (24 duplicates and 23 for other reasons), 115 records remained for screening, of which 36 were excluded. Of the 79 reports sought for retrieval, 38 could not be obtained, resulting in 41 reports assessed for eligibility. Nineteen reports were excluded (14 due to insufficient data and 5 as irrelevant), leading to the inclusion of 22 studies in the final review. The article screening process followed the PRISMA guidelines (Figure 1).

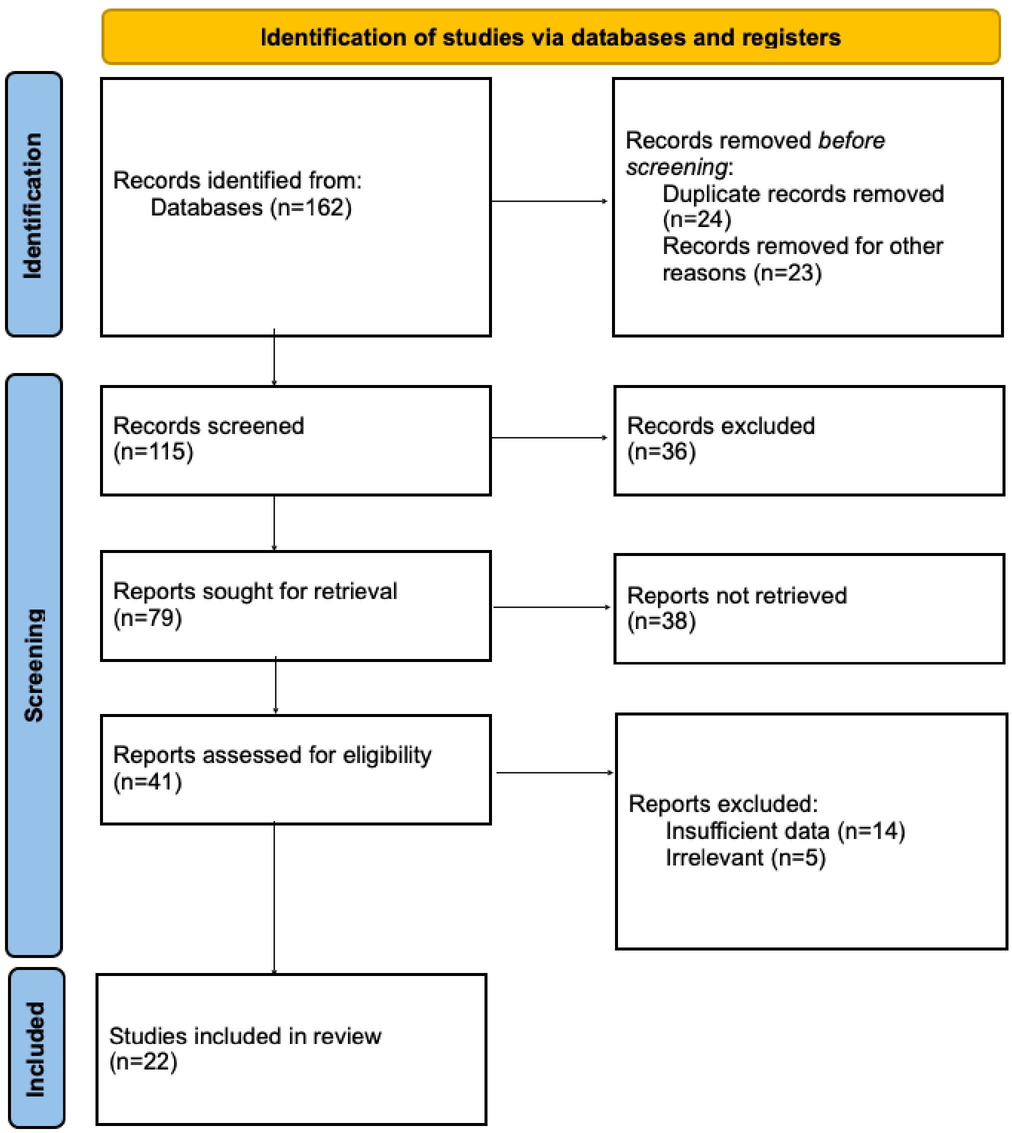

Figure 1. PRISMA CONSORT chart

3. RESULTS AND DISCUSSION

Mechanism of action

Creatine is a naturally occurring, nitrogen-containing compound central to cellular energy metabolism. It is synthesized endogenously mainly in the liver, kidneys, and pancreas. The enzyme AGAT transfers an amidino group from arginine to glycine to form guanidinoacetate, which is then methylated by GAMT using S-adenosyl-methionine as the methyl donor to yield creatine. 95% of the creatine in the body is stored in skeletal muscle, and the rest is found in other tissues such as the brain, heart, kidneys, and testes - high-energy-demanding tissues (Gutiérrez-Hellín et al., 2024). Creatine reaches these tissues via the bloodstream before being taken up into cells by a sodium- and chloride-dependent creatine transporter (CRT, SLC6A8). Inside the cell, creatine kinase catalyzes a reversible transphosphorylation reaction between ATP and creatine to produce phosphocreatine and ADP — the creatine kinase/phosphocreatine (CK/PCr) system. The CK/PCr system acts as a buffer, regenerating ATP within seconds. This is the physiological basis for creatine's proposed ergogenic effects. Apart from endogenous synthesis, creatine is also obtained from dietary sources like red meat, fish, or supplements, and it is continuously and non-enzymatically converted into creatinine, a breakdown product excreted by the kidneys at a fairly constant rate.

Muscle and performance

The strongest evidence for creatine supplementation lies in its effects on muscle and exercise performance. The International Society of Sports Nutrition said that creatine monohydrate is the most effective nutritional supplement on the market for increasing exercise capacity and lean body mass during training (Buford et al., 2007). Creatine supplementation increases intramuscular creatine concentrations, which appears to explain observed improvements in high-intensity exercise performance and, over time, greater training adaptations. This effect is well documented specifically when creatine is combined with resistance training: creatine supplementation is considered well established for enhancing fat-free mass when paired with resistance training, though the extent to which prior training experience influences this efficacy is still not fully understood. However, the benefits are not universal or uniform across all groups — a scoping review of RCTs from the past decade concluded that while athletes widely use creatine to improve performance and muscle growth, it is not consistently effective across every population studied, pointing to variability by age, sex, training status, and exercise protocol as important moderators that a critical literature review should weigh against the more sweeping "most effective supplement" claims made by industry-linked position stands (Wu et al., 2022).

Does taking creatine before the gym matter?

A related question in the literature is whether when creatine is taken — before versus after a workout — affects its benefits. The earliest controlled study on this, by Antonio and Ciccone (2013), had recreational bodybuilders take 5 g of creatine either immediately before or immediately after training for four weeks, and found that nearly all participants in the post-workout group improved in fat-free mass, whereas this was not the case for the pre-workout group, leading the authors to conclude that consuming creatine immediately post-workout appeared superior to pre-workout for body composition and strength. However, this early finding has not held up well under closer scrutiny: a 2022 randomized, placebo-controlled trial in male and female collegiate athletes, designed specifically to address the limitations of the 2013 study, found that all groups experienced similar and statistically significant increases in fat-free mass and both upper- and lower-body strength regardless of whether creatine was taken before or after training, and concluded that timing did not exert any additional influence over these outcomes (Dinan et al., 2022). This null result is consistent with other work in different populations — studies in older adults spanning 12 weeks and 8 months similarly reported no differential impact of creatine timing on resistance training adaptations (Candow et al., 2014; 2015).

Taken together, the timing literature suggests that the popular pre- versus post-workout debate is largely a marketing-driven distinction rather than one with strong scientific backing; what appears to matter far more is consistent daily intake over weeks to months, since creatine works by gradually saturating muscle stores rather than through an acute, workout-adjacent effect — a useful point for tempering some of the more timing-specific claims made in supplement marketing.

Loading phase vs. low-dose protocols

How much is too much? Is loading phase necessary? The foundational study compared a high-dose loading protocol against a low, steady dose in healthy men. The results showed that muscle total creatine concentration increased by approximately 20% after 6 days of creatine supplementation at 20 g/day, and this elevated concentration could then be maintained with a much lower 2 g/day dose for a further 30 days. Critically, the same study found that a similar 20% increase in muscle creatine could also be achieved without any loading phase at all, simply by taking 3 g/day continuously over 28 days — it just took roughly four to five times longer to reach the same saturation point (Hultman et al., 1996). This finding has since been replicated: a more recent trial testing low, continuous dosing directly against the classic loading protocol reported that low doses of creatine monohydrate supplementation, regardless of whether a saturation/loading phase was used, significantly increased maximum muscle strength and resistance to fatigue to a comparable degree (Vilar Neto et al., 2018). Meaning, loading and low-dose maintenance are not competing strategies. Both approaches achieve identical muscle creatine saturation levels, with the only real variable being the time required to reach that saturation point. This has direct relevance for a critical literature review, since much of the popular emphasis on "loading" — often marketed as necessary for results — appears to be more about speed of onset (useful before a competition or short training block) than about any difference in the eventual magnitude of benefit. It also comes with a higher likelihood of the mild gastrointestinal side effects and water retention discussed earlier, since those effects are more common at the higher loading doses.

Creatine and weight loss

Creatine supplementation typically causes a modest increase in scale weight, primarily because it draws water into muscle cells. It increases lean tissue — a 2024 GRADE-assessed systematic review and dose-response meta-analysis of 143 trials found that creatine supplementation increased both body mass and fat-free mass compared to placebo, while producing a very small but statistically significant decrease in body fat percentage, with no significant changes in fat mass or BMI (Pashayee-Khamene et al., 2024). Creatine does not burn fat, but with resistance training, it can improve overall body composition. Building or preserving lean muscle mass can reduce body fat percentage as a secondary effect. The authors of that same meta-analysis noted that these body-composition benefits were more robust specifically when creatine was combined with resistance training, reinforcing that creatine functions as an adjunct to an exercise and diet strategy rather than a standalone weight-loss agent. Any scale-weight increase seen in the first days of supplementation reflects water retention and muscle glycogen/creatine storage rather than fat gain.

Cognitive and mental health effects

Beyond its effects on muscle and performance, growing research has examined whether creatine's role in cellular energy metabolism applies to the brain as well, since the brain has high energy demands. Creatine plays an important part in brain bioenergetics. On this basis, it has been suggested that taking creatine could increase the amount of creatine in the brain and, as a result, improve memory. A systematic review and meta-analysis that tested this hypothesis in healthy people found evidence for a positive effect (Prokopidis et al., 2023). A systematic review stated that the majority of the studies it included showed a positive association between creatine and cognitive function, especially in relation to memory and attention—although with some limitations (Xu et al., 2024). One other review indicates that the cognitive advantages of creatine may be more noticeable in adults between the ages of 18 and 60 than in older adults. Research into the use of creatine in psychiatric conditions involves a 2025 systematic review of trials involving the supplementation of creatine monohydrate across various mental disorders (Fares et al., 2026). However, this area is still underdeveloped.

Creatine and brain fog

"Brain fog" — the informal term for poor concentration, slowed thinking, and mental fatigue — is not a formal medical diagnosis. Still, it maps reasonably well onto conditions that creatine researchers have studied directly, particularly sleep deprivation and acute mental exertion. The evidence comes from a 2024 study in Scientific Reports, which gave sleep-deprived participants a single high dose of creatine and used brain imaging to track energy metabolites in real time. The researchers found that creatine was bioavailable to the brain, as shown by increased brain creatine signals and reduced subjective fatigue compared to placebo, and that it alleviated the sleep-deprivation-induced changes in brain energy phosphates, pH levels, and cognitive performance, with improvements observed in short-term memory tasks and reaction speed following oral creatine administration during sleep deprivation (Gordji-Nejad et al., 2024). This fits creatine's proposed mechanism: because creatine monohydrate is capable of increasing brain creatine stores, which may help explain improvements in cognitive functioning particularly during states of metabolic stress such as sleep deprivation, hypoxia, and mental fatigue, it plausibly acts as a buffer when the brain's energy demand temporarily outpaces supply — the same rationale underlying its muscular effects. A 2024 review examined creatine's cognitive effects under stress. It was concluded that while creatine supplementation showed a moderate effect on cognition in the stressed-condition group overall (McMorris et al., 2024). The results varied considerably depending on the specific stressor. There are serious doubts about whether some of the studied stressors actually reduce brain creatine content in the first place.

Creatine and brain protection in older adults

The idea that creatine protects the brain from aging is promising. Aging is associated with declining muscle and brain creatine levels, reduced physical activity, and changes in how efficiently creatine is transported and metabolized in the brain. All of which could compound normal age-related cognitive decline. A 2025 systematic review focused specifically on adults aged 55 and older. It was found that there is a positive association between creatine and cognition in older adults, particularly in the domains of memory and attention, and noted that earlier literature has suggested creatine supplementation may have a more significant effect on cognition in older, diseased, or stressed individuals than in younger, unstressed ones — a pattern consistent with creatine acting as a buffer specifically when the brain's energy supply is already under strain, as it may be in aging (Marshall et al., 2026). First, quality of evidence remains limited. Second, and more importantly, creatine's benefits do not appear to extend uniformly to clinical neurodegenerative disease, where "brain protection" claims are most often made in public discourse: a research summary on creatine and neurodegeneration notes that creatine supplementation has been largely unsuccessful in protecting against decline in patients with neurodegenerative diseases: Parkinson's and Huntington's disease, ALS, and multiple sclerosis. The impact in Alzheimer's disease has not yet been determined, with a dedicated clinical trial still ongoing (Pratt et al., 2026).

Safety and renal function

When it comes to creatine as a supplement, safety is always at the heart of any critical evaluation. Still, the evidence in this case is more reassuring than the common accounts indicate. The most frequently raised concern is kidney function, mainly because creatine supplementation increases serum creatinine—a standard clinical indicator of kidney health (Kreider et al., 2017).

There was a correlation between taking creatine and higher serum creatinine levels (Naeini et al., 2025), but this rise is a normal result of creatine metabolism and not kidney damage. But further research confirms that creatine supplements are safe for humans (Longobardi et al., 2023). The fact reported in the wider study regarding side effects also supports the idea that the supplement is safe: a large review of hundreds of clinical trials showed that the percentage of people reporting side effects in the placebo groups (13.2%) was the same as that in the groups who received creatine (13.7%), there being no statistically significant difference between the two groups (Kreider et al., 2025). This implies that many of the side effects commonly feared may not actually be caused by creatine.

However, since there are not enough adequate studies available, people who already have impaired kidney function and pregnant women should be careful about taking creatine supplements (Antonio et al., 2021). The summary of the review is presented in Table 1.

Table 1. Summary of the review

Domain	Key Finding	Evidence Strength	Reference (s)
Muscle & performance	Increases fat-free mass and high-intensity exercise capacity, especially with resistance training	Strong	Buford et al., 2007; Wu et al., 2022
Timing (pre- vs. post-workout)	No meaningful difference in outcomes	Strong	Dinan et al., 2022; Candow et al., 2014, 2015
Loading vs. low-dose	Both reach same saturation; loading is only faster	Strong	Hultman et al., 1996; Vilar Neto et al., 2018
Weight / body composition	Increases lean mass and water weight, not fat loss	Moderate	Pashayee-Khamene et al., 2024
Cognition (general)	Modest benefits in memory/attention, most pronounced under metabolic stress	Mixed/limited	Prokopidis et al., 2023; Xu et al., 2024

Brain fog / mental fatigue	Some benefit under sleep deprivation; broader claims not well supported	Limited	Gordji-Nejad et al., 2024; McMorris et al., 2024
Brain protection (older adults)	Positive association with cognition; no benefit shown in neurodegenerative disease	Limited	Marshall et al., 2026; Pratt et al., 2026
Safety / kidney function	Raises serum creatinine (metabolic artifact), no evidence of true renal harm in healthy adults	Strong	Naeini et al., 2025; Longobardi et al., 2023; Kreider et al., 2025

4. CONCLUSION

Is creatine really a great supplement? — The evidence supports a qualified yes, but not the unconditional endorsement often found in marketing materials. Creatine reliably increases fat-free mass and high-intensity exercise capacity when combined with resistance training, and this benefit holds regardless of whether it is taken before or after a workout, or whether users choose a loading phase or a slower low-dose protocol — timing and loading affect only the speed of muscle saturation, not its eventual ceiling. Creatine is not a fat-loss agent, and actually the scale weight increases because it reflects water retention and lean mass accrual rather than fat gain, with any reduction in body fat percentage arising indirectly through improved training capacity. The cognitive and neurological evidence is the most promising yet the least settled area of the literature. Findings on memory, attention, and mental fatigue — particularly under conditions of metabolic stress such as sleep deprivation — are encouraging and mechanistically plausible, and a similar signal appears in healthy older adults. However, it is still unresolved statistically whether there are benefits for diagnosed neurodegenerative conditions like Parkinson's, Huntington's, and ALS, where "brain protection" claims are most often marketed but least supported. The rise in serum creatinine is probably a metabolic artifact rather than renal harm.

Creatine is the best-studied and most effective supplement available. It is an ergogenic aid for muscle and performance, not a cognitive enhancer or neuroprotective agent. It is highly effective for its established use in exercise performance and body composition, promising but preliminary for brain health, and safe for most healthy adults within the population and dosage ranges that have actually been studied.

Acknowledgments

We thank all co-authors and institutional staff for their support during the preparation of this review.

Authors' Contributions

Conceptualization, supervision, and project administration: Gabriela Krych, Aleksandra Rusak-Sobolewska
Methodology: Aleksandra Rusak-Sobolewska
Software, validation, formal analysis, investigation, resources, writing original draft preparation: Gabriela Krych
Writing, review editing, and visualization: Gabriela Krych, Aleksandra Rusak-Sobolewska.
All authors have read and agreed with the published version of the manuscript.

Informed consent

Not applicable.

Ethical approval

Not applicable. This article does not contain any studies with human participants or animals performed by any of the authors.

Funding

This research did not receive any external funding like specific grant from funding agencies in the public, commercial, or nonprofit sectors.

Conflict of interest

The authors declare that they have no conflicts of interest, competing financial interests or personal relationships that could have influenced the work reported in this paper.

Data and materials availability

All data associated with this study will be available based on the reasonable request to corresponding author.

REFERENCES

1. Buford TW, Kreider RB, Stout JR, Greenwood M, Campbell B, Spano M, Ziegenfuss T, Lopez H, Landis J, Antonio J. International Society of Sports Nutrition position stand: Creatine supplementation and exercise. J Int Soc Sports Nutr 2007;4:6. doi:10.1186/1550-2783-4-6
2. Pratt J, Fuchs CJ, Van Loon LJ, Kennerley AJ, Sale C. Creatine supplementation and brain health: Methodological challenges, current evidence, and translational perspectives. J Nutr Physiol 2026;5:100017. doi:10.1016/j.jnphys.2026.100017
3. Gutiérrez-Hellín J, Del Coso J, Franco-Andrés A, Gamonales JM, Espada MC, González-García J, López-Moreno M, Varillas-Delgado D. Creatine Supplementation Beyond Athletics: Benefits of Different Types of Creatine for Women, Vegans, and Clinical Populations-A Narrative Review. Nutrients 2024;17(1):95. doi:10.3390/nu17010095
4. Wu SH, Chen KL, Hsu C, Chen HC, Chen JY, Yu SY, Shiu YJ. Creatine supplementation for muscle growth: A scoping review of randomized clinical trials from 2012 to 2021. Nutrients 2022;14(6):1255. doi:10.3390/nu14061255
5. Antonio J, Ciccone V. The effects of pre versus post workout supplementation of creatine monohydrate on body composition and strength. J Int Soc Sports Nutr 2013;10:36. doi:10.1186/1550-2783-10-36
6. Dinan NE, Hagele AM, Jagim AR, Miller MG, Kerksick CM. Effects of creatine monohydrate timing on resistance training adaptations and body composition after 8 weeks in male and female collegiate athletes. Front Sports Act Living 2022;4:1033842. doi:10.3389/fspor.2022.1033842
7. Candow DG, Zello GA, Ling B, Farthing JP, Chilibeck PD, McLeod K, Harris J, Johnson S. Comparison of creatine supplementation before versus after supervised resistance training in healthy older adults. Res Sports Med 2014;22(1):61-74. doi:10.1080/15438627.2013.852088
8. Candow DG, Vogt E, Johannsmeyer S, Forbes SC, Farthing JP. Strategic creatine supplementation and resistance training in healthy older adults. Appl Physiol Nutr Metab 2015;40(7):689-694. doi:10.1139/apnm-2014-0498
9. Hultman E, Söderlund K, Timmons J, Cederblad G, Greenhaff PL. Muscle creatine loading in men. J Appl Physiol (1985) 1996;81(1):232-237. doi:10.1152/jappl.1996.81.1.232
10. Vilar Neto JDO, da Silva CA, Lima AB, Rosa de Souza FJ, Pinto DV, Araujo JDS, Assumpcao CDO, Daher EDF. Effects of low-dose creatine monohydrate on muscle strength and endurance. Asian J Sports Med 2018;9(3):e62739. doi:10.5812/asjsm.62739
11. Pashayee-Khamene F, Heidari Z, Asbaghi O, Ashtary-Larky D, Goudarzi K, Forbes SC, Candow DG, Bagheri R, Ghanavati M, Dutheil F. Creatine supplementation protocols with or without training interventions on body composition: A GRADE-assessed systematic review and dose-response meta-analysis. J Int Soc Sports Nutr 2024;21(1):2380058. doi:10.1080/15502783.2024.2380058
12. Prokopidis K, Giannos P, Triantafyllidis KK, Kechagias KS, Forbes SC, Candow DG. Effects of creatine supplementation on memory in healthy individuals: A systematic review and meta-analysis of randomized controlled trials. Nutr Rev 2023;81(4):416-427. doi:10.1093/nutrit/nuac064
13. Xu C, Bi S, Zhang W, Luo L. The effects of creatine supplementation on cognitive function in adults: A systematic review and meta-analysis. Front Nutr 2024;11:1424972. doi:10.3389/fnut.2024.1424972
14. Fares BJ, Zhou C, Fabiano N, Wong S, Stubbs B, Shorr R, Puder D, Candow DG, Ostojic SM, Solmi M. The effect of creatine monohydrate on mental disorders: A systematic review of randomized controlled trials. Can J Psychiatry 2026. doi:10.1177/07067437251408171
15. Gordji-Nejad A, Matusch A, Kleedörfer S, Patel HJ, Drzezga A, Elmenhorst D, Binkofski F, Bauer A. Single dose creatine improves cognitive performance and induces changes in cerebral high energy phosphates during sleep deprivation. Sci Rep 2024;14(1):4937. doi:10.1038/s41598-024-54249-9
16. McMorris T, Hale BJ, Pine BS, Williams TB. Creatine supplementation research fails to support the theoretical basis for an effect on cognition: Evidence from a systematic review. Behav Brain Res 2024;466:114982. doi:10.1016/j.bbr.2024.114982
17. Marshall S, Kitzan A, Wright J, Bocicariu L, Nagamatsu LS. Creatine and cognition in aging: A systematic review of evidence in older adults. Nutr Rev 2026;84(2):333-344. doi:10.1093/nutrit/nuaf135

18. Kreider RB, Kalman DS, Antonio J, Ziegenfuss TN, Wildman R, Collins R, Candow DG, Kleiner SM, Almada AL, Lopez HL. International Society of Sports Nutrition position stand: Safety and efficacy of creatine supplementation in exercise, sport, and medicine. J Int Soc Sports Nutr 2017;14:18. doi:10.1186/s12970-017-0173-z
19. Naeini EK, Eskandari M, Mortazavi M, Gholaminejad A, Karevan N. Effect of creatine supplementation on kidney function: A systematic review and meta-analysis. BMC Nephrol 2025;26(1):622. doi:10.1186/s12882-025-04558-6
20. Longobardi I, Gualano B, Seguro AC, Roschel H. Is it time for a requiem for creatine supplementation-induced kidney failure? A narrative review. Nutrients 2023;15(6):1466. doi:10.3390/nu15061466
21. Kreider RB, Gonzalez DE, Hines K, Gil A, Bonilla DA. Safety of creatine supplementation: Analysis of the prevalence of reported side effects in clinical trials and adverse event reports. J Int Soc Sports Nutr 2025;22(sup1):2488937. doi:10.1080/15502783.2025.2488937
22. Antonio J, Candow DG, Forbes SC, Gualano B, Jagim AR, Kreider RB, Rawson ES, Smith-Ryan AE, VanDusseldorp TA, Willoughby DS, Ziegenfuss TN. Common questions and misconceptions about creatine supplementation: What does the scientific evidence really show? J Int Soc Sports Nutr 2021;18(1):13. doi:10.1186/s12970-021-00412-w