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Letter to the Editor

Letter to the Editor From Constantin-Teodosiu: "Reducing NF-κB Signaling Nutritionally Is Associated With Expedited Recovery of Skeletal Muscle Function After Damage"

Dumitru Constantin-Teodosiu[1]

[1]School of Life Sciences, Division of Physiology, Pharmacology and Neuroscience, Queen's Medical Centre, University of Nottingham Medical School, Nottingham, UK

Correspondence: Dumitru Constantin-Teodosiu, PhD, University of Nottingham School of Medicine, Clifton Blvd, Nottingham, Notts NG7 2UH, UK. Email: tim.constantin@nottingham.ac.uk.

A recent study by Jameson et al, overseen by Francis Stephens (1), concluded that muscle function recovery from a bout of muscle-damaging one-leg exercise would be faster with a commercial protein drink, "through attenuating the inflammatory [nuclear factor]-kB signaling pathway," when compared with a sugary drink (control). The nonexercised legs served as baselines.

The present commentator finds this conclusion in contrast to that reported in an earlier publication of the same group, where despite the similarity in drinks and experimental protocol, it was inferred that recovery of muscle after the damaging exercise "could not be explained by the myofibrillar protein synthesis nor by inflammatory and regenerative gene expression pathways" (2). Therefore, it's bizarre that despite this earlier conclusion, Jameson et al (1) tried again to convince the reader that their protein drink would, after all, protect muscle function "through speeding up myofibrillar protein synthesis post exercise." Unsurprisingly, the changes in postexercise protein synthesis rates in Jameson et al were similar across all groups irrespective of the drink, damage status or time (Fig. 3) (1). This may be because, like in their earlier work (2), Jameson et al (1) did not have an appropriate baseline, as the first biopsy collection occurred 24 hours after exercise. This constitutes a major experimental design flaw since the consequences of muscle damage 24 hours post exercise wouldn't have been exclusively confined to the exercised leg. The molecular responses in the damaged muscle would have also been extended to the muscle of contralateral nonexercised legs, as we have previously demonstrated (3, 4). We showed that inflammatory factors released from injured muscles following major insults also affect muscles distal from the site of trauma (3, 4) via increased circulating cortisol and cytokines such as interleukin-6 and tumor necrosis factor α, which are still high 48 hours after injury (3). Purposely, we showed in porcine and human models that trauma induced by abdominal surgery is accompanied by muscle inflammation and metabolic dysregulation both locally (rectus abdominis) and distal to the surgery site (vastus lateralis) (3, 4). Notably, the trauma generated systemic inflammation augmented expression of local and distal muscle messenger RNAs and proteins linked to inflammation, atrophy through upregulation of MAFbx, MuRF1, FOXO1, and impaired carbohydrate oxidation pathways (3, 4), much like those investigated in Jameson et al (1).

The authors may counterclaim that their protein drink recovered muscle function faster than the sugar drink (Fig. 2B) (1). However, in absolute terms, the sugar group did 26% more work (78 × 642 = 50 076 J) than the protein group (69 × 574 = 39 606 J) during the damaging exercise (Table 1) (1). Therefore, one can safely assume that the muscle damage in the sugar group was greater than in the protein group, which might have well accounted for the muscle function in the former being still lower than in the latter at 48 hours.

In the light of the aforementioned shortcomings, the paper's conclusions appear to be shadowed by misgivings. In the absence of any study limitation disclaimer or self-criticism, the findings of this work should be viewed with high levels of caution.

References

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