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Letter to the Editor

Resistance exercise in lean older adults: mind the gap in energy intake

Dear editor,

With interest, we read the work of *Bagheri et al.*, entitled 'Effects of Icelandic yogurt consumption and resistance training in healthy untrained older males'[1]. The authors studied whether daily supplementation with Icelandic yogurt (18 g proteins; 88 kcal) improved the systemic and muscular responses to an 8-week resistance exercise program in older adults (68 ± 4 years) compared with placebo (0 g proteins; 8 kcal) supplementation. The authors found that yogurt supplementation was superior to placebo to improve lean mass, muscle strength and systemic muscle regulatory factors such as insulin-like growth factor 1, transforming growth factor-beta 1, growth differentiation factor 15, Activin A, myostatin and follistatin.

Although we acknowledge the importance of this work, in light of the need for strategies that improve muscular adaptations in older adults at risk for age-related sarcopenia, we believe that a crucial aspect of the data remained underexposed. Not only was the relative protein intake of the yogurt group (+23 %) significantly higher than that of the placebo group (+8 %) at the end of the study (compared with baseline), also the total energy intake at the end of the study was significantly higher in the yogurt group (+3·2 % *v.* +0·7 % in the placebo group). Moreover, there was a significant interaction for the change in body mass (+1 kg in the yogurt *v.* −0·7 kg in the placebo group). Together, these data suggest that the beneficial effects due to yogurt supplementation might be – at least partly – explained by a higher energy intake and a more positive energy balance. In older adults, an energy intake of ˜30 kcal/kg per d is recommended (adjusted individually according to nutritional status, physical activity expenditure and health status)[2]. When looking at the baseline characteristics of the participants in this trial, there appears to be a gap between pre-intervention total energy intake compared with this recommended threshold. Post-intervention, the total energy intake in the yogurt group approaches this threshold, but this is not the case in the placebo group. Thus, the importance of restoring the energy balance in the effect of resistance training on body composition should not be underestimated.

Whereas body weight loss is not necessarily detrimental for muscular responses in older adults with overweight or obesity[3], body weight loss is not desirable in lean older adults (like in the present study, i.e. BMI = 21·9 kg/m^2)[4–6], especially since a BMI < 23·0 kg/m^2 increases the risk of mortality in older adults[7]. The significant decrease in body weight observed in the placebo group likely reflects an energy deficit, whereas the yogurt supplement prevented an exercise-induced energy deficit. Therefore, part of the dietary proteins in the placebo condition might have been used for energy supply to compensate the exercise-induced energy deficit rather than as building blocks for muscle tissue. In contrast, with Icelandic yogurt supplementation, dietary proteins were probably prevented from being used for energy supply.

The question rises what the effect of yogurt supplement would have been, had the energy intake in this condition been similar to that of the placebo condition, thus not correcting for a possible energy deficit. Alternatively, would the effect of Icelandic yogurt supplementation still be superior if the energy intake in the placebo group had similarly increased to that of the yogurt group? The inclusion of an iso-energetic placebo group would have allowed to gain better insights in the potential beneficial adaptations of the yogurt supplement, as this would have excluded differences in exercise-induced energy deficits between both conditions. Unfortunately, this limitation was not explicitly discussed by the authors.

Furthermore, one might wonder what the effect would have been if the subjects had a higher pre-interventional total energy intake, and more precisely, one that is in line with the recommended energy intake of ˜30 kcal/kg per d[2]. In addition to energy intake, it would also have been valuable to assess satiety and appetite, as well as systemic regulators of energy intake (e.g. leptin, ghrelin and insulin), especially since growth differentiation factor 15, a hormone that lowers food intake[8], decreased more in the yogurt (-10·3 pg/ml^{-1}) *v.* the placebo group (-4·8 pg/ml^{-1}).

To conclude, the study of *Bagheri et al.* proposes protein-rich Icelandic yogurt as a promising nutritional strategy to improve muscular and systemic adaptations to resistance exercise in older adults. Though promising, it should be noted that the additional effects due to yogurt supplementation compared with a placebo without proteins could be ascribed to the higher energy intake in the yogurt group, and thereby preventing energy deficits as was the case in the placebo group. These findings highlight the importance to assess and compare energy balance, as well as markers of (or mechanisms that underlie) energy homoeostasis, satiety and appetite.

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References

1. Bagheri R, Moghadam B, Candow D, *et al.* (2021) Effects of Icelandic yogurt consumption and resistance training in healthy untrained older males. *Br J Nutr*, 1–9. Online ahead of print.
2. Volkert D, Beck AM, Cederholm T, *et al.* (2019) ESPEN guideline on clinical nutrition and hydration in geriatrics. *Clin Nutr* **38**, 10–47.
3. Longland T, Oikawa S, Mitchell C, *et al.* (2016) Higher compared with lower dietary protein during an energy deficit combined with intense exercise promotes greater lean mass gain and fat mass loss: a randomized trial. *Am J Clin Nutr* **103**, 738–746.
4. Pasiakos SM, Vislocky LM, Carbone JW, *et al.* (2010) Acute energy deprivation affects skeletal muscle protein synthesis and associated intracellular signaling proteins in physically active adults. *J Nutr* **140**, 745–751.
5. Areta JL, Burke LM, Camera DM, *et al.* (2014) Reduced resting skeletal muscle protein synthesis is rescued by resistance exercise and protein ingestion following short-term energy deficit. *Am J Physiol Endocrinol Metab* **306**, 989–997.
6. Slater GJ, Dieter BP, Marsh DJ, *et al.* (2019) Is an energy surplus required to maximize skeletal muscle hypertrophy associated with resistance training. *Front Nutr* **6**, 131.
7. Winter JE, MacInnis RJ, Wattanapenpaiboon N, *et al.* (2014) BMI and all-cause mortality in older adults: a meta-analysis. *Am J Clin Nutr* **99**, 875–890.
8. Patel S, Alvarez-Guaita A, Melvin A, *et al.* (2019) GDF15 provides an endocrine signal of nutritional stress in mice and humans. *Cell Metab* **29**, 707.e8–718.e8.