RANDOMIZED CONTROL TRIAL SUMMARY

Protein intake at breakfast promotes a positive whole-body protein balance in a dose-response manner in healthy children: a randomized trial

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Background

Children are in a continuous state of rapid growth and are in a net catabolic state in the morning following an overnight fast. Protein intake promotes whole-body net protein balance (NB) which is required for this growth. Determining how much protein is required at breakfast to offset overnight fasting and to promote a positive NB is critical for support of normal growth and development in children.

Objective

Objectives were (i) to determine the impact of incremental doses of milk protein at breakfast in offsetting the overnight fasting net protein balance, and (ii) to identify the effect of dietary protein distribution on NB in healthy, physically active children.

Methods

- Twenty-eight children (14 girls, 14 boys), ages 7 to 11 years with body mass index 16.0 ±1.9 kg/m2 (mean ±SD) participated in 2 intervention trials.
- At breakfast, the children drank an isoenergetic drink containing different levels of protein (group A=0 grams, group B=7 grams, group C=14 grams, or group D=21 grams) plus [15N]-glycine (for measurement of whole-body protein metabolism).
- All children also received an identical, controlled lunch during the study interval (including 18 grams of protein).
- Measurements of whole-body nitrogen turnover, protein synthesis and breakdown, and NB were completed at 9 and 24 hrs.

Results

- Children were in negative NB (-64.5 mg/kg/h) after the overnight fast.
- Protein intake at breakfast increased NB over the next 9 hours with protein synthesis 42% greater in group D than in group A ($p<0.05$).
- Negative NB can be overcome by a dietary intake of at least 7 grams of milk-based protein (Groups B, C, D) with carbohydrates at breakfast, as well as a controlled lunch for all.
- This approach led to a dose-response increase in whole-body net protein balance for the 9-hour period following breakfast and may also impact the 24-hour whole-body protein balance in children.

Conclusion

Consumption of at least 7 g of milk-based protein with carbohydrate at breakfast attenuates the overnight protein losses in children during the subsequent 9 hours following breakfast consumption. Consuming protein at breakfast is a key strategy to enhance net protein balance, thus supporting protein anabolism in healthy, active children.

The complete study may be accessed at:
https://pubmed.ncbi.nlm.nih.gov/30053279/

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