



Research summary

High protein breakfasts can help kids maintain a healthy weight

About the study

Currently one in three children aged 2–19 years is overweight in the United States and Canada. How can we ensure that children today can have a healthy future? Past studies have indicated that foods that are high in protein, such as eggs, have the potential to positively affect children's health.

High-protein foods can increase energy expenditure following a meal ('postprandial' energy expenditure), as the body must use dietary protein immediately after intake. Studies of adults and protein consumption have shown increased feelings of fullness (satiety), reductions in hunger, and increased energy expenditure following a meal. Given the importance of protein in healthy adult diets, these factors could also play an important role in developing treatment for and preventing obesity in children.

And so, building on this body of research, this study sought to identify whether consuming a protein-based breakfast could increase postprandial energy expenditure and fat oxidation (in which the body uses up stored fats to produce energy), while reducing hunger and food intake compared to a carbohydrate-based breakfast in normal weight versus overweight 8–12 year old children.

Methods

29 children participated in the study, ranging from 8 to 12 years of age. 16 participants were normal weight, while 13 participants were overweight.

Each participant visited the laboratory twice, with at least seven days between each visit. Arriving at the laboratory, and not having eaten since 8pm the evening before, their height, weight, resting energy expenditure, blood glucose levels and baseline appetite levels were measured. After this baseline information was gathered, participants were fed one of two breakfasts: either a protein-based breakfast, which contained 1 egg and 2 egg whites, 5g of butter, 118ml of orange juice and two slices of white bread; or a carbohydrate-based breakfast, which contained one frozen waffle, 10g of butter, 30ml of maple syrup, and 118ml of orange juice.

Following the breakfast, blood glucose and energy expenditure were measured regularly over the next four hours. Participants were also asked to rate their perceived hunger, fullness and desire to eat at regular

intervals. After four hours, participants ate a buffet lunch with a variety of foods from all food groups, and were asked to eat until they felt full. All food taken from the buffet was recorded and weighed to determine intake.

Findings

Regardless of participants' body weight, the researchers found that a protein-based breakfast decreased postprandial hunger and increased satiety when compared to a carbohydrate-based breakfast.

Fat oxidation and energy expenditure were higher after the consumption of the protein-based breakfast, especially for overweight participants. Furthermore, overweight participants who ate the protein-based breakfast had higher energy expenditure than normal weight participants who ate the protein- and the carbohydrate-based breakfasts.

As the researchers concluded, when considered together these findings suggest that increasing protein at breakfast for 8–12 year old children can result in increased satiety and energy expenditure, which could lead to weight loss and improved energy balance over time.

Conclusions

This study lays important groundwork for further research. Expanding the study to explore the effects of consuming the test breakfasts for a longer period of time, as well as increasing the sample size, would broaden the applicability and reach of the research. Further study that incorporates a breakfast with even higher levels of protein could show higher increases in postprandial energy metabolism.

As concerns about obesity grow, this research contributes to a wider body of scholarship that provides insight into how dietary protein, found naturally in eggs, can be consumed as part of a healthy diet that can contribute to maintaining healthy weights in children.



About the researchers

Jamie I. Baum is an assistant professor in the Faculty of Food Science at the University of Arkansas.

Michelle Gray is an assistant professor of Kinesiology in the Faculty of Health, Human Performance and Recreation at the University of Arkansas.

Ashley Binns is a doctoral candidate in the Faculty of Health, Human Performance and Recreation at the University of Arkansas.

Citation

Jamie I. Baum, Michelle Gray and Ashley Binns. *Breakfasts Higher in Protein Increase Postprandial Energy Expenditure, Increase Fat Oxidation, and Reduce Hunger in Overweight Children from 8 to 12 Years of Age.* Journal of Nutrition October 2015 145: 2229-2235.

This research project was supported with funding from the Egg Nutrition Center.



For more information about Egg Farmers of Canada, or our research program, visit eggfarmers.ca, or contact us at research@eggs.ca.

**EGG FARMERS
OF CANADA**
Dedicated to Quality



**LES PRODUCTEURS
D'ŒUFS DU CANADA**
Dédiés à la qualité