EDITORIAL (SEE CHEN ET AL., P. 2552)

Considering Options for Attenuating Postmeal Glucose Excursions

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Attenuating postmeal blood glucose excursions is a clinical challenge. While strategies for modifying the quantity and quality of carbohydrate consumed are widely used to reduce postprandial blood glucose peaks, we have paid relatively little attention to how premeal snacks and their composition may alter meal responses. In this issue, Chen et al. (1) reported that feeding a snack of soybeans (30 g) and yogurt (75 g) 2 h before breakfast lowered the post-breakfast blood glucose excursion by 40%. While their article did not provide the macronutrient composition of the snack, it was described as a high-protein, low-carbohydrate snack.

Chen et al. (1) appear to attribute the glycemic effects of the soy-yogurt primer to its high-protein, low-carbohydrate composition. However, they also mention that the suppression of postprandial free fatty acids of the snack was similar to the effects of arginine infusion in previous research from their laboratory (2). This line of research raises interesting questions about the role of insulin secretion and postprandial free fatty acid levels in creating the second-meal effect. Other research has addressed the longer-term metabolic effects of high protein intake and the variability in the effects of milk proteins (casein or whey) and specific amino on glycemia and regulators of glycemia (3–5). Reported benefits of high-protein, low-carbohydrate diets included reducing serum triacylglycerol, increasing HDL cholesterol, increasing LDL particle size, reducing blood pressure, reducing fasting and postprandial blood glucose, improving insulin response, and reducing glycated hemoglobin (6).

Examining how the amount and type of protein may alter metabolism in the management of diabetes is intriguing. Mortsensen et al. (7) have reported that adding whey to a high-fat meal blunts the postprandial lipemic response more than casesin or the other proteins that were evaluated. Their whey feeding also resulted in a significantly lower area under the curve for glucose response with a trend for lower response for gastric inhibitory protein (GIP) response and higher response for glucagon-like peptide 1 response. While much of this research that has been conducted is small sample studies, investigation of how the properties of food may affect metabolic modulators such as gastric inhibitory protein and glucagon-like peptide 1 may change how we look at nutrition with regard to diabetes management in the future.

The dairy industry has been examining methods to increase the whey content of yogurts in the development of probiotic functional foods for over a decade (8). Future research will need to determine whether there is any potential benefit of premeal snack primers such as soy-yogurt or from functional foods rich in whey with regard to diabetes medical nutrition therapy. If such strategies prove to be beneficial metabolically, we will then consider behavioral intervention strategies to help people incorporate these foods into their approaches for glucose control.

Strategies to reduce postprandial blood glucose excursions usually involve self-monitoring of blood glucose before and after meals (9). In patient-center counseling, self-monitoring of blood glucose can address self-perception, self-reflection, and self-regulation (10). Health providers can discuss patient food and glucose monitoring diaries to elicit perceptions about how glycemic control is related to concerns about threats posed by diabetes (e.g., short- and long-term complications). Discussing lifestyle in relation to glucose values encourages patients to reflect and understand the causes of glycemic fluctuation. Brainstorming approaches with the patient that would improve metabolic control encourages self-regulation in relation to how to reduce the impact of postmeal blood glucose excursions. The findings from the study by Chen et al. (1), if corroborated, will increase patients' options for managing their glucose control.

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References

1. Chen MJ, Jovanovic A, Taylor R. Utilizing the second-meal effect in type 2 diabetes: practical use of a soya-yogurt snack. Diabetes Care 2010;33:2552–2554
2. Jovanovic A, Gerrard J, Taylor R. The second-meal phenomenon in type 2 diabetes. Diabetes Care 2009;32:1199–1201
3. van Loon LJ, Kruijshoop M, Menheere PP, Wagenmakers AJ, Saris WH, Keizer HA. Amino acid ingestion strongly enhances insulin secretion in patients with long-term type 2 diabetes. Diabetes Care 2003;26:625–630
4. Hall WL, Millward DJ, Long SJ, Morgan LM. Casein and whey exert different effects on plasma amino acid profiles, gastrointestinal hormone secretion and appetite. Br J Nutr 2003;89:239–248
5. Nuttall FQ, Schweim K, Hoover H, Gannon MC. Effect of the LoBAG30 diet on blood glucose control in people with type 2 diabetes. Br J Nutr 2008;99:511–519
6. Layman DK, Clifton P, Gannon MC, Krauss RM, Nuttall FQ. Protein in optimal health: heart disease and type 2 diabetes. Am J Clin Nutr 2008;87:1571S–1575S
7. Mortensen LS, Hartvigsen ML, Brader LJ, Astrup A, Schrezenmeir J, Holst JJ, Thomsen C, Hermansen K. Differential effects of protein quality on postprandial lipemia in response to a fat-rich meal in type 2 diabetes: comparison of whey, casein, gluten, and cod protein. Am J Clin Nutr 2009;90:41–48
8. Hugunin A. Whey products in yogurt and fermented dairy products (application monograph–yogurt) [Internet], 1999.

U.S. Dairy Export Council. Available from www.usdec.org/files/publications/5yogurt.pdf. Accessed 15 August 2010
9. Wylie-Rosett J, Albright AA, Apovian C, Clark NG, Delahanty L, Franz MJ, Hoogwerf B, Kulkarni K, Lichtenstein AH, Mayer-Davis E, Mooradian AD, Wheeler M. 2006–2007 American Diabetes Association nutrition recommendations: issues for practice translation. J Am Diet Assoc 2007;107:1296–1304
10. Siebolds M, Gaedeke O, Schwedes U, SMBG Study Group. Self-monitoring of blood glucose–psychological aspects relevant to changes in HbA1c in type 2 diabetic patients treated with diet or diet plus oral antidiabetic medication. Patient Educ Couns 2006;62:104–110