

17TH GLOBAL DIABETES CONFERENCE & NURSING CARE

March 08-09, 2018 | Paris, France



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Divided consumption of late-night-dinner improves glucose excursions in both individuals with and without type-2 diabetes

Aim: Our aim was to explore the acute effect of the late-night-dinner and the divided-dinner on postprandial glucose levels in individuals with type-2 diabetes (DM) and young healthy women (NGT).

Methods: Both 16 individuals with type-2 diabetes and 14 healthy women were randomly assigned to this crossover study. Each participant wore a continuous glucose monitor for 5 days and consumed identical test meals from the second to the fourth day at home. Each participant consumed the test meals of breakfast at 08:00 h, lunch at 13:00 h and the half of the individuals consumed dinner at 21:00 h (D21) on the second day, 18:00 h (D18) on the third day and divided dinner (DD: vegetable and rice at 18:00 h and vegetable and the main dish at 21:00 h) on the fourth day. The rest of the individuals consumed DD on the second day and D21 on the fourth day.

Result: D21 demonstrated higher incremental glucose peak (IGP, DM: 6.78 ± 0.79 vs. 3.09 ± 0.62 mmol/L, $p < 0.01$; NGT: 2.74 ± 0.38 vs. 1.57 ± 0.23 mmol/L, $p < 0.05$, mean \pm SEM) and incremental area under the curve for glucose (IAUC) 23:00-08:00 h (DM: 644 ± 156 vs. 147 ± 63 mmol/L \times min, $p < 0.01$; NGT: 271 ± 63 vs. 111 ± 37 mmol/L \times min, $p < 0.05$) than D18. On the other hand, DD ameliorated IGP (DM: 3.75 ± 0.58 mmol/L, $p < 0.01$; NGT: 1.96 ± 0.29 mmol/L, $p < 0.05$), IAUC 23:00-08:00 h (DM: 142 ± 60 mmol/L \times min, $p < 0.01$; NGT: 80 ± 29 mmol/L \times min, $p < 0.001$) and the mean amplitude of glycemic excursion (DM: 5.33 ± 0.41 vs. 6.99 ± 0.60 mmol/L, $p < 0.01$; NGT: 2.34 ± 0.25 vs. 2.91 ± 0.28 mmol/L, $p < 0.05$) than D21 in both individuals with and without diabetes.

Conclusion: Our findings demonstrated that consuming late-night-dinner led to postprandial hyperglycemia and this postprandial hyperglycemia can be ameliorated by consuming DD. Thus, DD could be a practical strategy for individuals who took late-night-dinner to reduce the postprandial glucose levels in both individuals with and without type-2 diabetes.

Biography

Saeko Imai is a Professor of Department of Food and Nutrition in Kyoto Women's University, Japan. Previously, she was a Professor of Osaka Prefecture University and a Biologist with training and research experience at Molecular Nutrition at Graduated School of Life and Environmental Science in Kyoto Prefectural University. She is the Councilor of Japan Society of Metabolism and Clinical Nutrition, Japan Society of Nutrition and Food Science and Japanese Society of Nutrition and Dietetics. She is also a Member of the Japan Diabetes Society, American Diabetes Association and European Association for the Study of Diabetes. She has also authored the book "Eating order diet for Diabetes" in addition to many scientific and public policy articles.

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