

Postprandial Glucagon-like peptide-1 secretion analysis in high-fat/high-sucrose diet-fed rats

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Introduction: GLP-1 (Glucagon-like peptide-1) is primarily incretin hormone secreted from L cells in the lower digestive tract. It has an effect on various tissues such as insulin secretion promotion and has a lot of action involved in postprandial blood glucose adjustment, lipid absorption inhibition, pancreatic β cell protection, obesity, impaired glucose tolerance defense. While it has been reported that diabetes and impaired glucose tolerance patients make GLP-1 secretion decreased, there is also a report to deny, it has not obtained consensus. Therefore, we observe temporal changes in the postprandial GLP-1 response in obesity development process.

Aim: We aim to show how the production of GLP-1 affect digestive tract in the development process of impaired glucose tolerance and obesity.

Methods: First, SD rats (5-week-old, male) after the acclimated for one week was allowed to freely take a five-week high-fat, high-sucrose diet, performed a meal tolerance test for 1-4 weeks to evaluate meal response, we observed blood glucose and GLP-1 secretory response. In the meal tolerance test, to administrate a control diet (AIN-93G) to rats under fasting overnight, collected blood chronologically up to 120 minutes before meals and after meals. Second, placed osmotic pumps subcutaneously, administrated GLP-1 antagonist exendinin tested as described above to investigate whether GLP-1 is involved in diet-induced obesity and glucose intolerance,

Results and Discussion: Although fasting blood glucose was increased in high fat/high-sucrose diet group, postprandial blood glucose was similar to the control diet group. Since postprandial GLP-1 and insulin secretion had increased in the high-fat/ high-sucrose diet group, it suggested for postprandial GLP-1 secretion promotion to contribute to the suppression of postprandial hyperglycemia. In the high-fat high-sucrose diet + exendin (9-39) administration group postprandial blood glucose level was high, compared to the group of high-fat/high-sucrose diet only. From this result, in the high-fat/high-sucrose diet, it became clear that the elevation of postprandial GLP-1 secretion contributes to the alleviation of postprandial hyperglycemia. From the above, we revealed postprandial GLP-1 secretion increased early in high fat/high sucrose diet group, it suggested that postprandial insulin secretion is increased accordingly and that postprandial hyperglycemia is suppressed.

Key Words: GLP-1, high-fat/high-sucrose, hyperglycemia

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