

Inhibition of Carbohydrate Digestion and Adsorption Using Specific Egg Yolk Antibody

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Abstract

Carbohydrates are the major nutrient factor and used as the main energy sources but surplus carbohydrates are closely related to obesity and diabetes. To regulate the digestion and absorption of dietary carbohydrates, we developed an egg yolk immunoglobulin (IgY) against brush border membrane vesicle (BBMV) of porcine small intestine, which containing maltase, sucrase and sodium dependent glucose cotransporter (SGLT). After immunization to hens with BBMV, specific antibody titers of blood IgG and egg yolk IgY were increased in accordance with immunization periods. To estimate the inhibitory effect of anti-BBMV IgY on the digestion of dietary carbohydrates and absorption of glucose *in vitro*, following as enzyme kinetic assay of maltase and 18-fluoro-deoxyglucose(¹⁸FDG) absorption experiment were carried out. As results, 400 μ g/mL of IgY obtained from immunized hens reduced Vmax of maltase about 61% in contrast to control group or IgY from non-immunized hens. In glucose absorption experiment, 10 μ g of phloridzin, known as specific SGLT blocker, decreased ¹⁸FDG uptake into LOVO cells about 33% and 1 μ g of anti-BBMV IgY decreased glucose uptake more than 42%. Using *Sprague-Dawley* rats, we also evaluated the *in vivo* efficacy of anti-BBMV IgY. The oral administration of anti-BBMV IgY lowered blood glucose level about 30 to 60% in rats comparing with non-treated group. These results suggest that the anti-BBMV IgY, inhibiting carbohydrate digestion and absorption, could be used as functional food materials for weight control and the regulation of blood glucose level in case of obesity and diabetes.