Effects of dietary arginine on inflammation and renal receptor of advanced glycation end product expressions in rats with streptozotocin-induced type 2 diabetes

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Arginine (Arg) has been shown to have immunomodulatory effect and inhibits advanced glycation end products (AGEs) formation in in vitro studies. This study investigated the effects of dietary Arg supplementation on inflammatory mediator production and renal receptor of AGE (RAGE) expressions in diabetic rats. There were 1 normal control (NC) group and 2 diabetic groups in this study. Rats in NC groups were fed with chow diet. One diabetic group (DM) was fed a common semipurified diet whereas the other diabetic group received a diet in which part of the casein was replaced by Arg (DM-Arg) for 8 wk. Diabetes was induced by intraperitoneal injection of nicotinamide followed by streptozotocin for three consecutive days. Rats with blood glucose levels exceeding 180 mg/dl were considered diabetic. Blood samples were collected at baseline, 4 wk, and 8 wk. The kidneys of the animals were harvested at the end of the study for further analysis. The results showed that plasma monocyte chemotactic protein (MCP)-1, prostaglandin (PG)E_2 and fructosamine levels were significantly higher in the diabetic groups than those in the NC group. No differences in plasma MCP-1 and PGE2 levels were found between the DM and DM-Arg groups. However, fructosamine were significantly lower in DM-Arg group than in DM group. Kidney nitrotyrosine concentrations and nuclear factor-kappa B p65 protein expressions were significantly lower in DM-Arg group than in DM group. The result of immunohistochemistry stain also showed that the expressions of RAGE in kidney were significantly lower in DM-Arg group than in DM group. These results suggest that dietary Arg supplementation may decrease AGE formation and ameliorate renal damage in rats with type 2 diabetes.