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The Effect of Cyanate on Glucose Metabolism in Diabetic Mice

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Background: Loss of renal function and dialysis therapy can influence glycemic regulation in ways that can both worsen and improve blood glucose control. Cyanate, one of uremic toxin, can alter the function of various proteins and amino acids in uremic circumstance by carbamylation. Here, we tested whether cyanate affects glucose metabolism.
Materials and Methods: C57BL/6J mice were divided into four groups: one fed normal chow diet (NCD) with or without cyanate treatment and the other fed 45% high fat diet (HFD) with or without cyanate. Cyanate was provided in drinking water containing 1mg/mL sodium cyanate for 9 weeks.
Results: After 1 week on the cyanate, body weight was decreased in the cyanate group (25.6±1.2 g, $p<0.001$) compared with the control group (28.4±1.4 g). After 9 weeks on the cyanate, the cyanate group (25.7±1.3 g, $p<0.001$) lost -16% of total body weight compared with the control group (30.8±1.6 g). And, the HFD group (43.3±3.8 g, $p<0.01$) lost -37% of total body weight compared with the NCD group (27.0±2.5 g). PGTT was performed before CN treatment in NCD and HFD groups. After 5 weeks on HFD feeding, the glucose tolerance test confirmed an elevated AUC levels in HFD group (126±12% [HFD] vs. 100±8% [NCD], $p<0.001$), and revealed glucose resistance in the HFD mice. After cyanate treatment, cyanate group (82±16% AUC, $p<0.01$) demonstrated a decrease in the AUC levels compared with the control (100±8% AUC).
Conclusion: Cyanate may affect weight gain, glucose resistance and insulin sensitivity in diabetic mice.

Key Words: 만성콩팥병, 당뇨병, 요독
Chronic kidney disease, Diabetes mellitus, Uremic toxin