

Efek suplementasi Vitamin D3 terhadap Kadar Glutation Tereduksi (GSH) dan Glutation Teroksidasi (GSSG) pada Ginjal Tikus Model Prediabetes = Effect of Vitamin D3 Supplementation on Reduced Glutathione (GSH) and Oxidized Glutathione (GSSG) Levels in the Kidney of Prediabetic Rat Models

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Abstrak

Prediabetes adalah kondisi dimana kadar gula darah seseorang diatas batas normal tetapi belum mencapai kriteria diagnosis diabetes melitus. Hiperglikemia pada penderita prediabetes dapat meningkatkan penanda inflamasi kronik dan pembentukan spesies oksigen reaktif, yang akan meningkatkan stres oksidatif. Kadar GSH (glutation tereduksi), GSSG (glutation teroksidasi), dan rasio GSH/GSSG dapat diukur untuk melihat tingkat stres oksidatif. Dilakukan pengukuran GSH dan GSSG pada ginjal tikus Wistar dengan metode kolorimetri. Tikus dibedakan menjadi tikus sehat sebagai kontrol negatif dan prediabetes. Induksi prediabetes dilakukan dengan diet tinggi lemak dan glukosa ditambah injeksi streptozotocin. Tikus prediabetes terbagi menjadi tiga kelompok intervensi, yaitu tanpa suplementasi vitamin D3 dan suplementasi vitamin D3 dengan dosis 100 dan 1000 IU/kgBB/hari. Pemberian vitamin D3 pada tikus model prediabetes tidak memberikan efek yang signifikan secara statistik pada kadar GSH ($p=0,077$) dan GSSG ($p=0,509$) ginjal tikus. Pemberian vitamin D3 dosis rendah (100 IU/kgBB/hari) meningkatkan rasio GSH/GSSG ginjal tikus model prediabetes ($2,59 \pm 0,32$) dibandingkan dengan ginjal tikus model prediabetes tanpa pemberian vitamin D3 ($1,68 \pm 0,80$) dan signifikan secara statistik ($p = 0,026$). Suplementasi vitamin D 100 IU/kgBB/hari pada ginjal tikus prediabetes dapat meningkatkan rasio GSH/GSSG secara signifikan.

.....Hyperglycemia in prediabetic patients can increase the formation of reactive oxygen species, which will increase oxidative stress. GSH (reduced glutathione), GSSG (oxidized glutathione), and the GSH/GSSG ratio can be measured to see the level of oxidative stress. GSH and GSSG were measured in the kidneys of Wistar rats using the colorimetric method. Mice were differentiated into healthy mice as negative controls and prediabetes. Prediabetes was induced with a diet high in fat and glucose plus injection of streptozotocin. Prediabetic rats were divided into three intervention groups, namely without vitamin D3 supplementation and vitamin D3 supplementation at doses of 100 and 1000 IU/kgBW/day. Administration of vitamin D3 to prediabetic rats did not have a statistically significant effect on rat kidney GSH ($p=0.077$) and GSSG ($p=0.509$) levels. Administration of low-dose vitamin D3 (100 IU/kgBW/day) increased the ratio of GSH/GSSG in the kidneys of prediabetic rat models (2.59 ± 0.32) compared to the kidneys of prediabetic rats without administration of vitamin D3 (1.68 ± 0.80) and statistically significant ($p = 0.026$). Supplementation of vitamin D 100 IU/kgBB/day in the kidneys of prediabetic rats can significantly increase the ratio of GSH/GSSG.