

Joint event on

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8TH ANNUAL CONGRESS ON PROBIOTICS, FUNCTIONAL FOODS & NUTRACEUTICALS****March 25-26, 2019 Hong Kong****The effect of physical exercise to barrier glomerular filtration system in diabetic rat****Yensuari and Achmad Rudijanto**
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Introduction: Albuminuria in hyperglycemia or diabetes occurs due to leakage of the barrier glomerular filtration system. Other causes of albuminuria are insulin resistance, hyperinsulinemia, low-grade inflammation, dysregulation of adipocytokine and metabolic syndrome alone or together and synergistically can cause glomerular damage to the kidneys. Before the occurrence of albuminuria, it was preceded by the occurrence of podocyturia due to damage of glomerular podocytes which is one of the components of the glomerular filtration barrier. Mild and moderate physical exercise in people with diabetes mellitus will reduce the level of albuminuria, but the mechanism is still unclear.

Aim: To prove the differences in the effect of physical exercise on the barrier of the glomerular filtration system in diabetic rats.

Methods: Four (4) normal sedentary rats, normal physical exercise, sedentary diabetes and diabetes were given physical exercise treatment. Diabetes in rats is induced by giving a high-fat diet for two weeks, then injection of Streptozotocin (STZ) 30 mg/kg (0.1 M citrate buffer, pH 4.5) Intraperitoneal (IP) every week for two weeks. Sedentary treatment, rats remain left in the cage while physical exercise treatment using a special tool in the form of a treadmill rat (rodent-treadmill), six days a week for 10 weeks (chronic) and moderate intensity, beginning with a speed of 10 meters per minute for 10 minutes per day. The speed and duration of physical exercise is increased gradually every two weeks until it reaches the length of physical exercise one hour per day with a speed of 27 meters per minute. Sometimes metabolic (metabolic cage) urine is collected 24 hours before (pre) and after (post) physical exercise. Levels of albumin, Podocalyxin (PCX) in 24-hour urine were measured by ELISA (Enzyme Linked Immunosorbent Assay) and HOMA IR methods. Hypothesis testing uses paired t test, the data shows mean $\pm$ SD with $p \leq 0.05$ meaningful.

Results: There was no significant difference in the levels of albumin in the normal group of sedentary rats before and after treatment ($p=0.49$), while the normal group of physical exercise had a significant increase ($p=0.04$). The albumin level in the diabetic group increased ($p=0.27$), while the diabetes exercise group decreased albumin levels ($p=0.32$). PCX levels in sedentary normal rats decreased before and after treatment ($p=0.42$), while the normal group physical exercise increased ($p=0.20$). In diabetic rats PCX levels increased before and after treatment ($p=0.47$), while in the diabetes group physical exercise decreased ($p=0.71$). IR HOMA values decreased in both groups of rats, normal sedentary ($p=0.04$) and normal physical exercise ($p=0.59$). The HOMA value of the IR sedentary group increased ($p=0.45$), while the diabetes group physical exercise before and after treatment decreased ($p=0.84$).

Conclusion: Chronic physical intensity with moderate intensity can reduce the progressive damage to the glomerular filtration system barrier in diabetics. Selecting the intensity and duration of selective physical exercise is needed to avoid damage to the glomerular filtration system in normal individuals and individuals who have a disease with a tendency to kidney complications such as diabetes.

Biography

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