

# Perbandingan kadar GFAP dan HSP27 plasma laki-laki dewasa muda pada durasi latihan fisik aerobik akut intensitas sedang yang berbeda = Comparison between GFAP and HSP27 plasma concentrations in young adults on different moderate intensity acute aerobic exercise duration

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## Abstrak

Latihan fisik berpengaruh terhadap plastisitas sinaps yaitu dalam interaksi neuron-glia. Astrosit adalah sel glia yang paling berperan dalam plastisitas sinaps. Penelitian ini menggunakan kadar glial fibrillary acidic protein (GFAP) dan heat shock protein 27 (HSP27) plasma sebagai parameter aktivitas astrosit yang diinduksi latihan fisik. Tujuan penelitian ini adalah untuk membandingkan durasi latihan fisik aerobik intensitas sedang (10 menit vs 30 menit) terhadap kadar GFAP dan HSP27 plasma pada orang dewasa muda sehat.

Penelitian eksperimental ini menggunakan desain kontrol diri sendiri. Mahasiswa kedokteran usia dewasa muda (n=22) dibagi dalam dua kelompok perlakuan, kelompok pertama menggunakan perlakuan sepeda statis intensitas sedang dengan durasi 10 menit dan kelompok yang lain menggunakan perlakuan sepeda statis intensitas sedang dengan durasi 30 menit. Uji sepeda statis dilakukan selama 1 hari. Sebelum dan sesudah uji sepeda statis dilakukan pengambilan darah. Kadar GFAP dan HSP27 plasma diukur dengan enzyme-linked immunosorbent assays (ELISA). Kadar GFAP plasma menurun bermakna pada kelompok yang mendapat latihan fisik aerobik intensitas sedang durasi 30 menit ( $p < 0,05$ ). Kadar HSP27 plasma menurun bermakna pada kelompok yang mendapat latihan fisik aerobik intensitas sedang durasi 10 menit ( $p < 0,05$ ). Kadar GFAP dan HSP27 plasma antara kelompok latihan fisik aerobik intensitas sedang durasi 10 menit dan 30 menit tidak memiliki perbedaan yang bermakna ( $p > 0,05$ ).

Penelitian ini menunjukkan latihan fisik intensitas sedang menginduksi perubahan yang bermakna pada marker aktivitas astrosit. Kadar GFAP plasma menurun bermakna pada durasi 30 menit sedangkan konsentrasi HSP27 menurun bermakna pada durasi 10 menit. Namun, durasi latihan fisik aerobik intensitas sedang tidak berpengaruh secara bermakna terhadap kadar dua parameter aktivitas astrosit yaitu GFAP dan HSP27 plasma. Meskipun kadar GFAP plasma menurun pada durasi latihan fisik yang berbeda, perbandingan antara kadar GFAP plasma sesudah durasi 10 menit dan 30 menit tidak memiliki perbedaan yang bermakna. Hasil yang sama juga ditemukan pada HSP27. Penelitian ini adalah yang pertama kali menunjukkan penurunan kadar GFAP plasma sesudah latihan fisik durasi 30 menit dan kadar HSP27 plasma sesudah latihan fisik durasi 10 menit.

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Physical exercise effects on synapses plasticity that in neuron-glia interactions. Astrocytes are the most responsible glial cells in synapse plasticity. This study uses the glial fibrillary acidic protein (GFAP) and heat shock protein 27 (HSP27) plasma concentrations as exercise-induced astrocyte activity parameter. The aim of this study was comparison between two duration of moderate-intensity aerobic exercise (10 minutes vs 30 minutes) on GFAP and HSP27 plasma concentration in healthy young adults.

This experimental study was before and after study design. Healthy young adult medical students (n = 22) were divided into two treatment groups, the first group was using stationary bikes exercise in moderate-

intensity activity for 10 minutes duration and the other group was using stationary bikes exercise in moderate-intensity activity for 30 minutes duration. Static bike test was performed in the same day. Blood sampling was performed before and after static bike test. GFAP and HSP27 plasma levels were measured with enzyme-linked immunosorbent assays (ELISA). GFAP plasma concentration decreased significantly in the 30 minutes moderate-intensity aerobic exercise duration ( $p < 0.05$ ). HSP27 plasma concentration decreased significantly in the 10 minutes moderate-intensity aerobic exercise ( $p < 0.05$ ). There was no significant differences in GFAP and HSP27 plasma concentration between 10 minutes and 30 minutes moderate-intensity aerobic exercise ( $p > 0.05$ ).

Our result showed moderate-intensity aerobic exercise induced significant changes in astrocytes activity parameter. 30 minutes duration significantly lowered GFAP plasma concentration while 10 minutes duration significantly lowered HSP27 plasma concentration. However, duration of moderate-intensity aerobic exercise did not alter significantly plasma concentration of the two astrocyte activity parameter: GFAP and HSP27. Despite the lowered GFAP plasma concentration in different exercise duration, comparison between GFAP plasma concentration after 10 minutes and 30 minutes duration showed no significant differences. The same result also found in HSP27. This is the first result that showed a decrease in GFAP plasma concentration after 30 minutes exercise and HSP27 plasma concentration after 10 minutes.