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Respons Tubuh Terhadap Latihan Fisik Aerobik Overtraining: Kajian Terhadap Kadar Growth Hormone (GH), Insulin-like Growth Factor I (IGF-I), dan Insulin-like Growth Factor Binding Protein 3 (IGFBP-3) pada Serum Tikus Wistar = Body Response to Aerobic Overtraining Exercise: Study of Growth Hormone (GH), Insulin-like Growth Factor I (IGF-I) and Insulin-like Growth Factor Binding Protein 3 (IGFBP-3) levels on Wistar Rat's Serum

Roman Ardian Goenarjo, author

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Abstrak

adalah salah satu penyebab penurunan performa fisik pada seseorang yang melakukan program latihan fisik jangka panjang. Kondisi overtraining dihubungkan dengan gangguan dalam regenerasi sel tubuh. Insulin-like growth factor-I (IGF-I) adalah protein yang menstimulasi pertumbuhan dan proliferasi sel. IGF-I bekerja dalam regulasi aksis GH/IGF, dimana kerja IGF dipengaruhi oleh growth hormone (GH) dan insulin-like growth factor binding protein-3 (IGFBP-3). Penelitian ini bertujuan untuk mengetahui respons tubuh terhadap latihan fisik aerobik overtraining dengan menganalisa kadar GH, IGF-I, dan IGFBP-3, mengingat hormon dan protein ini berperan dalam regenerasi sel tubuh, khususnya otot rangka. Subjek penelitian adalah 19 ekor tikus putih jantan galur Wistar (berusia 8-10 minggu, berat 150-250 gr) yang dibagi menjadi 3 kelompok (satu kelompok kontrol dan dua kelompok yaitu kelompok aerobik dan kelompok aerobik overtraining yang diberikan perlakuan masing-masing selama 11 minggu). Perlakuan latihan fisik aerobik dan aerobik overtraining dilakukan dengan Animal treadmill L-6000 sebanyak lima hari dalam seminggu. Setelah hari terakhir perlakuan, seluruh hewan coba dikorbankan. Serum darah diambil dengan cara pungsi jantung. Kadar GH, IGF-I, dan IGFBP-3 dalam serum diukur dengan metode ELISA dan data hasil penelitian dianalisis dengan one way ANOVA dan dilanjutkan dengan uji Post Hoc. Hasil pemeriksaan ELISA menunjukkan kadar IGFBP-3 yang lebih rendah secara signifikan pada kelompok aerobik overtraining dibandingkan dengan kelompok aerobik, sementara tidak ada perbedaan kadar GH dan IGF-I pada ketiga kelompok. Kadar IGFBP-3 dalam serum dapat dipertimbangkan sebagai penanda biologis kondisi overtraining.

.....Overtraining is one of the causes of decline in physical performance in long-term physical exercise program. Overtraining is associated with impaired regeneration of body cells. Insulin-like growth factor-I (IGF-I) is a stimulator of cell growth and proliferation. IGF act based on the GH/IGF axis, which mean IGF-I act is regulated by growth hormone (GH) and insulin-like growth factor binding protein-3 (IGFBP-3). This study purpose is to determine the body's response to aerobic overtraining exercise by analyzing the levels of growth hormone (GH), insulin-like growth factor-I (IGF-I), and insulin-like growth factor binding protein-3 (IGFBP-3) as those hormone and proteins play a role in the regeneration of body cells, especially skeletal muscle cells. Subjects were 19 white male rats of the Wistar strain (8-10 weeks old, weight: 150-250 g) were divided into 3 groups (one control group and two groups of aerobic and aerobic overtraining group both were given treatment for 11 weeks). Aerobic exercise and aerobic overtraining exercise treatment were conducted five days a week using Animal treadmill L-6000. After the last day of treatment, all experimental animals were sacrificed. Blood serum collected by cardiac puncture. Levels of GH, IGF-I and IGFBP-3 in

serum were measured by ELISA. The data were analyzed by one-way ANOVA followed by post hoc test. ELISA results showed significant lower levels of IGFBP-3 in aerobic overtraining group compared to the aerobic group, while there was no difference in the levels of GH and IGF-I in all groups. IGFBP-3 levels in the serum may be a suitable as biological markers for overtraining condition.