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急性跑台运动对骨骼肌氧化应激及Fas/FasL、Bcl-2/Bax基因表达的影响 [点此下载全文](#)

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摘要:

摘要目的: 通过检测急性跑台运动中骨骼肌氧化应激情况以及Fas/FasL、Bcl-2/Bax等凋亡调控基因表达的动态变化, 探究急性跑台运动诱导骨骼肌细胞凋亡的分子机制。方法: 以小鼠急性递增负荷跑台运动为实验模型, 连续观察与分别测定安静组(Con)、急性跑台运动45min组(E45)、90min组(E90)、120min组(E120)和150min组(E150)的腓肠肌丙二醛(MDA)、过氧化氢(H₂O₂)、一氧化氮(NO)含量和超氧化物歧化酶(SOD)活性变化以及Fas/FasL、Bcl-2/Bax基因表达水平。结果: ①骨骼肌MDA和H₂O₂含量在急性跑台运动第45分钟时显著升高(P<0.05), 维持一段时间后又稳步下降, 直到运动结束; 骨骼肌SOD活性却呈现与之基本相反的变化态势; 骨骼肌NO含量在急性跑台运动第45分钟时显著升高(P<0.01), 并始终维持较高水平, 直到运动结束。②骨骼肌Fas/FasL mRNA表达水平在急性跑台运动第90—120分钟时显著上升(P<0.01), 随后有稳步下降态势; 骨骼肌Bcl-2 mRNA表达水平在急性跑台运动第90—120分钟时显著降低(P<0.05), 随后有稳步上升态势; 骨骼肌Bax mRNA表达水平在急性跑台运动第45分钟时显著上升(P<0.05), 在第90分钟时达到峰值(P<0.01), 维持到第120分钟(P<0.05)后呈现下降态势; Bcl-2/Bax比率在急性跑台运动第45分钟时显著降低(P<0.05), 在90min时达最低水平(P<0.01), 维持到第120分钟(P<0.05)后呈现上升态势。结论: 急性跑台运动可使骨骼肌MDA、H₂O₂、NO含量显著上升、SOD活性下降, 致使自由基过度生成与聚集, 氧化应激水平提高。急性跑台运动可显著增强骨骼肌Fas/FasL和Bax基因表达、降低Bcl-2基因表达和Bcl-2/Bax比率, 使骨骼肌细胞发生凋亡, 这可能与自由基过度聚集, 氧化应激水平提高有关。

关键词: [骨骼肌](#) [氧化应激](#) [细胞凋亡](#) [急性跑台运动](#) [Fas/FasL](#) [Bcl-2/Bax](#)

Effects of acute treadmill exercise on oxidative stress and apoptosis regulating gene expressions in skeletal muscle [Download Fulltext](#)

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Fund Project:

Abstract:

Abstract Objective: To measure oxidative stress as well as dynamic changes of Fas/FasL, Bcl-2/Bax gene expressions in skeletal muscle, and investigate the mechanism of apoptosis in skeletal muscle during acute treadmill exercise. **Method:** The different phase models of acute load treadmill exercise were setting up, and the mice were divided into control group (Con), acute treadmill exercise for 45min group (E45), 90min group (E90), 120min group (E120) and 150min group (E150). Microplate reader was used to measure the levels of malondialdehyde (MDA), hydrogen peroxide (H₂O₂), nitric oxide (NO) and superoxide dismutase (SOD), quantitative real-time PCR technique was used to detect Fas/FasL, Bcl-2/Bax gene expressions in skeletal muscle. **Result:** ① The contents of MDA and H₂O₂ in skeletal muscle both rose quickly at the early stage of acute treadmill exercise, and were significantly higher than the control group at the 45th min (P<0.05), after maintained for a few minutes, they began to decrease until the exercise was over. The activity of SOD was basically revised to the contents of MDA and H₂O₂. The content of NO rose quickly at the 45th min (P<0.05), and maintained time until the exercise was over. ② The levels of Fas/FasL mRNA expressions in skeletal muscle increased significantly at the 90th—120th min (P<0.01) during acute treadmill exercise, and then began to drop steadily. The level of Bcl-2 mRNA expression decreased significantly at the 90th—120th min (P<0.05), and then began to rise steadily. The level of Bax mRNA expression increased significantly at the 45th min (P<0.05), and reached the peak at the 90th min (P<0.01), and maintained until the 120th min (P<0.05), it began to drop steadily. The ratio of Bcl-2/Bax decreased significantly at the 45th min (P<0.05), and reached the lowest level at the 90th min (P<0.01), and maintained until the 120th min (P<0.05), it began to rise steadily. **Conclusion:** Acute treadmill exercise could significantly increase the contents of MDA, H₂O₂ and NO, as well as decrease the activity of SOD in skeletal muscle. Eventually, free radicals assembled and the level of oxidative stress improved. Acute treadmill exercise could significantly improve the levels of Fas/FasL and Bax mRNA expressions in skeletal muscle, decrease the level of Bcl-2 mRNA expression as well as the ratio of Bcl-2/Bax, and eventually increase the apoptosis, which were related to the excessive accumulation of free radicals and improvement of oxidative stress.

Keywords: [skeletal muscle](#) [oxidative stress](#) [apoptosis](#) [acute treadmill exercise](#) [dynamic change](#) [Fas/FasL](#) [Bcl-2/Bax](#)

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