

Abstract

Study on the Changes of Urine Differential Protein Expression of Female Athletes after Different Intensity Treadmill Exercise [†]

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Abstract: Objective: to apply proteomics technology to detect the expression of differential proteins in the urine of female athletes after treadmill running at different intensities, and to explore the changes of urinary protein components after different intensities of exercise and their correlation with human immune function and exercise-induced fatigue, so as to provide scientific basis and practical methods for exercise biochemical monitoring. Methods: two dimensional electrophoresis was used to analyze the differential expression of urine proteome map of 10 female athletes after treadmill exercise at the intensity of 40%, 60%, 70% and 90% maximum oxygen uptake respectively. Egg white spots with up regulation of differential protein expression ≥ 5 times and repeatability after exercise were selected and analyzed by matrix assisted laser desorption ionization tandem time of flight mass spectrometry. Results: there were 261 differential protein spots of urine proteome after four different intensities of exercise determined by two-dimensional electrophoresis, including 76 down-regulated protein spots and 185 up-regulated protein spots; A total of 23 proteins, including zinc, were identified by mass spectrometry- $\alpha 2$ -glycoprotein, apolipoprotein, vitamin D binding protein, albumin, complement protein C3, immunoglobulin, etc; The analysis shows that the functions of these differential proteins are closely related to the biological processes of immune regulation and inflammatory response. Conclusion: proteomic analysis can better explain the changes of urinary protein components after exercise, including apolipoprotein and zinc- $\alpha 2$ -glycoprotein is related to energy metabolism after exercise, immunoglobulin, albumin, complement protein C3, mannose binding lectin related protein 19 and vitamin D binding protein are related to immune regulation after exercise, which provides a theoretical basis and application method for investigating the changes of human immune function and fatigue state after women's exercise training.

Keywords: proteome; movement; urine; female athletes

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