

運動による骨格筋の毛細血管密度の制御に対する マイオカインの役割

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The Role of Myokines in The Regulation of Capillary Density by Exercise

by

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ABSTRACT

Regular exercise improves capillary density (capillary network) in skeletal muscle, which contributes to protect against chronic diseases- or aging-induced skeletal muscle atrophy. Although capillary density in skeletal is likely to be regulated by multiple angiogenic factors from skeletal muscle, the exercise-induced angiogenic factor family are poorly understood. In this study, we measured angiogenic factors in skeletal muscle to identify a family of angiogenic factors that regulate capillary density by regular exercise. To identify multiple angiogenic factors, we compared the factors between oxidative soleus muscle with high capillary density and glycolytic extensor digitorum longus muscle with low capillary density. We also compared angiogenic factors between exercise training group and sedentary group in plantaris muscle. After the analysis, we combined these results to identify family for exercise-induced angiogenic factors. Thirty-four angiogenic factors in oxidative soleus muscle were higher than glycolytic muscle. Forty-one angiogenic factors in exercise training group were higher than sedentary group. Twenty-seven an angiogenic factors were abundant in both oxidative muscle and exercise group. These results suggest that the multiple angiogenic factors could be a potential role to regulate capillary density by exercise training.

要 旨

定期的な運動は骨格筋の血管新生因子を増加し、毛細血管密度（毛細血管網）を増加することで筋萎縮を抑制する。血管新生は骨格筋由来の血管新生因子が統合的に調節する可能性が高いが、これを網羅的解析から同定した報告はない。そこで本研究では、骨格筋が産生する血管新生因子に着目し、運動が毛細血管密度を調節する血管新生因子群の同定を目的とした。方法は、毛細血管密度が高い遅筋および運動群と毛細血管密度が低い速筋および安静群の血管新生因子を網羅的に解析した。解析後、両解析結果を統合し、血管新生を誘導する因子群を統合した。その結果、遅筋の方が速筋よりも発現が高い血管新生因子は34種類、運動群の方が安静群よりも発現が高い血管新生因子は41種類、遅筋と運動群の両群で発現が高い因子は27種類あった。これらの結果は、定期的な持久的運動による骨格筋の血管新生は複数の血管新生因子が統合的に調節する可能性を示唆している。