

Abstract

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Changes in plasma and tissue amino acid levels in an animal model of complex fatigue.

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OBJECTIVE: Fatigue can be classified as physical or mental, depending on its cause. In physical fatigue, changes in the plasma levels of some amino acids have been reported. However, complex fatigue, which is experienced in daily life, is a combination of physical and mental fatigue. We aimed to identify changes in amino acid levels in the plasma, skeletal muscle, liver, and brain in an animal model of complex fatigue.

METHODS: Rats were kept in a cage filled with water to a height of 2.2 cm for 5 d. Because rats showed a reduction of body weight when the model was developed, we also included a food-restricted group showing a similar profile in weight reduction as the water-immersed rats. A non-treated control group was also included.

RESULTS: Results indicated that levels of branched-chain amino acids (valine, leucine, and isoleucine) were increased in plasma (valine, leucine, and isoleucine; $P < 0.01$), skeletal muscle (valine, leucine, and isoleucine; $P < 0.01$), the liver (valine; $P < 0.05$), and brain (isoleucine; $P < 0.05$), whereas a reduction in other amino acid levels (total amino acids and glutamine in the plasma, skeletal muscle, and liver; and phenylalanine, tyrosine, arginine, and threonine in the brain; $P < 0.01$) was seen in animals with complex fatigue.

CONCLUSION: Complex fatigue may bring about systemic changes in amino acid metabolism in multiple organs.

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