

Loss of skeletal muscle mass is not specific to type 2 diabetes

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Abstract

Skeletal muscle is a massive insulin-sensitive tissue in the body. Loss of muscle mass is associated with mitochondrial dysfunction, and is often a result of diabetes. Insulin deficiency or insulin resistance can only be seen as reduced skeletal muscle mass. Diabetes is caused by insulin deficiency or insulin resistance; however, insulin resistance is not unique to diabetics. Insulin resistance also exists in many diseases.

Key Words: Diabetics; Insulin deficiency; Insulin resistance; Skeletal muscle mass

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Core Tip: Insulin resistance is present in hypertension, and in this case, loss of skeletal muscle mass occurs. At the same time, insulin resistance also results in obesity, and in this case, there is also a reduction in skeletal muscle mass. Loss of skeletal muscle mass can occur in many diseases.

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TO THE EDITOR

We read with great interest the study by Chen LY *et al*[1] which discovered that there is a relationship between loss of skeletal muscle mass and the presence of diabetic mellitus in males, but not in females. The findings have positive implications for the treatment and prevention of diabetes. Nonetheless, it appears to me that there are still some issues worth rethinking.

In the study, loss of skeletal muscle mass was shown to be associated with diabetes in men; however, the loss of skeletal muscle mass is not unique to diabetes. High insulin resistance occurs in both type 2 diabetes and high blood pressure. Insulin resistance plays a major role in the development of hypertension. Previous animal studies have also found that the spontaneously hypertensive rat manifests insulin resistance[2]. At the same time, there is a loss of skeletal muscle mass in insulin-resistant diseases. Skeletal muscle is the largest insulin-sensitive tissue in the body. Decreased muscle mass is associated with mitochondrial dysfunction and increased fat infiltration. This leads to a decrease in glucose processing capacity. Therefore, loss of skeletal muscle mass is also associated with hypertension.

In addition, insulin resistance also appears in adolescent obesity. Lipid accumulation is evident in skeletal muscles in adolescents with obesity. Intermuscular fat may impair insulin action through reducing blood flow to muscles[3,4]. Obesity is associated with biological dysfunction in skeletal muscles[5]. Sarcopenic obesity is a symptom of obesity with loss of muscle mass and physical dysfunction. Obesity can cause several biological dysfunctions, including insulin resistance, mitochondrial dysfunction, and inflammation. These changes further aggravate skeletal muscle loss and physical dysfunction. There is a study that shows that in the early stages of juvenile obesity development, the microvasculature and prefrontal cortex exhibit impaired insulin signaling[6]. This study suggests that obesity has insulin resistance. At the same time, there is a loss of skeletal muscle mass in insulin-resistant diseases. This further suggests that skeletal muscle mass loss is not unique to diabetes.

In summary, decreased skeletal muscle mass occurs in both hypertension and obesity. Insulin resistance is not just a loss of skeletal muscle mass. Loss of skeletal muscle mass is also present in many diseases and is not a specific feature of diabetes. More research is needed to determine the relationship between reduced skeletal muscle mass and diabetes.

FOOTNOTES

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