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Skeletal Muscle is the Largest and Most Energy-Consuming Organ in the Human Body

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DESCRIPTION

Skeletal muscle plays an important role in energy metabolism and glucose uptake. Skeletal muscle glucose uptake is markedly reduced in patients with type 2 diabetes (DM). Aerobic exercise can reduce hyperglycemia and improve insulin resistance in people with type 2 diabetes. Insulin exerts a variety of effects, many of which include increasing glucose uptake, promoting glycogen synthesis and inhibiting glycogenolysis, increasing free fatty acid uptake, increasing protein synthesis, promoting muscle hypertrophy, and reducing protein breakdown. Such inhibition is mediated by Akt. Skeletal muscle mass gradually decreases with age, leading to a decline in muscle strength and physical function. Sarcopenia is a syndrome characterized by decreased skeletal muscle mass, muscle weakness, and loss of physical function. Decreased organ function leads to susceptibility to external stress. Frailty is associated with falls, fractures, and hospitalization. However, it is reversible to return to a healthy state with appropriate intervention. Frailty next he is divided into three subgroups.

Euglycemic diabetic ketoacidosis (DKA) is an acute, life-threatening metabolic disorder characterized by ketoacidosis and relatively low blood glucose levels (<11 mmol/L). The absence of hyperglycemia is a mystery to emergency room and intensive care physicians. Diagnosis and treatment may be delayed, leading to worse outcomes. Euglycemic DKA is a rare diagnosis but can occur in patients with type 1 or type 2 diabetes. Addition of sodium/glucose cotransporter-2 inhibitors for the treatment of diabetes mellitus increased the incidence of euglycemic DKA. Other causes of euglycemic DKA are pregnancy, fasting, bariatric surgery, gastroparesis, insulin pump failure, cocaine addiction, chronic liver disease, and glycogen storage disease. The pathophysiology of euglycemic DKA includes relative or absolute carbohydrate deficiency, a reduced degree of insulin deficiency or resistance, and an elevated glucagon/insulin ratio. Euglycemic DKA is a diagnosis of exclusion and should be considered in the differential diagnosis of patients with a history of diabetes mellitus despite hypoglycemia or urinary ketone deficiency. Diagnostic evaluation includes exclusion of arterial blood gases, serum ketones, and other causes of high anion gap metabolic acidosis in metabolic acidosis.

Pterostilbene, a phenolic compound derived from resveratrol, has better bioavailability than the parent compound due to the presence of two methoxyl groups. This review summarizes the beneficial effects of pterostilbene on diabetes, fatty liver and dyslipidemia. Pterostilbene is a bioactive compound useful for the prevention of type 1 diabetes, insulin resistance and type 2 diabetes in animal models, with respect to type 1 diabetes, the main mechanisms described to justify the beneficial effects of this phenolic compound are an increase in hepatic glycogen content, hepatic glucokinase and phosphofructokinase activity, restoration of pancreatic islet structure. Similar to type 2 diabetes, increased hepatic glucokinase and glucose-6-phosphatase activities and decreased fructose-1, 6-biphosphatase activity have been reported. Dietary induction of insulin resistance results in greater activation of the insulin signaling cascade, increasing levels of cardiotrophin-1 and hepatic glucokinase and glucose-6-phosphatase activity, fructose-1, it has been reported to reduce 6-biphosphatase activity. Although there are few data on pterostilbene and hepatic steatosis to date, reduction of oxidative stress by pterostilbene may be involved, as oxidative stress is associated with progression from steatosis to steatohepatitis. Finally, pterostilbene effectively lowers total cholesterol, LDL cholesterol, and serum triglyceride levels while increasing HDL cholesterol in animal models of dyslipidemia.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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