There Is an Obesity Metabolic Program in Muscle

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What makes some people prone to become obese while others seem resistant? This is an important question to ask at this time when there is an obesity epidemic in most developed countries. Our lab has addressed this question by studying metabolism of severely obese individuals. Data will be presented to support the following points:

a. There is an “obesity metabolic program” in skeletal muscle.

We studied insulin action, carbohydrate metabolism and lipid metabolism at the whole body level, in muscle tissue and in cultured muscle cells for normal non-obese subjects and severely obese individuals. The insulin resistance, impaired fat oxidation and metabolic inflexibility found in muscle of obese people seem to be factors that would predispose to obesity.

b. The obesity metabolic program in muscle is probably genetically or epigenetically imprinted.

To determine if the metabolism phenotype of severely obese is due to environmental conditions in the body or to genetic or epigenetic imprinting, we studied metabolism in cultured muscle cells. The myotubes of severely obese individuals maintained the metabolic program of intact muscle tissue.

c. The obesity metabolic program can be altered by exercise and gastric bypass surgery.

We investigated whether muscle metabolism can be re-programmed by doing studies on severely obese people who underwent endurance exercise training or gastric bypass surgery. Exercise restores muscle metabolism to normal while gastric bypass increases insulin sensitivity but muscle fat oxidation remains impaired.

REFERENCES:
