Mice that have a genetic deletion for the protein known as p107 have a severe adipose deficiency but do not manifest the metabolic changes typical for the loss of fat stores. In fact, the mice exhibit low levels of serum triglycerides and a normal liver phenotype. When fed a high fat diet, p107 null mice still did not accumulate fat in the liver, and display markedly elevated energy expenditures together with an increased energy preference for fatty acid. Skeletal muscle was therefore examined, as this is normally the major tissue involved in whole body metabolism of fat. We found that the isolated p107-deficient muscle tissue displays a 3-fold increase in fatty acid metabolism. Notably, it expresses increased levels of the protein PGC-1a, that is involved in increasing mitochondrial production and efficiency of function. In addition, the deficient mice contained increased numbers of the mitochondria filled type I and type IIa myofibers. These observations might explain the metabolic characteristics. Evidence for this idea is from results that show p107 inhibits gene expression of PGC-1a. Moreover, the injection of p107 directly into muscle tissue results in a pronounced decrease in the numbers of type IIa myofibers. Therefore, p107 determines the metabolic state of skeletal muscle that contributes significantly to the whole body fat metabolism.

Reference: Scimè A, Soleimani VD, Bentzinger CF, Gillespie MA, Le Grand F, Grenier G, Bevilacqua L, Harper ME, Rudnicki MA. **Oxidative status of muscle is determined by p107 regulation of PGC-1alpha.** J Cell Biol. 2010 Aug 23;190(4):651-62.

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