Is activating AMPk the key to weight loss?

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What if weight loss was simply a matter of turning on a key enzyme in the body that would magically burn fat and turn up our metabolism—would you believe it? Well, scientists may have found this master switch for weight loss in the form of an enzyme called AMP-activated protein kinase, or AMPk for short. The activity of this enzyme goes a long way in explaining why some people have no problem maintaining their ideal body weight while others seemingly fight a major battle to lose weight and keep it off.

Consequences of low AMPk activity

-Accelerated aging

-Chronic inflammation

-High blood cholesterol and triglycerides

-Increased visceral “belly” fat

-Insulin resistance

-Mitochondrial insufficiency and dysfunction

-Neurodegeneration

-Insulin resistance

-Obesity

-Poor blood sugar control

AMPk is found inside every cell and serves as a “master regulating switch” in energy metabolism. Overall, the activity of this enzyme plays a major role in determining our body fat composition and especially the amount of visceral “belly” fat that we carry. Its activity is also tied to our life expectancy. When we are young, AMPk is more active, but as we age, the cellular AMPk activation decreases, leading to visceral fat accumulation and loss of muscle mass.

The good news is that researchers are discovering natural ways to enhance AMPk. Specifically, certain dietary strategies and food components greatly influence AMPk activity in a positive way. Not surprisingly, these natural approaches hold great promise in the goal of near effortless weight loss as a result.

The activity of AMPk is influenced by a great many factors including a variety of hormones and dietary factors. That said, the most important influencer of AMPk activity ultimately appears to be the sensitivity of the cell to the hormone insulin. Hence, with insulin resistance, there is reduced AMPk activity.

Insulin resistance is closely tied to abdominal obesity. If your waist circumference is larger than your hips, there is an extremely strong likelihood that you suffer from insulin resistance. As the number and size of fat cells increase, they lead to a reduction in the secretion of compounds that promote insulin action, including a novel protein produced by fat cells known as adiponectin. Making matters even worse is that there is also an increase in the secretion of a substance known as resistin that dampens the effect of insulin.

Adiponectin increases the activation of AMPk, while resistin impairs AMPk activity. So, while adiponectin is associated with improved insulin sensitivity and metabolism, resistin is associated with poor blood sugar control, increased blood lipids, and the development of atherosclerosis. All of these effects are due to the influence these compounds have on AMPk activity.

So, the first step in improving AMPk is working to improve insulin sensitivity. By doing so, the process results in increasing adiponectin levels and lowering resistin levels which in turn lead to AMPk activation. Simple, right?

Improving Insulin Sensitivity

Improving insulin sensitivity is most successfully done with a combination of lifestyle changes, such as increasing physical activity and improving diet and nutrition, and targeted nutritional supplementation. One of the most important dietary and supplement strategies is increasing the amount of water-soluble, viscous dietary fiber. This type of fiber is associated with increasing the sensitivity of tissues to insulin and improving the uptake of glucose by the muscles, liver, and other tissues, thereby preventing a sustained elevation of blood sugar. Particularly good sources of water-soluble, viscous fiber are legumes (beans), oat bran, nuts, seeds, psyllium seed husks, pears, apples and most vegetables. In regards to supplementation, I recommend PGX (PolyGlycopleX), as the unique, patented fiber matrix exerts the greatest degree of viscosity and gel-forming properties of any known dietary fiber. The typical suggested usage for PGX is 2.5g to 5g before meals.

Factors that influence AMPk

Inhibitors of AMPk	Activators of AMPk
High fat diet Caloric excess Sedentary lifestyle Aging	Intense exercise Calorie restriction Thyroid hormone Adiponectin Highly viscous dietary fiber (PGX) Good oils -- olive oil (and polyphenols), EPA+DHA, MCTs from coconut oil Mitochondrial enhancers -- creatine, carnitine, alpha lipoic acid, coenzyme Q10 Various flavonoids/polypenols -- green tea (EGCG), resveratrol, curcumin, genistein, anthocyanins, procyanidolic oligomers Numerous botanicals -- mulberry leaf, green tea coffee bean extract, cinnamon, berberine sources

In addition to viscous dietary fiber, there are a number of very important steps to activate AMPk. Most notable are reducing total calorie intake and regular "vigorous" exercise. It is also interesting that many components of the traditional Mediterranean diet activate AMPk. In particular, olive oil, resveratrol from red wine, and the omega-3 fatty acids EPA and DHA from fish oil. In fact, all of the various health promoting diets, whether looking at the Mediterranean, Okinawan, DASH, New Nordic or Portfolio diet, share a common underlying factor: They contain rich sources of dietary components that activate AMPk.

There are a lot of botanicals that also activate AMPk. The one that appears to really stand out is mulberry leaf extract. The mulberry plant (*Morus alba*) is probably best known as the food for silkworms, but it has also been highly regarded in traditional Chinese and Japanese medicine. Recently, human clinical studies have confirmed the benefits of mulberry leaf extract in helping to improve blood sugar control, promote weight loss, prevent and treat type 2 diabetes as well as exerting favorable actions against the metabolic syndrome and cardiovascular disease. Many of these effects of mulberry leaf extract are due to it positively influencing AMPk activity. The daily dosage is generally equivalent to 3,000 mg of dried mulberry leaves. Extracts are generally used. The dosage for a 10:1 extract is 300 mg daily.

There will undoubtedly eventually be a lot of marketing focus on various dietary supplements and herbal products being touted as AMPK activators. In fact, my guess is that it will rival the hype that thermogenic formulas generated in the late 1980s through the 1990s. The key point to remember is that the most important activators of AMPK are related to diet, physical activity and sensitivity to insulin.