

# BENEFITS OF EXERCISE ON BLOOD GLUCOSE REGULATION

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Bioenergetics and metabolic biochemistry may seem daunting and pointless to some. But, having a general understanding can go a long way in providing reasoning to exercise, improve dietary habits, and influence peers to make lifestyle changes.

According to The Center of Disease Control (CDC), nearly 37 million Americans are type II diabetic, while nearly  $\frac{1}{3}$  are pre diabetic (fasting glucose 100-150 mg/dl). But we have it under control, right? RIGHT?? Doctors just prescribe medications to lower insulin sensitivity and lower blood glucose levels. There's no need for exercise mediation, RIGHT??

WRONG!!

To better understand the benefits of exercise mediation on type II diabetes and blood glucose levels, we must first understand the physiology of how somebody can develop the metabolic disease, or at least be at risk for it.

“Glucose” is your body's main fuel source for brain function, high intensity exercise bouts, and general activity. Glucose provides immediate yet short lived energy for exercise, while fat oxidation provides low intensity, long lasting energy for exercise bouts. There is a crossover effect where a person will utilize both fats and carbohydrates during exercise. When a person becomes more aerobically fit, The “curve” shifts up and to the right slightly. Essentially utilizing more fat storage with higher intensities. This is why most marathon runners are extremely lean.

It should be noted that you store glucose in your blood (minimally), liver, and muscular tissue. You could walk all the way to Tampa with the amount of fat stores that you have, while you could only make it to downtown Akron if you were heavily reliant on your glycogen stores.

Going back to the biochemistry of diabetes....

When you consume large copious amounts for sugar over extended periods of time, your blood becomes viscous, thick, and compromised. This results in thick arterial vessels, reduced blood flow, and insulin sensitivity. Your blood essentially turns into poison. This can develop conditions like neuropathy, and decreased healing time on injuries.

HOWEVER, this is not the end of the world. Your body has 13 Glut Protein Messengers that can act in different ways to aid with glucose uptake and transport. Arguably the most important one is “GLUT -4”. GLUT 4 can act independently from insulin to help regulate blood glucose levels through the notion of endocytosis. Essentially, once you exercise, GLUT 4 is inhibited, and naturally helps clear and utilize blood glucose. Glut 4 can be activated through various amounts of exercise such as aerobic fitness bouts, resistance training, and even some chores. For a diabetic, physicians and exercise physiologists recommend that they first begin with moderate intensity exercise that uses large muscle groups. When you recruit larger muscle groups, you simultaneously recruit more glut 4 protein. Studies and research suggests that exercising at least 3 days per week at moderate intensity can significantly lower chronically high BG levels, and improve blood circulation, resting glucose measurements, and reduce other metabolically driven comorbidities.

However, the best plan of action is to increase exercise, and reduce high glycemic carbohydrates. Increasing your consumption of low glycemic, fibrous carbohydrates will keep your blood sugar lower and much more consistent throughout the day. Having constant spikes in your blood sugar has also been shown to increase risks for diabetes and other metabolic conditions.