What Is Insulin Sensitivity/Resistance?
Insulin sensitivity refers to the amount of glucose cleared from the blood into tissues in response to insulin. When normal amounts of insulin do not clear a normal amount of glucose from the blood into tissues, this is known as insulin resistance. The body will compensate by releasing more and more insulin from the pancreas. Over time, the beta cells of the pancreas will become exhausted and will fail to release insulin, causing the onset of Type II Diabetes.1

What Can Coffee Do For You?

Abstract
Caffeine is the most widely used drug in the nation – arguably in the world. Many consumers ingest caffeine in the form of coffee for an energy boost and increased mental focus. With Type II Diabetes becoming the top pandemic of today, caffeine may also have beneficial effects towards diabetic patients and even prevent the new onset of diabetes. Research has shown that acute caffeine consumption decreases insulin sensitivity, specifically decreasing glucose uptake by A1 adenosine receptors in skeletal muscle. Evidence has shown that coffee consumption has beneficial effects on metabolism in diabetics and has an inverse relationship with new incidences of Type II Diabetes. More long-term studies need to be demonstrated.

Conclusions
Coffee may be more beneficial in decreasing the prevalence of Type II Diabetes compared to supplemental caffeine due to its other constituents
Decaffeinated coffee may be as beneficial as regular coffee in diabetics and also for prevention of Type II Diabetes

Future Directions
Research needs to explain the pharmacology of coffee in the body
-Studies show some benefits of coffee in diabetics, but don’t demonstrate the mechanism behind it
Research needs to be conducted on long-term detrimental effects of caffeine and coffee consumption in diabetics
Research needs to be demonstrated on effect of insulin sensitivity with coffee ingestion and metformin administration in diabetics

References
1. Powers AC. Chapter 43. Endocrine Pancreas and Pharmacotherapy of Diabetes Mellitus and Hypoglycemia. Goodman & Gilman’s The Pharmacological Basis of Therapeutics, 12e. 2011
2. Hoffman RJ. Methylxanthines and Selective β2-Adrenergic Agonists. Goldfrank’s Toxicologic Emergencies, 10e. 2015

How Does Caffeine Help?
Coffee consumption long-term (15 years) in normal and diabetic subjects increased the mean value of adiponectin levels compared to the normal and diabetic subjects who did not3
FBG, PBPB, and HBA1c were lower in diabetics who consumed coffee long-term compared to diabetics who did not3
Improvements in adipocyte and liver function indicative of adiponectin and fetuin-A levels may contribute to beneficial long-term metabolic effects from coffee consumption, which may reduce the risk of Type II diabetes4

Decaffeinated coffee had a more beneficial effect on insulin resistance and glucose uptake compared to alkaloid caffeine added to decaffeinated coffee over four weeks6

What Is Happening Inside the Body of Someone With Type II Diabetes?
When a meal is consumed, there is an adequate amount of insulin released by the pancreas – if any – to maintain normal blood glucose levels. This is due to impaired beta cell function. Lipid metabolism is also impaired and fat accumulates in the abdomen, muscles, and liver.1
-Adiponectin is responsible for fatty acid oxidation and its levels in the body are low in diabetics

Caffeine chemical class and mechanism of action
Methylxanthine and adenosine antagonist2

Pathophysiology of type 2 diabetes mellitus. Graphs show data from diabetic (red line) and non-diabetic (blue line) patients, comparing postprandial insulin and glucagon secretion and hepatic glucose production, and the sensitivities of muscle glucose use and adipocyte lipolysis to insulin.2