Micronutrients for Insulin Sensitivity

Medical Mavens
HEALTH & HORMONE HARMONY

Insulin is the primary hormone that controls blood sugar levels in the body. Insulin resistance (IR) is a condition where muscles and other tissues in the body do not respond to insulin as expected. Insulin resistance causes the body to make more and more insulin in order to keep blood sugars in a healthy range. Over time, the body's ability to produce higher amounts of insulin is exhausted, which can lead to the development of prediabetes, and eventually, type 2 diabetes.

Insulin sensitivity is a term that describes the responsiveness of muscles and tissues to the body's production of insulin. There are several things that can increase insulin sensitivity, including regular cardio and resistance exercises, stress management, good sleep, maintaining a healthy weight, and of course, nutrition. Summarized below are several nutrition-related factors that can increase insulin sensitivity, especially when combined as part of an overall healthy approach to diet and lifestyle.

INSULIN SENSITIZERS

- **Vitamin D** is a fat-soluble vitamin that also acts like a hormone in the body. There are vitamin D receptors on many cells throughout the body, including insulin-secreting pancreatic beta cells. Many studies show that lower vitamin D levels are associated with insulin resistance.[1] Those with low blood levels should supplement with vitamin D3 and monitor their blood levels to adjust supplement dosages accordingly. **Non-supplemental sources of Vitamin D include sunlight exposure, wild salmon, sardines, organic whole milk (fortified), and egg yolks.**
- **Magnesium** is an essential mineral that supports bone health, blood pressure, and insulin function. It also participates in hundreds of metabolic reactions in the body. People who do not get enough magnesium in their diet are at higher risk for type 2 diabetes, heart disease, metabolic syndrome, and osteoporosis.2 Some individuals may have a higher functional need for magnesium which requires supplementation.[2] There are several forms of supplemental magnesium, some of which have a stronger laxative effect. Incorporate magnesium rich foods into your daily diet and talk to your Functional Medicine provider to determine which magnesium supplement is best for you. **Food sources of magnesium include nuts, avocado, garbanzo beans, leafy greens, and whole grains.**
- **Zinc** is an essential mineral involved in many bodily processes, including growth and development, immune system function, vision, fertility, antioxidant production and more. Zinc is also essential for the normal production, storage, and secretion of insulin. Low levels of zinc in the body are associated with impaired insulin secretion and decreased insulin sensitivity.[3] Zinc supplementation has been shown in multiple studies to lower HOMA-IR, a measure of insulin resistance.[3] Supplementing with zinc may contribute to deficiencies in other minerals, so work with your Functional Medicine practitioner to determine the right dose and duration for you. **Food sources of zinc include oysters, grass-feed beef, organic soybeans, yogurt, nuts, legumes, and cheese.**
- **Alpha** lipoic acid, also called lipoic acid, is a substance made in the body and found naturally in many fruits and vegetables. It is involved in cellular energy production and is an antioxidant which protects nerves and other tissues. Some research shows that alpha lipoic acid supports healthy weight, which in turn supports insulin sensitivity.[4] Multiple studies have shown that alpha lipoic acid also reduces symptoms of diabetic nerve pain.[5] **Food sources of alpha lipoic acid include spinach, broccoli, peas, Brussels sprouts, tomatoes, and grass-fed organ meats.**
- **Probiotics** are beneficial bacteria that have a positive effect on the gut microbiome. The gut microbiome is the collection of bacteria, yeasts, and viruses that live in the digestive tract. Although probiotics do not colonize the gut, they provide benefits as they pass through the digestive system. Some of the well-documented benefits associated with probiotics are improvement in digestive

symptoms, like gas and bloating. There is also emerging research which shows that probiotics may have beneficial effects on reducing blood sugar, insulin, and Hemoglobin A1c, especially for those who have type 2 or gestational diabetes.[6] **Probiotics are found in yogurt, kefir, fermented foods (e.g., kimchi, sauerkraut, miso, etc.), and probiotic supplements.**

- **Chromium** is trace mineral required in very small amounts by the body. It is thought to play a role in insulin function, but it's exact mechanism is not fully understood. Studies looking at the effect of chromium supplementation on insulin resistance and glucose control are inconsistent, with a smaller number of studies showing positive benefits, mainly in those who have diabetes.[7] Other studies suggest that chromium and biotin (vitamin B7) combined may help lower Hemoglobin A1c, blood sugar, and cholesterol.[10] Those at risk for kidney disease should not take chromium supplements. **Chromium is available in many unprocessed foods including broccoli, organic turkey breast, green beans, grapes, oranges, apples, and bananas.**
- **Co-enzyme Q10**, or CoQ10, is a fat-soluble substance made by the body and found in food. CoQ10 is involved in cellular energy production. A form of CoQ10 called ubiquinol also acts like an antioxidant in the body. The body's production of CoQ10 decreases with age, and certain medications, like statins, have been shown to deplete CoQ10 in the body. CoQ10 has been shown to increase insulin sensitivity in individuals who do not have diabetes and may modestly lower glucose in individuals who have type 2 diabetes.[8,9] **Food sources of CoQ10 include grass-fed beef, organic chicken, fish, sesame seeds, pistachios, and broccoli.**
- **Physical activity, sleep, and stress management** are powerful natural insulin sensitizers. Taking a supplement without addressing these lifestyle factors is unlikely to address insulin resistance long-term. Work with a Functional Medicine provider to ensure that your physical activity, sleep, and stress management routines are working for you.

RECOMMENDATIONS TO SUPPORT INSULIN SENSITIVITY		SUPPLEMENT DOSING/ OTHER NOTES
☐ Vitamin D3	☐ Chromium	
☐ Magnesium	☐ CoQ10	
☐ Zinc	☐ Physical activity	
☐ Probiotics	☐ Sleep	
☐ Alpha Lipoic Acid	☐ Stress management	

References

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