



The Role of **MICRONUTRIENTS** In **METABOLIC SYNDROME**

WHAT IS METABOLIC SYNDROME?

Metabolic syndrome is a group of health risks that significantly increase your chance of developing cardiovascular disease, stroke, and diabetes. According to a national health survey, more than 1 in 5 American adults (47 million) and roughly one million adolescents have metabolic syndrome, and the number is rising. The risk of metabolic syndrome increases with age, affecting more than 40% of people in their 60s and 70s.

ARE YOU AT RISK?

Metabolic syndrome is diagnosed when any 3 of the 5 following conditions are present:

1. Abdominal fat: waist circumference > than 40 (men) or 35 (women) inches
2. Elevated fasting triglycerides (> 150 mg/dL)
3. Low HDL (<40 mg/dL in men or <50 mg/dL in women)
4. High blood pressure: (> 130/85 mmHg) or taking antihypertensive medication
5. Diagnosis of insulin resistance or diabetes (fasting glucose > 110 mg/dL)

THE ROLE OF NUTRITION IN METABOLIC SYNDROME

There is evidence that subclinical deficiencies in certain vitamins, minerals, and antioxidants can significantly influence the development of metabolic syndrome and its symptoms. Similarly, the presence of metabolic syndrome in a patient may lead to various nutrient deficiencies.

VITAMIN E

Recent studies have shown that vitamin E affects several conditions of metabolic syndrome. It inhibits LDL oxidation, slows atherosclerosis, reduces insulin resistance, and reduces the risk of complications associated with diabetes, specifically blindness. Vitamin E may also help moderate inflammatory response and reduce oxidative stress, two conditions seen in the development of coronary artery disease.

VITAMIN D

There is evidence that vitamin D deficiency may contribute to insulin resistance, which is the precursor to clinical diabetes. This may be due in part to the fact that excess body fat makes vitamin D, which is stored in adipose tissue, less available for use by the body.

VITAMIN B1 (THIAMINE)

Thiamine is essential for glucose metabolism and insulin production by pancreatic beta-cells.

VITAMIN B3 (NIACIN)

Niacin lowers total cholesterol, lowers blood triglycerides, increases HDL cholesterol, and inhibits the oxidation of LDL cholesterol – all important risk factors in metabolic syndrome.

VITAMIN B6 (PYROXIDINE)

Deficiencies of vitamin B6 can induce abnormal glucose intolerance. Vitamin B6 has also been shown to reduce blood pressure.

CO-ENZYME Q10

Co-enzyme Q10 is a powerful antioxidant that may reduce blood pressure, protect arteries from oxidation of LDL cholesterol, and significantly decrease atherosclerotic plaques. Since metabolic syndrome increases the development of vascular disease, the heart-protective benefits of Co-enzyme Q10 are crucial.

ALPHA LIPOIC ACID

This powerful antioxidant has been shown to improve insulin sensitivity and glucose tolerance in type 2 diabetic patients. It also reduces blood pressure, inhibits vascular inflammatory responses and reduces oxidative stress, therefore lowering the risk of cardiovascular disease. Studies have also shown that alpha lipoic acid may help patients lose weight due to its ability to stimulate glucose uptake and metabolism, especially in the muscles.

CALCIUM

Observational data suggest that high dietary calcium intake may decrease the risk of obesity, possibly by helping to modulate energy metabolism, which would therefore reduce the risk of metabolic syndrome. Calcium supplementation has also been shown to reduce blood pressure in hypertensive patients.

CHROMIUM

Recent studies have suggested that a deficiency in chromium may lead to impaired glucose tolerance. Chromium appears to play a critical role in glucose, lipid and protein metabolism. It can facilitate the binding of insulin to cells, thus alleviating insulin resistance.

MAGNESIUM

Magnesium is an important cofactor in hundreds of enzymatic reactions in the body. A recent study found that low serum levels of magnesium are an independent risk factor for the development of diabetes for certain groups of people. Magnesium supplementation has also been shown to reduce blood pressure.

SELENIUM

Selenium is an important mineral that has powerful antioxidant properties. It is useful in lowering the risk of cardiovascular disease in metabolic syndrome patients. It can also reduce fasting blood glucose levels and protect against hypertension.

ANTIOXIDANTS

The protective effects of antioxidants have been well established. There is evidence that high blood sugar is associated with a marked increase in the production of free radicals, which can lead to the increased oxidation of LDL cholesterol. This increase is thought to play a pivotal role in the development of atherosclerotic plaques and may increase the release of inflammatory enzymes, accelerating cardiovascular disease. Since many antioxidants work together, it is important to measure total antioxidant function. SpectraCell's SPECTROX[®] provides a complete and accurate picture of each patient's overall antioxidant status.

HOW DO I FIND OUT IF I AM DEFICIENT?

With a simple blood test from your physician, you too can know if you are at risk for nutritional deficiencies that can lead to metabolic syndrome or other chronic disease conditions.

SpectraCell Laboratories' patented technology is the only functional assessment to identify 33 specific nutrient deficiencies and antioxidant status that play an important role in the development and progression of metabolic syndrome and other chronic disease conditions.

Micronutrient
Testing 

SpectraCell's micronutrient tests measure 33 vitamins, minerals and antioxidants in your body and evaluates how well your body absorbs and utilizes each nutrient. Ask your doctor about SpectraCell's Micronutrient Testing today!