



# DIABETES

## Your Nutritional Status Matters

### UNDERSTANDING DIABETES

According to the American Diabetes Association, type 2 diabetes is the most common form of diabetes. With this type of diabetes, cells do not receive enough insulin. As a result, cells starve for energy, and, over time, a glucose buildup in the blood stream causes negative effects on a person's eyes, kidneys, nerves and/or heart.

Today's fast-paced society has led to quicker, higher carbohydrate alternatives as food sources. As a result, there is a greater threat of developing diabetes due to cells becoming insulin-resistant.

Micronutrients such as niacin, magnesium, calcium, zinc, carnitine, inositol, alpha-lipoic acid, as well as vitamins E, B6 and D all play an important role in the prevention and treatment of diabetes.

Though diabetes is a serious disease - with the right treatment - living a longer, healthier life can be made easier.

### THE ROLE OF MICRONUTRIENTS IN DIABETIC HEALTH

#### NIACIN

Niacin (nicotinamide) may help to preserve residual B-cell function in individuals with type 1 or type 2 diabetes. This B-vitamin is believed to be one of the components of the glucose tolerance factor (GTF).

#### MAGNESIUM

This mineral is involved in more than 300 enzymatic functions in the body. Magnesium deficiency has been associated with insulin resistance, glucose intolerance, dyslipidemia and hypertension, which have all been associated with diabetes mellitus. Magnesium has been found to be one of the more common micronutrient deficiencies in diabetes.

#### VITAMIN E

Low levels of vitamin E are associated with increased incidences of diabetes. Research suggests that individuals with diabetes mellitus have decreased levels of antioxidants. Increased antioxidant requirements may be a result of increased free radical production during periods of hyperglycemia.

#### ALPHA-LIPOIC ACID (THIOCTIC ACID)

This antioxidant has been shown to regenerate other antioxidants such as glutathione, vitamin E and vitamin C. Alpha-lipoic acid has been shown to enhance glucose uptake in skeletal muscle tissue, thus improving glucose regulation in diabetic mellitus individuals. In addition, this antioxidant can be beneficial in the treatment of diabetic polyneuropathy.

#### VITAMIN D

Obesity is often associated with vitamin D deficiency and also with type 2 diabetes. Research indicates that diabetic individuals (both type 1 and type 2) have a higher risk for bone fracture. This vitamin deficiency has clearly been associated with lower bone density. Subjects with hypovitaminosis D are at higher risk of insulin resistance and metabolic syndrome.

## CHROMIUM

This trace mineral is fundamental in proper insulin function and is believed to facilitate the attachment of insulin to the cell's insulin receptors. A lack of chromium can lead to insulin resistance, which leads to elevated blood levels of insulin and glucose. Elevated levels of glucose in the blood can lead to diabetes and cardiovascular complications. Food processing removes most of naturally occurring chromium. However, chromium can be supplemented or found in brewer's yeast, nuts, meat, whole grains, green beans and broccoli.

## HOMOCYSTEINE

Homocysteine elevation is a risk factor for overall mortality in type 2 diabetic individuals independent of other risk factors. Adequate levels of pyroxidine (vitamin B6), folate and vitamin B12 are required for normal homocysteine metabolism.

## INOSITOL

This nutrient is found in high concentrations in peripheral nerves. There is some evidence that inositol may be effective in the treatment of diabetic neuropathy.

## VITAMIN B6

Research shows that a deficiency of vitamin B6 may result in abnormal glucose tolerance, degeneration of the pancreatic beta cells, reduced insulin response to glucose and reduced serum and pancreatic insulin levels. In addition, vitamin B6 deficiency has been associated with polyneuropathies.

## CALCIUM

Studies have shown that individuals with a low intake of calcium have an increased risk of non-insulin dependant diabetes mellitus. Numerous studies have also revealed that diabetes may be associated with abnormal regulation of intracellular calcium.

## ZINC

This mineral has been associated with over 200 enzymatic functions in the body. Increased fasting blood glucose levels have been associated with low zinc. Zinc has been shown to be important in the synthesis, storage and secretion of insulin. Increased urinary zinc excretion has also been associated with diabetic individuals.

## CARNITINE

This amino acid in the form of acetyl-L-carnitine has been shown to benefit those individuals with diabetic polyneuropathy. One of the proposed mechanisms is that this amino acid may restore the depleted nerve myoinositol content and decrease free radical production.

## HOW DO I FIND OUT IF I AM DEFICIENT?

With a simple blood test from your physician, SpectraCell can determine if you are at risk for these nutrient deficiencies that may lead to or cause complications in diabetes or other chronic disease conditions. SpectraCell Laboratories' patented technology, micronutrient testing, is the only functional assessment to identify 33 specific nutrient deficiencies and antioxidant status at the cellular level.

**Ask your doctor about SpectraCell's micronutrient testing to find out if you are deficient in any nutrients presented in this brochure and take action to prevent and fight diabetes.**