**Chromium**
Helps insulin attach to cell’s receptors increasing glucose uptake into cell; Deficiency can cause insulin resistance; Supplementation trials show dose-dependent benefits for type II diabetics.36,37,38

**Biotin**
Stimulates glucose-induced insulin secretion in pancreatic B-cells; High dose biotin can improve glycemic control in diabetics.33,34,35

**Magnesium**
Deficiency reduces insulin sensitivity; Low magnesium exacerbates foot ulcers in diabetics.31,32

**Zinc**
Needed in the synthesis, storage and secretion of insulin; Protects pancreatic B-cells from damage; Affects the expression of genes linked to diabetes.29,30

**Lipoic Acid**
Enhances glucose uptake in skeletal muscle tissue; Protects pancreatic B-cells from damage; Affects the expression of genes linked to diabetes.29,30

**Glutathione & Cysteine**
Glutathione-containing enzymes protect B-cells which are particularly sensitive to oxidative stress; Type 2 diabetics have abnormal antioxidant status; Supplementation with the glutathione precursor cysteine restores antioxidant status.23,24,25

**Vitamin B12**
Deficiency common in diabetics because metformin depletes B12.1,2

**Vitamin B3**
Preserves B-cell function in type 1 diabetics; Part of GTF (glucose tolerance factor) which facilitates insulin binding.3,4,5

**Vitamin D**
Lowers risk of type 1 and 2 diabetes; Supresses inflammation of pancreatic B-cells; Vitamin D receptor gene linked to diabetes.6,7,8

**Vitamin E**
Confers protection against diabetes by protecting pancreatic B-cells from oxidative stress induced damage; May prevent progression of type I diabetes.6,9

**Vitamin C**
Lowers glycosylated hemoglobin (HbA1c) and fasting and post-meal glucose levels and in type 2 diabetics.10,11,12

**Inositol**
Evidence suggests that inositol may be effective in treating diabetic neuropathy.13,14

**Carnitine**
Reduces and even prevents pain from diabetic neuropathy; Improves insulin sensitivity by increasing glucose uptake and storage.15,16,17,18

**Glutamine**
Stimulates a hormone called GLP-1 (glucagon-like peptide 1) that regulates insulin secretion after meals; Improves insulin signaling and sensitivity.19,20

**Coenzyme Q10**
Protects kidney from diabetes related damage; Improves glycemic control in type 2 diabetics.21,22
patients with impaired glucose metabolism and insulin concentrations in lean, obese, and type 2 diabetic subjects. Metabolism 2003;52:176-183.


References