Micronutrient Testing

A Window on Obesity

CLINICAL APPLICATIONS OF SPECTRACELL'S MICRONUTRIENT TESTS IN OBESITY

Obesity is a complex, multi-factorial, chronic disease involving environmental (social and cultural), genetic, physiological, metabolic, behavioral and psychological components. It is the second leading cause of preventable death in the U.S. Each year, obesity causes at least 300,000 excess deaths in the U.S., and healthcare costs of American adults with obesity amount to approximately $100 billion.

Being overweight and obesity are part of the U.S. Department of Health and Human Services' health agenda that have steadily moved away from their established targets for improvement. Today, public health leaders recognize obesity as a "neglected public health problem." Approximately 127 million adults in the U.S. are overweight, 60 million obese and 9 million severely obese. That's 65% of our population that is overweight or obese.

Obesity increases the risk of illness from about 30 serious medical conditions, including diabetes, high blood pressure, high cholesterol, coronary heart disease and is associated with increases in deaths from all-causes. Earlier onset of obesity-related diseases, such as Type 2 Diabetes, are being reported in children and adolescents with obesity. The increase in overweight, obesity and severe obesity prevalence is evident in adults (aged 20 to 74) of both genders over the last decade. Prescription medications used to treat many of these conditions can induce deficiency status.

Weight loss drugs and bariatric surgery also increase the risk of serious deficiencies as well. Multiple medications, post-surgical "dumping" and severely limited food intake without proper supplementation can lead to malnutrition and serious deficiencies. This increases the risk for illness and chronic disease conditions despite efforts to lose weight and gain health.

DRUGS AND THEIR EFFECT ON NUTRITIONAL STATUS

DRUG	NUTRIENT	POTENTIAL HEALTH PROBLEM(S)
Anti-Diabetic Drugs	Coenzyme Q10	Various cardiovascular problems, weak immune system, low energy
Sulfonylureas (Dymelor,	Vitamin B12	Anemia, tiredness, weakness, increased cardiovascular disease risk
Micronase/Glynase/Diabeta,Tolinase)	Folic Acid	Birth defects, cervical dysplasia, anemia, cardiovascular disease
Biguanides (Glucaphage)		
Weight loss drugs	Vitamin D	Osteoporosis, muscle weakness, hearing loss
Orlistat	Vitamin E	Heart disease risk, weak immune system, increased free radical damage
No other prescription or OTC weight loss drugs have been studied for nutrient depletions		
Hydralizine-containing Vasodilators	Vitamin B6	Anemia, tiredness, weakness, increased cardiovascular disease risk
	Coenzyme Q10	Various cardiovascular problems, weak immune system, low energy
Diuretics Furosemide (Lasix),	Calcium	Osteoporosis, heart & blood pressure irregularities, tooth decay
Bumetanide (Bumex), Ethacrynic acid	Coenzyme Q10	Various cardiovascular problems, weak immune system, low energy
(Edecrin) Hydrochlorothiazide (HCTZ),	Folic Acid	Birth defects, cervical dysplasia, anemia, cardiovascular disease
Methylclothiazide (Enduron),	Magnesium	Cardiovascular problems, asthma, osteoporosis, cramps, PMS
Chlorothiazide (Diuril),	Potassium	Irregular heartbeat, muscle weakness, fatigue, edema
Indapamide (Lozol), Metolazone	Vitamin B1	Depression, irritability, memory loss, muscle weakness, edema
(Zaroxolyn), Chlorthalidone (Hygroton),	Vitamin B6	Depression, sleep disturbance, increased cardiovascular disease risk
Dyazide, Maxzide,Triamterene	Vitamin C	Lowered immune system, easy bruising, poor wound healing
(Dyrenium), etc.	Sodium	Muscle weakness, dehydration, memory problems, loss of appetite
	Zinc	Weak immunity, wound healing, sense of smell/taste, sexual dysfunction

NUTRIENTS SPECIFICALLY IMPORTANT TO CARDIOVASCULAR DISEASE

In addition to common depletions by drug therapies used to treat disease conditions related to obesity, these nutrients have extra significance in treating obese patients:

CoQ10	Various cardiovascular problems, weak immune system, low energy
Calcium	Heart & blood pressure irregularities, osteoporosis, tooth decay
Magnesium	Cardiovascular problems, asthma, osteoporosis, cramps, PMS
Potassium	Irregular heartbeat, muscle weakness, fatigue, edema
Vitamin B6	Increased cardiovascular disease risk, depression, sleep disturbance
Vitamin B12	Increased cardiovascular disease risk, anemia, tiredness, weakness
Folic Acid	Cardiovascular disease, birth defects, cervical dysplasia, anemia
Vitamin E	Hearing disease risk, weak immune system, increased free radical damage
Carnitine	Elevated blood lipid levels, abnormal liver function, muscle weakness, less energy, impaired glucose control

NUTRIENTS TESTED BY SPECTRACELLÕS MICRONUTRIENT AND CARDIOVASCULAR TESTS

Vitamin A
Vitamin B1
Vitamin B2
Vitamin B3
Vitamin B6
Vitamin B12
Vitamin C
Vitamin D
Vitamin E
Vitamin K2
Biotin
Inositol
Folate
Pantothenate
Asparagine
Calcium
Carnitine
Choline
Chromium
Coenzyme Q10
Copper
Cysteine
Fructose Sensitivity
Glucose/Insulin Metabolism
Glutamine
Glutathione
Lipoic Acid
Magnesium
Oleic Acid
Selenium
Serine
SPECTROX™ Total Antioxidant Function
Zinc

COMMON RELATED DIAGNOSIS CODES

414.00	Coronary atherosclerosis, of native coronary artery	269.90	Nutritional deficiency, unspecified
780.71	Chronic fatigue syndrome	769.40	Other abnormal clinical findings
401.10	Essential Hypertension, benign	226.20	Other nutritional deficiency
401.90	Essential Hypertension, unspecified	277.80	Other unspecified disorders if metabolism
272.40	Hyperlipidemia, other and unspecified	719.48	Pain in joint, other specified sites
272.90	Disorder of metabolism	272.00	Pure hypercholesterolemia
259.90	Endocrine disorder, unspecified	786.05	Shortness of breath
780.79	Malaise and fatigue, other general symptoms	780.20	Syncope and collapse
269.30	Mineral Deficiency, unspecified	785.20	Undiagnosed cardiac murmurs
729.10	Myalgia and myositis, unspecified	269.20	Vitamin deficiency, unspecified

COMPARISON: MICRONUTRIENT TESTING & OTHER NUTRITIONAL ASSAYS	Micronutrient Testing	Metabolite Excretion	Enzyme Activation Index	Microbial Growth Assays
Measure a combination of cellular functions for each micronutrient?	YES	NO	NO	NO
Measure ability to support normal metabolic functions?	YES	NO	NO	NO
Determines individual functional requirements?	YES	NO	NO	NO
Demonstrate the intracellular function simultaneously?	YES	NO	NO	NO
Reflect average of long-term nutritional history (over three months)?	YES	NO	NO	NO
Use living cells from the patient?	YES	NO	NO	NO
Identify biochemical individuality?	YES	NO	NO	LIMITED

WEIGHT MANAGEMENT

Asparagine
This amino acid increases insulin sensitivity which helps the body store energy in muscle instead of storing it as body fat.[1,2]

Biotin Boosts metabolism by improving glycemic control (stabilizes blood sugar) and lowering insulin, a hormone that promotes fat formation.[3,4,5]

Carnitine
Carries fatty acids into the cell so they can be burned for fuel; Helps reduce visceral adiposity (belly fat). [6,7]

Calcium Inhibits the formation of fat cells; Also helps oxidize (burn) fat cells.[8,9,10]

Zinc Deficiency of zinc reduces leptin, a beneficial hormone that regulates appetite, which is reversed by zinc repletion.[10,37]

Lipoic Acid Improves glucose uptake into cells, which helps a person burn carbohydrates more efficiently.[11,12,13]

Vitamin K
Poor vitamin K status linked to excess fat tissue; Vitamin K helps metabolize sugars.[35,36]

Chromium Makes the body more sensitive to insulin, helping to reduce body fat and increase lean muscle.[14,15,16,27,28,4]

Vitamin D Deficiency strongly linked to poor metabolism of carbohydrates; Genes that are regulated by vitamin D may alter the way fat cells form in some people.[8,33,34]

Vitamin B5 Taking B5 lowers body weight by activating lipoprotein lipase, an enzyme that burns fat cells. One study linked B5 supplementation to less hunger when dieting.[17,18]

Vitamin E Inhibits pre-fat cells from changing into mature fat cells, thus reducing body fat.[10,31,32]

Magnesium Low magnesium in cells impairs a person's ability to use glucose for fuel, instead storing it as fat; Correcting a magnesium deficiency stimulates metabolism by increasing insulin sensitivity. Magnesium may also inhibit fat absorption.[19,20,21]

Vitamin A
Enhances expression of genes that reduce a person's tendency to store food as fat; Reduces the size of fat cells.[10,29,30]

Vitamin B3 (Niacin)
Treatment with B3 increases adiponectin, a weight-loss hormone secreted by fat cells; Niacin-bound chromium supplements helped reduced body weight in clinical trials.[26,27,28]

Inositol
Supplementation may increase adiponectin levels.[25]

Cysteine
Supplementation with this antioxidant reduced body fat in obese patients.[24]

Glutamine
Reduces fat mass by improving glucose uptake into muscle.[22,23]