Conditionally Essential Nutrients in Skin Rejuvenation

Non-essential nutrients are the nutrients that can either be synthesized by the body or the ones the body can do without. Essential nutrients are the nutrients the body cannot produce but cannot do without. There is also another important but underappreciated class of nutrients called conditionally essential. Generally, conditionally essential nutrients can be synthesized by a healthy body working at optimal efficiency. However, under certain conditions (e. g. stress, disease, intoxication, advanced age, etc), the body may lose the ability to synthesize these nutrients in sufficient quantities and becomes dependent on obtaining them from food. It appears that insufficient synthesis and/or intake of some conditionally essential nutrients contributes to age-related decline in the function of many organs, including the skin. Supplementing conditionally essential nutrients may produce skin benefits in some people, particularly if their bodies do not produce enough of these nutrients due to stress, older age or health conditions.

Lipoic acid

Lipoic acid is a conditionally essential nutrient required by cell for generating energy from carbohydrates and some other fuels. It is also an effective antioxidant and heavy metal chelator. The body can synthesize lipoic acid in modest amounts but the production may fall short of requirements in many situations such as stress or illness. As with many key substances in the body, levels of lipoic acid decline with age.

Lipoic acid is unique in its versatility among antioxidants. It is both water and fat soluble, capable of protecting all body tissues and compartments. It is effective against most types of free radicals, including superoxide anion, hydroxyl radical, singlet oxygen, and hydrogen peroxide. It also chelates (binds and neutralizes) the ions of metals that catalyze free radical formation (iron, copper, cadmium, lead and mercury). Yet another important effect of lipoic acid is its ability to lower blood sugar. A unique combination of antioxidant, metal-chelating and glucose-lowering properties makes lipoic acid an inhibitor of glycation and cross-linking. (Glycation and cross-linking comprise one of the key mechanisms of aging, playing an important role in the formation of wrinkles).

Coenzyme Q10

Coenzyme Q10 (CoQ10) has two important roles: it is an essential part of the cellular respiration system located in the mitochondria, and it is an antioxidant. CoQ10 improves both the rate and efficiency of energy production in the cells, and at the same time protects mitochondria from free radicals. The body can produce CoQ10, but many factors, including age, illness, cholesterol-lowering drugs and malnutrition can impair that ability. CoQ10 is sometimes called a "biomarker of aging" because its level correlates so well with aging and degenerative diseases. In one study, CoQ10 supplementation increased life expectancy in mice by 50%. A large number of studies clearly demonstrated the efficiency of CoQ10 in congestive heart failure and other diseases of heart muscle. Other conditions that appear to be helped by CoQ10 include hypertension, decreased immunity, and muscular atrophy. Unfortunately, the studies of the benefits of CoQ10 specifically for the skin are lacking. It is likely, however, that the increased energy production facilitated by CoQ10 will benefit the skin as well.

Cysteine and methionine

Cysteine and methionine are sulphur-containing amino acids. In addition to being structural units of proteins, these amino acids act as antioxidants and facilitate the removal of heavy metals from the body. Cysteine is also a part of glutathione which is the primary water soluble antioxidant inside cells. Methionine is an essential amino acid; it cannot be produced by the body and has to come from food. Cysteine can be synthesized in the body from methionine and is considered conditionally essential, meaning that it may become essential if the supply of methionine is limited. The content of methionine and cysteine in the body seems to decline with age. Supplementing diet with these amino acids increases life span in mice. Indirect evidence suggests that maintaining optimal levels of sulphur-containing amino acids in humans may provide some health and longevity benefits, including better skin health.