

GLYCATION MANAGER **AGE CONTROL COMPLEX**

Almost all measures of physiological function decline as we age. The extent to which these declines occur depends on many factors, including numerous chemical processes occurring at the level of cells, tissues, and organs. A fundamental part of aging and decline in organ function may simply be the result of unwanted chemical processes causing the spontaneous appearance of side products of normal metabolism—the formation of mutated, less active, otherwise undesirable species of DNA, RNA, proteins, lipids, and small molecules. To the extent that humans can minimize the accumulation of these altered biomolecules, we can thrive and remain healthy. Several main biochemical processes occur as a normal part of human metabolism, but are modifiable to enhance health and longevity.

Glycation is one of these processes increasingly understood as a modifiable lifestyle factor that improves glucose metabolism and metabolic health, as well as slows the physical signs of aging. However, managing blood sugar levels is only part of the story. Even patients with normal blood sugar can benefit from slowing glycation in the body. Advanced Glycation End-products (AGEs). AGEs are formed exogenously in food and endogenously in the body as a result of glycation reactions. They form at a constant but slow rate in the body, starting in early embryonic development, and accumulate with time. Their formation is responsive to availability of glucose in the blood.

AGEs are a heterogeneous group of molecules formed from the non-enzymatic reaction of reducing sugars with free amino groups of proteins, lipids, and nucleic acids. The initial product of this reaction is called a Schiff base, which spontaneously rearranges itself into an Amadori product, as is the case of the well-known hemoglobin A1c. Initial glycation reactions are reversible depending on the concentration of the reactants. A lowered glucose concentration can unhook the sugars from the amino groups to which they are attached; conversely, as glucose concentrations rise, the opposite effect may occur. A series of subsequent reactions lead to the formation of AGEs.

One key feature of certain reactive or precursor AGEs is their ability to form covalent crosslinks between proteins, which alters their structure and function, as in cellular matrix, basement membranes, and vessel-wall components. AGEs also interact with a variety of cell-surface AGE-binding receptors, leading either to their endocytosis and degradation, or to cellular activation, pro-oxidant, and cytokine-related events. These are normal processes occurring in everyone all the time.

Glycation Manager AGE control complex is a nutritional supplement designed to slow the formation of AGEs associated with normal metabolism and aging. The ingredients in this unique formulation have been shown to exhibit several benefits for slowing the formation of AGEs. It contains:

Benfotiamine

Benfotiamine (S-benzoylthiamine 0-monophosphate) is a fat-soluble, biologically active form of thiamine with unique effects on glycation that ordinary thiamine lacks.' Once absorbed, benfotiamine increases intracellular thiamine diphosphate, a cofactor needed to activate transketolase, which in turn reduces tissue levels of AGEs." Benfotiamine also affects alternative pathways induced by glucose, while increasing pentose phosphate shunt.

Chromium

Chromium is an important nutrient involved in the healthy metabolism of carbohydrates and lipids, playing a role in cellular transduction of insulin signals. Chromium may inhibit the glycosylation of protein in erythrocytes.

Alpha-Lipoic Acid

Alpha-lipoic acid is a broad-acting antioxidant due to its dual fat and water solubility." It is among the best validated nutrients for supporting healthy nerve function." Lipoic acid has pronounced anti-aging effects because it can reverse the age-associated decline in mitochondrial enzymes. Both intravenous and oral alpha-lipoic acid have been shown support healthy peripheral, autonomic, and cranial nerves. Researchers have proposed benefits due to both the ability to reduce oxidative stress as well as support a healthy insulin response at cellular receptors.

Carnosine

L-Carnosine (beta-alanyl-L-histidine) is a small dipeptide composed of histidine and alanine. In humans, carnosine is concentrated in heart muscle, skeletal muscle, and the brain. It has been shown in animals and in vitro to exert carbonyl-quenching effects that attenuate the development of AGEs, reduce age-related mitochondrial dysfunction, and support healthy anti-oxidation and anti-glycation tissue responses. Its antioxidant and anti-glycation properties are attributed to carnosine's ability to scavenge radicals and sugar aldehydes. Carnosine protects against glycation-induced loss of enzyme activity and prevents glycation-induced changes in protein structure.

Thiamine and Vitamin B6

Thiamine (vitamin B1) and Pyridoxine/Pyridoxal-5'-phosphate (vitamin B6) serve many important roles in the body including supporting numerous metabolic enzyme systems, glucose metabolism, and supporting nerve health.

Correction of thiamine deficiency restores disposal of triosephosphates by the reductive pentose phosphate pathway. This prevents activation of protein kinase C, activation of the hexosamine pathway, increased glycation, and oxidative stress. Consequently, thiamine supplementation can support healthy kidney, nerve, and retinal structure and function.

Pyridoxine may help support healthy oxygen transport by erythrocytes by reducing glycosylation.

Grape Seed

Grape Seed is a potent inhibitor of AGEs due to its content of flavonoids such as catechin, epicatechin, and procyanidins. These flavonoids have been shown to inhibit the glycosylation.

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