

Zinc Inhibits Thickening of the Arteries

May 29, 2010 [Alicia Richardson](#)

Atherosclerosis is the principal cause of death in Western countries. A new study shows zinc's protective effect against this disease.

Thickening of the arteries (atherosclerosis) is a complex disease of diverse etiology. In Western countries, it is estimated that it accounts for 30% - 40% of cases of ischemic cerebrovascular diseases including strokes, and heart disease. Evidence shows that atherosclerosis is due to the deposition of oxidized LDL cholesterol (oxLDL), calcium, and debris in the *intima* - the innermost lining of the endothelial wall (s)- which causes impaired vasodilation (expansion), vasospasm, and reduced blood flow to target organs. In contrast, *native* or "unmodified" LDL cholesterol is not atherogenic.

Human Studies on Zinc's Efficacy Against Atherosclerosis

It is a well established fact that chronic inflammation and oxidative stress increases one's risk for atherosclerosis. To determine if zinc can downregulate inflammation and reduce oxidative stress load, Bao and colleagues enrolled 40 healthy elderly individuals aged 56 - 83 years to participate in a study.

The subjects were split into two groups. One group was given an oral dose of 46 mg zinc gluconate daily for 6 months, while the control group was given a placebo. After 6 months of zinc supplementation, those who received zinc supplementation had *higher* zinc plasma levels and *reduced* levels of inflammatory biomarkers such as C-reactive protein (CRP), interleukin - 6 (IL-6), macrophage chemoattractant protein -1 (MCP-1), vascular cell adhesion molecule-1 (VCAM-1), secretory phospholipase A2, malondialdehyde (MDA), and hydroxyalkenals (HAEs).

In vitro studies also showed that zinc reduced the generation of tumor necrosis factor - alpha (TNF-a), IL-1 beta, VCAM-1, MDA, HAE and the activation of nuclear factor kappa B (NFkB) - a protein complex that controls the transcription of DNA. NFkB is involved in

stress, free radical, UV radiation, oxidation of LDL cholesterol, and immune response against bacterial or viral antigens. More importantly, zinc enhances the activation of the anti-inflammatory *protein A20* and *Peroxisome Proliferator Activated Receptor alpha* (PPAR- α). Protein A20 suppresses cell growth and prompts apoptosis (cell suicide), while PPAR- α acts as a transcription factor that regulates gene expression. PPAR- α is essential to cellular differentiation, development, and metabolism of nutrients.

The researchers concluded that because of zinc's ability to downregulate the activation of inflammatory agents and reduce oxidative stress as evidenced by reduced MDA and HAE levels (MDA and HAE are products of lipid or fat oxidation), it may have a prophylactic role in the prevention of atherosclerosis.

Biological Functions of Zinc

Zinc (Zn) is a versatile trace mineral that is required in more than 100 enzymes. Almost all cells contain zinc. In the body, bones and muscles contain the highest levels of zinc, but muscles do not readily give up their deposit of zinc, so an individual must consume zinc-rich foods frequently to maintain optimum levels.

Zinc supports the work of various proteins including metalloenzymes that are needed for numerous metabolic processes. Metalloenzymes are enzymes that contain 1 or more minerals as part of their structure. Zinc's key activities include:

- stabilization of cell membranes helping to strengthen their defense against free-radical attacks as an antioxidant, and as an anti-inflammatory agent
- assisting in immune function See ["Zinc and Respiratory Infections"](#)
- participating in growth development
- participating in the synthesis, storage, and release of insulin in the pancreas
- interacting with platelets in blood clotting
- affecting thyroid function
- influencing behaviour and learning performance
- participating in the production of the active form of vitamin A or "retinal"
- participating in wound healing, sperm production, fetal growth, and normal taste perception

Health experts maintain that the best way to obtain nutrients is to consume a healthy diet that contains fresh, whole, or minimally processed foods. To see dietary sources of zinc, view here [Zinc and Exercise](#). However, there are times when nutritional support or vitamin/mineral supplementation may be warranted. These events include times of severe stress, acute or chronic illness, evidence of

clinical deficiency, or being in a high-risk group for certain diseases. In this regard, zinc supplementation is justified to maintain homeostasis.

References

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