**INFLAMMATION**

**Selenium**
Subclinical deficiency negatively alters genes that regulate the inflammatory response; Deficiency promotes vascular inflammation.\(^{37,38}\)

**Copper**
Deficiency lowers enzyme activity (such as superoxide dismutase) that fights inflammation; Lowers damaging isoprostanes, a by-product of inflammation.\(^{34,35,36}\)

**Zinc**
Inflammation raises demand for zinc; Pro-inflammatory chemicals (cytokines) dose dependently decrease in response to zinc repletion.\(^{31,32,33}\)

**Vitamin A**
Regulates the cellular immune response to inflammatory signals; Deficiency increases the severity of chronic inflammation; Zinc depletion lowers vitamin A status.\(^{28,29,30}\)

**Vitamin B2**
Riboflavin (B2) helps minimize pain associated with inflammation; Detoxifies homocysteine, an amino acid that indirectly causes inflammation in various tissues.\(^{26,27}\)

**Manganese**
Cofactor to the powerful antioxidant superoxide dismutase that fights inflammation within cells.\(^{1,2}\)

**Magnesium**
Deficiency activates pro-inflammatoryatory chemicals called cytokines; Deficiency will also kick start a damaging immune response by activating cells called leukocytes and macrophages.\(^{3,4,5}\)

**Glutathione**
Repairs damage to cells caused by inflammation; Regulates the production of pro-inflammatory cytokines; Recycles vitamins C and E.\(^{6,7}\)

**Cysteine**
Protects organs such as blood vessels, brain and liver from inflammatory damage; Precursor to glutathione production; Supplementation with N-acetyl cysteine raises glutathione.\(^{8,9}\)

**Vitamin C**
Low vitamin C linked to inflammation; Inversely related to C-reactive protein (CRP), a marker for systemic inflammation; Increases glutathione.\(^{10,11,12}\)

**Vitamin D**
Potent modulator of inflammation; Helps turn off chronic inflammatory responses; Inhibits pro-inflammatory cytokine production.\(^{13,14}\)

**Vitamin E**
Limits destructive cell behavior caused by inflammatory enzymes gone wild; Reduces damage from tumor necrosis factor alpha (TNF-\(\alpha\)); Deficiency predisposes a person to inflammation-related diseases.\(^{15,16}\)

**Vitamin B6**
Low B6 status is linked to high levels of CRP and systemic inflammation.\(^{24,25}\)

**Coenzyme Q10**
Decreases several inflammatory markers (CRP and IL-6) in supplementation trials; Affects genes that control response to inflammatory stress.\(^{21,22,23}\)

**Glutamine**
Decreases cytokine production; Invokes an anti-inflammatory response; Precursor to glutathione.\(^{19,20}\)

**Lipoic Acid**
Neutralizes free radicals caused by uncontrolled inflammation in both water and lipid phases of the cell; Protects endothelial cells from inflammation; Regenerates other antioxidants such as vitamin E, C and glutathione.\(^{17,18}\)

Additional nutrients affect inflammation. This list is non-exhaustive.
REFERENCES