HYPOTHYROIDISM

**Choline**
Hypothyroidism negatively affects choline function in the brain, which can affect mood and cognition.29,30

**Carnitine**
Decreased tissue levels of carnitine in both hypo- and hyperthyroidism contribute to muscle fatigue.24,25,26

**Glutathione**
Hypothyroidism decreases efficacy of some antioxidants, such as glutathione peroxidase and superoxide dismutase.1,2

**B Vitamins**
A deficiency in B6, B12 or B9 (folate) can cause elevated homocysteine, which is linked with hypothyroidism. Folic acid levels have been linked levels of thyroid stimulating hormone (TSH).3,4,5,6,7

**Vitamin C and E**
Partially restores thyroid function when liver detoxification ability is compromised.2,8,9,10,11

**Vitamin A**
Activates gene that regulates TSH (thyroid stimulating hormone).12,13,14

**Zinc**
Increases thyroid hormone T3 in deficient subjects15,16,17,20,21

**Copper**
Low levels seen in experimentally induced hypothyroidism; Indirectly affects thyroid status by its antioxidant role via superoxide dismutase.17

**Asparagine**
This amino acid is part of the structure of thyroid stimulating hormone which regulates communication with other hormones.22,23

**Lipoic Acid**
Improves endothelial function in people with subclinical hypothyroidism; Protects thyroid cells from oxidative stress; May interfere with T4 therapy.27,28

**Selenium**
Converts thyroid hormones T4 (thyroxine) into T3 (triiodothyronine); Deficiency reduces T3 levels causing classic hypothyroidism symptoms such as fatigue, depression or weight gain.18,19,20,21

**Glutathione**
Hypothyroidism decreases efficacy of some antioxidants, such as glutathione peroxidase and superoxide dismutase.1,2

**Vitamin C**
Newly discovered role in neural tissue may explain its clinical benefit in a double blind trial on headache frequency.

**Vitamin B3**
Dilates blood vessels; increases serotonin

**CoQ10**
Aids mitochondrial metabolism; may prevent migraines

**Vitamin D & Calcium**
Small trials show benefit with combined supplementation.

**Vitamin B2**
Effective for migraine prevention, aids mitochondrial energy metabolism.

**Magnesium**
Efficacious for migraine prevention in several trials; magnesium deficiency can cause arterial spasm and its role in neurotransmission may explain the migraine-magnesium depletion link.

**Carnitine**
Implicated in migraine pathophysiology due to its role in mitochondrial energy metabolism

**Vitamin C**
Enhances mitochondrial energy metabolism

**Vitamin B12**
Scavenges nitric oxide, which is implicated in migraine pathogenesis

**Folate**
MTHFR gene linked to migraines. This gene raises folate requirements.

**Glutathione**
Low levels of glutathione peroxidase implicated in migraine etiology
REFERENCES


18. Moncayo R, Kroiss A, Obenwinker M et al. The role of Se, vitamin C, and zinc in benign thyroid diseases and of Se in malignant thyroid diseases: low Se levels are found in subacute and silent thyroiditis and in papillary and follicular carcinoma. BMC Endocr Disord 2008;8:2.


