

#### Choline

Hypothyroidism negatively affects choline function in the brain, which can affect mood and cognition.<sup>29,30</sup>

#### Glutathione

Hypothyroidism decreases efficacy of some antioxidants, such as glutathione peroxidase and superoxide dismutase.<sup>1,2</sup> 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).<sup>3,4,5,6,7</sup>

**B** Vitamins

# Vitamin C and E

Partially restores thyroid function when liver detoxification ability is compromised.<sup>2,8,9,10,11</sup>

#### Vitamin A

Activates gene that regulates TSH (thyroid stimulating hormone).<sup>12,13,14</sup>

### Lipoic Acid

Improves endothelial function in people with subclinical hypothyroidism; Protects thyroid cells from oxidative stress; May interfere with T4 therapy.<sup>27,28</sup>

# HYPOTHYROIDISM

#### Zinc

Increases thyroid hormone T3 in deficient subjects<sup>15,16,17,20,21</sup>

#### Copper

Low levels seen in experimentally induced hypothyroidism; Indirectly affects thyroid status by its antioxidant role via superoxide dismutase.<sup>17</sup>

#### Carnitine

Decreased tissue levels of carnitine in both hypo- and hyperthyroidism contribute to muscle fatigue.<sup>24,25,26</sup>

#### Asparagine

This amino acid is part of the structure of thyroid stimulating hormone which regulates communication with other hormones.<sup>22,23</sup>

## Selenium

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

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