

5/31/2020

**ESSENTIAL  
MICRONUTRIENTS  
IN CHRONIC  
DISEASES**

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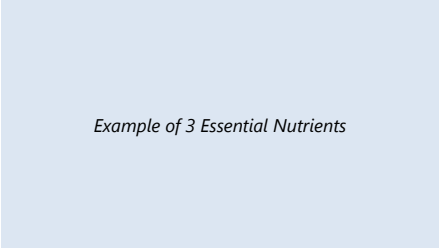




**All Nutrients Are  
Essential**

## ***Nutrients Levels***

*Difference Between Daily Minimum  
Required Amount & Amount Required  
for Optimal Health*



*Example of 3 Essential Nutrients*

*Essential nutrients #1*


**VITAMIN D**

## Vitamin D is important for healthy immune function.



Vitamin D is found in

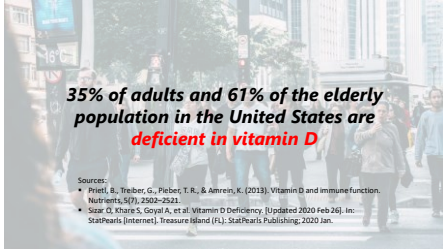
- Fatty fish, like salmon.
- Foods fortified with vitamin D, like some dairy products, orange juice, soy milk, and cereals.
- Beef liver.
- Cheese.
- Egg yolks.
- Mushrooms



**The best source of vitamin D is sunshine exposure.**

**During exposure to sunlight, the skin absorbs UV radiation, which leads to the creation of vitamin D3.**

Wacker, M., & Holick, M. F. (2013). Sunlight and Vitamin D: A global perspective for health. *Dermato-endocrinology*, 5(1), 51–108.



**35% of adults and 61% of the elderly population in the United States are deficient in vitamin D**

Sources:

- Prietl, B., Treiber, G., Pieber, T. R., & Amrein, K. (2013). Vitamin D and immune function. *Nutrients*, 5(7), 2502–2521.
- Sizar O, Khare S, Goyal A, et al. Vitamin D Deficiency. [Updated 2020 Feb 26]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan.



***“vitamin D supplementation studies have shown beneficial effects of vitamin D on immune function”***

Priehl, B., Treiber, G., Pieber, T. R., & Amrein, K. (2013). Vitamin D and immune function. *Nutrients*, 5(7), 2502–2521.  
<https://doi.org/10.3390/nu5072502>

***Studies are conflicting, but there is probable association between deficiency of vitamin D and an increases of risk of **multiple sclerosis, autoimmune conditions, rheumatoid arthritis, hypertension, cardiovascular heart disease, and several types of cancers.*****

Sources:

- Sizar O, Khare S, Goyal A, et al. Vitamin D Deficiency. [Updated 2020 Feb 26]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. Available from:
- Holick MF. Vitamin D: important for prevention of osteoporosis, cardiovascular heart disease, type 1 diabetes, autoimmune diseases, and some cancers. *South. Med. J.* 2005 Oct;98(10):1024-7.

**VITAMIN D**

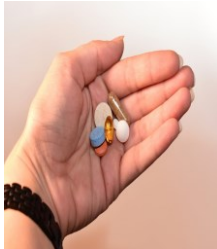
*How much should you take?*

## ***VITAMIN D SUPPLEMENT***

*Depends of how much you are deficient!*

*Vitamin D3 between 2,000 to 5,000 is often recommended*

Sizar O, Khare S, Goyal A, et al. Vitamin D Deficiency. [Updated 2020 Feb 26]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. Available from:



### *Who might need more vitamin D?*

- *Labs are showing deficiency*
- *Taking certain medications*
- *Have a malabsorption syndrome*
- *African American or Hispanic*

Sizar O, Khare S, Goyal A, et al. Vitamin D Deficiency. [Updated 2020 Feb 26]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan.

*Essential nutrients #2*

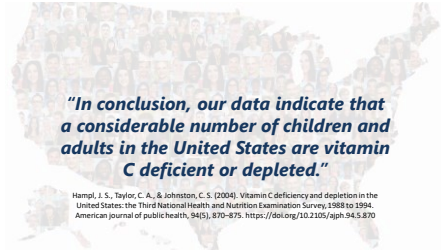
**VITAMIN C**



***Vitamin C is a vital antioxidant that protects your cells from damage and contributes to immune defense.***



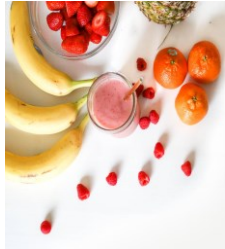




***“In conclusion, our data indicate that a considerable number of children and adults in the United States are vitamin C deficient or depleted.”***

Hampel, J. S., Taylor, C. A., & Johnston, C. S. (2004). Vitamin C deficiency and depletion in the United States: the Third National Health and Nutrition Examination Survey, 1988 to 1994. *American journal of public health, 94*(5), 870–875. <https://doi.org/10.2105/ajph.94.5.870>

*How much vitamin  
C to take for  
optimal function?*

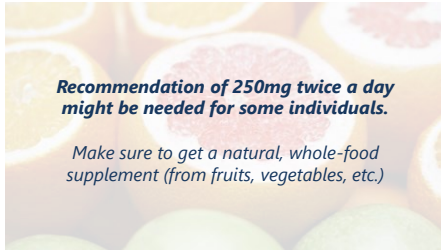


**A study published in 2017 recommended a minimum of 100–200 mg/day, to optimize cell and tissue levels**

Carr, A. C., & Maggini, S. (2017). Vitamin C and Immune Function. *Nutrients*, 9(11), 1211. <https://doi.org/10.3390/nu9111211>

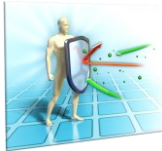
***When do you need more vitamin C?***

- ***Under stress***
- ***Smoking***
- ***Eating fast food or lack of vitamins***
- ***Get less sleep***
- ***Have inflammation or infection***



*Essential nutrients #3*

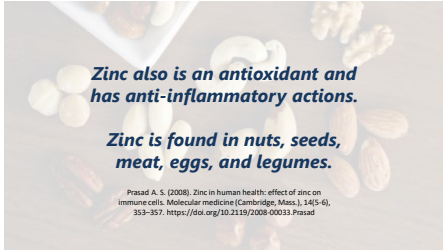
**ZINC**



***Zinc is essential for the function of the immune system.***

***Zinc is needed for healthy immune protection.***

Wessels, I., Maywald, M., & Rink, L. (2017). Zinc as a Gatekeeper of Immune Function. *Nutrients*, 9(12), 1286. <https://doi.org/10.3390/nu9121286>



***Zinc also is an antioxidant and has anti-inflammatory actions.***

***Zinc is found in nuts, seeds, meat, eggs, and legumes.***

Prasad A. S. (2008). Zinc in human health: effect of zinc on immune cells. *Molecular medicine (Cambridge, Mass.)*, 14(5-6), 353-357. <https://doi.org/10.2119/2008-00033.Prasad>





**Zinc absorption in the elderly is significantly lower than that of the younger.**

Nihon Ronen Igakkai Zasshi. [Zinc deficiency in the elderly].  
2007 Nov;44(6):677-89.

***Zinc supplementation might help to fight infections.***

***Daily recommended dosage of zinc for adults is 8 to 11 mg/day.***

Prasad AS. Impact of the discovery of human zinc deficiency on health. *J Am Coll Nutr*. 2009 Jun;28(3):257-65.

Institute of Medicine (US) Panel on Micronutrients. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Washington (DC): National Academies Press (US); 2001. 12, Zinc. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK222317/>



**Other important nutrients are:**

**Magnesium, Selenium, Glutathione (or NAC), Vitamins A, Vitamin E, and B12**



**NUTRITIONAL MEDICINE:  
Important Micro-Nutrients  
In Chronic Diseases**

## Essential Micro-Nutrients In Treating ADHD

### Magnesium & B6

*"...moderate doses of magnesium and vitamin B6 improved symptoms in children with ADHD."*

Herb: *Gingko biloba* extract. Standardized Extract (50:1)= 120-240 mg/d (24% flavone glycosides and 6% terpenoids)

Mousain-Bosc et al. (2006). Improvement of neurobehavioral disorders in children supplemented with magnesium-vitamin B6. I. Attention deficit hyperactivity disorders. *Magnesium Research: Official Organ Of The International Society For The Development Of Research On Magnesium*, 19(1), 46-52

## Essential Micro-Nutrients In Treating Asthma

### Magnesium & Vitamin C

- *Magnesium promotes relaxation of bronchial smooth muscle.*
- *Vitamin C deficiency may increase airway hyper-reactivity to histamine.*
- *Taking Vitamin C inhibited histamine-induced bronchoconstriction.*
  
- **Herb:** *Coleus forskohlii*- tincture 3-5 ml TID (raises cAMP --> relaxation of bronchial muscles and asthma symptoms)

Bucca C, Rolla G, Arossa W, et al. Effect of ascorbic acid on increased bronchial responsiveness during upper airway infection. *Respiration*. 1989;55(4):214-219. doi:10.1159/000195737

## Essential Micro-Nutrients In Treating Hypertension

### K & CoQ10

- Increasing potassium intake lowers systolic and diastolic BP.
- **Supplementation with CoQ10 produced substantial decreases in BP in patients with essential hypertension...**
  - **Herb:** Leonurus cardiaca: Tincture: 1-4 ml TID

Whelton PK, He J, Cutler JA, et al. Effects of oral potassium on blood pressure. Meta-analysis of randomized controlled clinical trials. *JAMA*. 1997;277(20):1624-1632.

Digiesi, V., F. Cantini, and B. Brodbeck. "Effect of coenzyme Q10 on essential arterial hypertension." *Current therapeutic research* 47.5 (1990): 841-845.

## Essential Micro-Nutrients In Treating Diabetes

### Chromium

**Studies have found that chromium supplementation improved glycemic control or insulin sensitivity in patients who had diabetes or impaired glucose tolerance. (> 200 mcg/ day)**

Herb: Gymnema sylvestre (aka sugar destroyer) Tincture: 1-3 ml TID; powdered leaves: 400 mg

Morris BW, Kouta S, Robinson R, MacNeil S, Heller S. Chromium supplementation improves insulin resistance in patients with Type 2 diabetes mellitus. *Diabet Med.* 2000;17(9):684-685.



## Essential Micro-Nutrients In Treating Hypothyroidism

### Selenium

- Supplementation with selenium significantly decreased TPO antibody levels in patients with autoimmune thyroiditis.
- Herb: **Coleus forskohlii** (can increase secretion of thyroid hormone) tincture: 3-5 ml TID; powdered: 200-400 mg BID

Gärtner R, Gasnier BC, Dietrich JW, Krebs B, Angstwurm MW. Selenium supplementation in patients with autoimmune thyroiditis decreases thyroid peroxidase antibodies concentrations. *J Clin Endocrinol Metab.* 2002;87(4):1687-1691.

## Essential Micro-Nutrients In Treating Headaches

### MAGNESIUM

**Tension type headache has been found to be associated with suboptimal magnesium status or magnesium deficiency.**

**Stress may promote the development of magnesium deficiency, which is common in people with tension-type headache.**

Herbs: Feverfew (tanacetum), Lemon balm, California Poppy

Altura BM, Altura BT. Tension headaches and muscle tension: is there a role for magnesium?. *Med Hypotheses*. 2001;57(6):705-713.

Cuciureanu MD, Vink R. Magnesium and stress. In: Vink R, Nechifor M, editors. *Magnesium in the Central Nervous System [Internet]*. Adelaide (AU): University of Adelaide Press; 2011.

## Essential Micro-Nutrients In Treating Osteoarthritis

### Vitamin C

Higher intake of vitamin C was associated with a lower risk of cartilage loss and disease progression in patients with OA of the knee.

Herbs: Boswellia, Curcumin, Hesperidin...

McAlindon TE, Jacques P, Zhang Y, et al. Do antioxidant micronutrients protect against the development and progression of knee osteoarthritis?. *Arthritis Rheum.* 1996;39(4):648-656.

## Essential Micro-Nutrients In Treating Osteoporosis

CALCIUM, VITAMIN D, AND BEYOND

Some studies have shown that the combination of calcium and vitamin D slowed the rate of bone loss or reduced the incidence of fractures, or both.

**Herb:** Horsetail (*Equisetum*): as a nutritive and connective tissue tonic. Tincture: 3-5 ml  
TID

Dawson-Hughes B, Harris SS, Krall EA, Dallal GE. Effect of calcium and vitamin D supplementation on bone density in men and women 65 years of age or older. *N Engl J Med.* 1997;337(10):670-676.

## Essential Micro-Nutrients In Treating Osteoporosis

### Zinc

**Zinc** is essential for the formation of osteoblasts and osteoclasts. It also enhances the biochemical action of vitamin D. Zinc is necessary for the synthesis of numerous proteins in bone formation. **Low zinc levels** have been found in the serum and bone of elderly people with osteoporosis.

Atik OS. Zinc and senile osteoporosis. J Am Geriatr Soc. 1983;31:790-791.

## Essential Micro-Nutrients In Treating Alzheimer's Disease

### Vitamin B12

Findings have suggested that patients with Alzheimer's disease have a defect in the transport of vitamin B12 across the blood-brain barrier or accelerated breakdown of the vitamin in brain tissue.

Herb: Ginkgo biloba extract: 120-240 mg/day

Ikeda T, Furukawa Y, Mashimoto S, Takahashi K, Yamada M. Vitamin B12 levels in serum and cerebrospinal fluid of people with Alzheimer's disease. *Acta Psychiatr Scand.* 1990;82(4):327-329.

## Essential Micro-Nutrients In Treating Dementia

### Magnesium

**Severe magnesium deficiency is a reversible cause of  
dementia...**

**Herb: Ginkgo biloba extract: 120-240 mg/day**

Freyre AV, Flichman JC. Spasmophilia caused by magnesium  
deficit. *Psychosomatics*. 1970;11(5):500-501.

## Essential Micro-Nutrients In Treating Parkinson's Disease

### Vitamin C and E

- Vitamin C & E may be useful for slowing the progression of the disease.
- Supplementation with antioxidants may prevent or reduce the rate of progression of this disease.

- Herb: Bacopa monnieri: tincture: 1-3 ml TID

Fahn S. A pilot trial of high-dose alpha-tocopherol and ascorbate in early Parkinson's disease. *Ann Neurol.* 1992;32 Suppl:S128-S132.

Prasad KN, Cole WC, Kumar B. Multiple antioxidants in the prevention and treatment of Parkinson's disease. *J Am Coll Nutr.* 1999;18(5):413-423.



## Essential Micro-Nutrients In Treating Colds and Immune Deficiency

### Vitamin C & Zinc...

- **Vitamin C demonstrates antiviral and antihistamine effects in vitro and plays important roles in immune function.**
- **Several double blind trials showed that treatment with zinc lozenges significantly reduced the duration of symptoms in adults suffering from colds.**

Wilson CW, Loh HS. Common cold and vitamin C. *Lancet*. 1973;1(7804):638-641.

Mossad SB, Macknin ML, Medendorp SV, Mason P. Zinc gluconate lozenges for treating the common cold. A randomized, double-blind, placebo-controlled study. *Ann Intern Med*. 1996;125(2):81-88.



**Other herbs and supplements for optimal immune function:**

- Astragalus
- Echinacea
- Ginseng
- Elderberry
- Glycyrrhiza

## Essential Micro-Nutrients In Treating Rheumatoid Arthritis

### Zinc!

Many studies demonstrate significantly lower zinc levels in patients with RA than in healthy controls (measured in serum, plasma, or whole blood).

**Herb:** Devil's Claw (*Harpagophytum procumbens*): tincture: 1-3 ml BID-TID

Naveh Y, Schapira D, Ravel Y, Geller E, Scharf Y. Zinc metabolism in rheumatoid arthritis: plasma and urinary zinc and relationship to disease activity. *J Rheumatol*. 1997;24(4):643-646.

**Essential  
Micro-Nutrients  
In Treating Multiple Sclerosis**

**Vitamin B12 (& D)**

**Patients with MS have been reported to have an increased prevalence  
of low serum and/or cerebrospinal fluid vitamin B12 levels...**

Herb: Ginkgo biloba extract: 120-240 mg/day

Reynolds EH, Bottiglieri T, Laundry M, Crellin RF, Kirker SC. Vitamin B12 Metabolism in Multiple Sclerosis. *Arch Neurol.* 1992;49(6):649-652.

## Essential Micro-Nutrients For Treating Depression

### Folic Acid

- Deficiency of folic acid is the most common nutrient deficiency in the world. Studies of depressed patients have shown that 31% to 35% are deficient in folic acid. (800 mcg/day)
- Herb: St. John's wort is now becoming a standard treatment in antidepressant therapy. Extract (0.3% hypericin) 900 to 1800 mg daily.

Godfrey PS, Toone BK, Carney MW, et al. Enhancement of recovery from psychiatric illness by methylfolate. *Lancet*. 1990;336:392-395.

## Essential Micro-Nutrients For Treating Hypercholesterolemia

### Niacin

In several studies, supplementation with of niacin (1.5 - 3.0 g/day ) was found to produce substantial decreases in serum total cholesterol, LDL-C, and triglycerides, and increases in HDL-C. [could initiate tx at 50-100 mg/d]

Guyton JR, Blazing MA, Hagar J, et al. Extended-release niacin vs gemfibrozil for the treatment of low levels of high-density lipoprotein cholesterol. *Niaspan-Gemfibrozil Study Group. Arch Intern Med.* 2000;160(8):1177-1184. doi:10.1001/archinte.160.8.1177

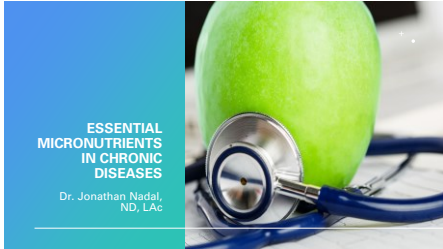
**Herb:** Consider red yeast rice: 600-2,400 mg

## Essential Micro-Nutrients For Treating Kidney Failure

### L-Carnitine

Patients on dialysis tend to be deficient due to carnitine loss during dialysis and decreased synthesis. Consider 500 mg/day after dialysis  
"...findings indicate that L-carnitine therapy improved cardiac dysfunction via the amelioration of the abnormal myocardial fatty acid metabolism, at least in part."

Kaneko M, Fukasawa H, Ishibuchi K, Niwa H, Yasuda H, Furuya R. L-carnitine Improved the Cardiac Function via the Effect on Myocardial Fatty Acid Metabolism in a Hemodialysis Patient. *Intern Med.* 2018;57(24):3593-3596. doi:10.2169/internalmedicine.1055-18



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