



Common Drug Classes, Drug-Nutrient Depletions, & Drug-Nutrient Interactions

Pharmavite LLC

Purpose: For educational use by healthcare professionals only.

Disclaimer: People taking prescription drugs may be more likely to have reduced levels of certain nutrients. Low nutrient levels may lead to other problems. Prescriptions are important to the consumer's health and will function without the recommended dietary supplements. The dietary supplements mentioned here are not intended to replace prescription drugs. It is important to advise consumers to consult with their healthcare provider before beginning a dietary supplement regimen.

DND = Drug Nutrient Depletion

General Recommendation for all Categories: Daily Multivitamin

DRUG CATEGORY	Drug Category Brief Description	Drug-Induced Nutrient Depletions	Additional Suggested Supplements for Nutritional Support*	Dietary Supplements that have Potential for Interactions with Drug (or Drug Class)**
<p>1. ACID-SUPPRESSING DRUGS and ANTACIDS¹⁻⁵</p> <p>Ex: Nexium®, Pepcid®, Prevacid®, Prilosec®, Tagamet® and others</p>	<p>1. H2 antagonists block histamine (H2) receptors on gastric mucosal cells and decrease the production and secretion of acid.</p> <p>2. Proton-Pump Inhibitors block the acid transporter pump on the luminal surface preventing acid from entering the gastric lumen.</p> <p>3. Antacids directly neutralize existing acid in the stomach.</p>	<p>DND: H2 antagonists deplete calcium, folic acid, iron, vitamin B₁₂, and vitamin D.</p> <p>Proton-pump inhibitors deplete magnesium and vitamin B₁₂.</p> <p>RECOMMENDED SUPPLEMENTATION:</p> <ul style="list-style-type: none"> • H2 antagonists and proton-pump inhibitors: <ul style="list-style-type: none"> * Vitamin B₁₂: 25–1000 mcg/day * Magnesium: 250–400 mg/day 	<p>Calcium: 500 mg daily</p> <p>Iron^a: discuss with healthcare provider.</p> <p>Vitamin D^b: 1000–2000 IU daily</p> <p>Zinc^c: 11 mg daily</p>	<p>Goldenseal and Ginger: These supplements may increase stomach acid and thus might interfere with antacids, H2 antagonists, and proton pump inhibitors.</p> <p>Green Tea: Tagamet® (cimetidine) can inhibit the metabolism of caffeine in green tea and significantly reduce its clearance.</p>
<p>2. ANTIBIOTICS^{1-4,6}</p> <p>Ex: Amoxil®, Bactrim®, Ceclor®, Cipro®, Levaquin® and others</p>	<p>Antibiotics are used to treat bacterial infections.</p>	<p>DND: Antibiotics deplete calcium, magnesium, potassium as well as certain B vitamins (B₁-thiamin, B₂-riboflavin, B₃-niacin, B₅-pantothenic acid, B₆, B₉-folic acid, B₁₂) and vitamin K.</p> <p>RECOMMENDED SUPPLEMENTATION:</p> <ul style="list-style-type: none"> • Calcium: 500–1000 mg daily in divided doses • Magnesium: 250–400 mg daily 		<p>Calcium, Iron, Magnesium, and Zinc: When taken concurrently with antibiotics, absorption of both can be affected due to formation of insoluble complexes.</p> <p>Green Tea Catechins: Certain antibiotics (fluoroquinolones) reduce clearance of some green tea constituents (caffeine and theophylline) and may increase the risk of their side effects: nervousness, palpitations, and insomnia.</p> <p>St. John's wort: It causes photosensitivity and may exacerbate the photosensitizing effects of certain antibiotics.</p>
<p>3. ANTIDEPRESSANTS^{1-3, 6-7} <i>(continued page 2)</i></p> <p>Ex: Cymbalta®, Lexapro®, Paxil®, Prozac®, Zoloft® and others</p>	<p>This class of medications increases the levels of one or more of the biogenic amines (e.g. norepinephrine, serotonin, dopamine) in the central nervous system. Clinical improvement from antidepressant therapy generally takes 3–6 weeks.</p>		<p>Folic acid: 240 mcg daily</p>	<p>Melatonin: Melatonin may interact with medications that inhibit serotonin reuptake including a number of antidepressant medications. Endogenous melatonin levels are reduced by SSRI medications.</p>

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3. ANTIDEPRESSANTS^{1-3, 6-7} <i>(continued from page 1)</i>				<p>SAM-e: Studies suggest SAM-e may augment the actions of anti-depressant drugs in individuals who are refractory to, or do not get full remission from their anti-depressants.</p> <p>St. John's wort and 5-HTP: St. John's wort and other supplements such as 5-HTP, in combination with drugs that increase CNS serotonin levels, can increase the risk of serotonergic side effects, including serotonin syndrome.</p>
4. ANTIEPILEPTICS¹⁻³ (Anticonvulsants) Ex: Dilantin®, Lyrica®, Mysoline®, Tegertol®, Trileptal® and others	These drugs work by decreasing the firing of aberrant neurons in the brain and/or decreasing the spread of abnormal activity to the surrounding regions of the brain.		Calcium ^d : 500 mg daily Vitamin B ₁₂ ^e : 25–1000 mcg daily Vitamin D ^d : 1000–2000 IU daily	Use caution with the following supplements since they may interfere with the effectiveness of antiepileptic drugs. Folic acid Ginkgo biloba Niacin St. John's wort
5. ANTIPSYCHOTICS¹⁻³ <i>(continued page 3)</i> Ex: Abilify®, Haldol®, Seroquel®, Risperdal®, Zyprexa® and others	Antipsychotics block receptors for neurotransmitters (i.e. dopamine, serotonin). They can reduce the symptoms of schizophrenia, decrease agitation and/or aggression associated with other psychiatric conditions and may stabilize mood in bipolar disease.	<p>DND: Vitamin B₂ (Riboflavin)</p> <p>RECOMMENDED SUPPLEMENTATION:</p> <ul style="list-style-type: none"> • Daily Multivitamin • B Vitamins 	Vitamin C ^f : 250–500 mg daily	<p>Echinacea: Echinacea may inhibit the human drug metabolizing enzyme CYP1A2 leading to decreased clearance (increased blood levels) of Zyprexa®, and this increases potential for side effects.</p> <p>Evening Primrose Oil: Seizures have been reported in people with schizophrenia treated concomitantly with phenothiazine drugs and evening primrose oil.</p> <p>Ginkgo biloba: Ginkgo has been report to cause seizures or lower seizure threshold. Thus, in combination with drugs that lower seizure threshold (including antipsychotics), there may be a significant increase in risk of seizures.</p> <p>Ginseng: Ginseng may exacerbate some psychiatric conditions including hysteria, mania, and schizophrenia and thus compromise the therapeutic benefit of antipsychotics. It may also inhibit some of the drug metabolizing enzymes responsible for clearance of antipsychotic drugs.</p>

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5. ANTIPSYCHOTICS¹⁻³ <i>(continued from 3)</i>				<p>Goldenseal: Goldenseal can inhibit cytochrome P450 2D6 (CYP2D6) and might affect effectiveness of several antipsychotics as well as impact potential for side effects.</p> <p>St. John's wort: St. John's wort in combination with antipsychotic drugs may lead to unpredictable effects. It is also known to cause photosensitivity and this risk may be increased in combination with certain antipsychotics (phenothiazines), which also can cause photosensitivity.</p>
6. ANXIETY MEDICATION¹⁻³ (Benzodiazepines) Ex: Ativan®, Prosom®, Restoril® Valium®, Xanax® and others	Benzodiazepines are a class of drugs primarily used to treat anxiety.	<p>DND: Calcium</p> <p>These medications decrease calcium absorption by increasing metabolism of vitamin D, which is needed for calcium absorption.</p> <p>RECOMMENDED SUPPLEMENTATION:</p> <ul style="list-style-type: none"> • Calcium: 500–1000 mg daily in divided doses 	Melatonin ⁹ : 1–3 mg daily	<p>Kava: The combination of kava and benzodiazepines is not recommended due to their similar effects.</p>
7. BIRTH CONTROL¹⁻³ (Oral Contraceptives)	Synthetic and semi-synthetic analogs of estrogen and/or progesterone are used to prevent pregnancy by (1) inhibiting ovulation, (2) thickening cervical mucus and/or (3) diminishing endometrial integrity.	<p>DND: Folic acid Magnesium Vitamin B₆</p> <p>RECOMMENDED SUPPLEMENTATION:</p> <ul style="list-style-type: none"> • Folic acid: 240 mcg daily • Magnesium: 250–400 mg daily • Vitamin B₆: 5 mg daily 	Calcium ^h : 500 mg daily	<p>Copper and Iron: Oral contraceptives may increase serum copper and iron levels.</p> <p>Garlic and St. John's wort: Garlic and St. John's wort supplements may decrease effectiveness of oral contraceptives. St. John's wort also causes photosensitivity which may be exacerbated by oral contraceptives.</p> <p>Green Tea: Use caution with green tea and oral contraceptives. Oral contraceptives can decrease caffeine clearance by 40–65% and may increase adverse effects of caffeine in green tea. Adjust dose or discontinue if necessary.</p>

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<p>8. BLOOD PRESSURE MEDICATION^{1-3,8} (Anti-hypertensives)</p> <p>Ex: ACE Inhibitors, Angiotensin Receptor Blockers (ARBs), Beta Blockers, Calcium Channel Blockers.</p>	<p>The major classes of anti-hypertensive drugs include: ACE inhibitors, ARBs, beta blockers, and calcium channel blockers. These drugs help reduce blood pressure by either decreasing total peripheral resistance, or cardiac output or both.</p>	<p>DND: ACE inhibitors deplete zinc.</p> <p>Calcium channel blockers deplete potassium.</p> <p>RECOMMENDED SUPPLEMENTATION:</p> <ul style="list-style-type: none"> • ACE inhibitors- Zinc: 11 mg daily • Calcium channel blockers-Potassium: ≤ 100 mg daily 	<p>CoQ10: 100–200 mg daily</p> <p>Iron: Take as directed by healthcare provider</p>	<p>Calcium (with calcium channel blockers only): Calcium supplements may interfere with the blood pressure lowering activity of these drugs.</p> <p>CoQ10 and Fish Oil: These supplements may decrease blood pressure in combination with anti-hypertensive drugs. Monitor blood pressure regularly.</p> <p>Garlic, Ginkgo biloba & St. John's wort: These supplements have the potential to interfere with the cytochrome P450 system and therefore affect the metabolism and/or clearance of drugs.</p> <p>Green Tea and Goldenseal: These supplements may affect therapeutic benefits of anti-hypertensive drugs.</p> <p>Melatonin: Melatonin may impair the efficacy of some calcium channel blockers. Monitor for changes in therapeutic efficacy and adjust doses as necessary and/or avoid use of melatonin with this drug class.</p> <p>Potassium (with ACE inhibitors and ARBs only): Taking these drugs along with potassium supplements increases risk for hyperkalemia due to a decrease in renal potassium excretion.</p> <p>Vitamin D: Vitamin D supplements interfere with the activity of a calcium channel blocker (verapamil).</p>
<p>9. BLOOD THINNING MEDICATION¹⁻³ (Anticoagulants/Antiplatelets) <i>(continued page 5)</i></p> <p>Ex: Aspirin, Coumadin® (Warfarin), Plavix®, Ticlid® and others.</p>	<ol style="list-style-type: none"> 1. <u>Anticoagulants</u> decrease the potential for clotting via the Prothrombin-Thrombin-Fibrinogen cascade. 2. <u>Antiplatelets</u> decrease potential for clots as a result of impacting platelet aggregation. 			<p>Use caution with the following supplements as they may increase effectiveness of medication and potentially increased risk of bleeding.</p> <p>Bilberry Cod Liver Oil Dong Qual Evening Primrose Oil Feverfew Fish Oil Flaxseed Oil Garlic Ginger Root Ginkgo biloba Ginseng Glucosamine Goldenseal Grape Seed Extract Green Tea Horse Chestnut Milk Thistle Saw Palmetto Vitamin C Vitamin E</p>

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9. BLOOD THINNING MEDICATION ¹⁻³ (Anticoagulants/Antiplatelets) <i>(continued from page 4)</i>				Vitamin K: People taking anticoagulant medications should maintain consistent amount of vitamin K from their diet and supplement regimen, while avoiding fluctuations in intake or large doses of vitamin K. Coenzyme Q10 (CoQ10): CoQ10 is structurally similar to vitamin K and may interfere with effectiveness of anticoagulants.
10. CHOLESTEROL LOWERING MEDICATION (Statins) ¹⁻³ Ex: Crestor®, Lescol®, Lipitor®, Mevacor®, Zocor® and others	Statins inhibit the HMG CoA reductase enzyme—a key step in the hepatic synthesis of cholesterol. The reduction of cholesterol synthesis subsequently increases the liver's removal of circulating LDL cholesterol. Note: HMG CoA reductase is also a key enzyme in the synthesis of coenzyme Q10 (CoQ10)	DND: Fat soluble vitamins (vitamins A, D, E, K) may be affected by medication use. RECOMMENDED SUPPLEMENTATION: <ul style="list-style-type: none"> • Vitamin D: 1000–2000 IU daily 	CoQ10 ⁶ : 100–200 mg daily Fish Oil: 500–1000 mg EPA + DHA daily	Garlic (containing allicin) and St. John's wort: These supplements may impact cytochrome P450 metabolism of some statins and affect their effectiveness. Red Yeast Rice: Red yeast rice contains lovastatin which also lowers blood cholesterol levels. This supplement should not be taken with cholesterol-lowering drugs unless under the supervision of healthcare professional. Vitamin A: Long term use of cholesterol lowering drugs may increase vitamin A levels in the blood. Vitamin A levels may need to be monitored in some individuals.
11. CORTICOSTEROIDS ²⁻³ Ex: Prednisone	Corticosteroids are synthetic compounds that mimic the effects of hormones naturally produced in the body by adrenal glands. They are known for relieving inflammation, pain and discomfort resulting from various health conditions	DND: Calcium Magnesium RECOMMENDED SUPPLEMENTATION: <ul style="list-style-type: none"> • Calcium: 500 mg daily • Magnesium: 250–400 mg daily 		Use caution with the following supplements as they may interact with and/or affect effectiveness of medication. Herbal Supplements Licorice St. John's wort
12. DIABETES MEDICATION (Oral Hypoglycemics) ^{1-3,10-11} Ex: Avandia®, Diabeta®, Glucophage® (Metformin), Prandin®, and others		DND: Folic acid Vitamin B₁₂ RECOMMENDED SUPPLEMENTATION: <ul style="list-style-type: none"> • Folic acid: 120–240 mcg daily • Vitamin B₁₂: 25–1000 mcg daily 		Use caution with the following supplements as they may interfere with the effectiveness of oral hypoglycemic drugs and/or cause additive blood glucose lowering effects and increase risk of hypoglycemia when used in combination. Alfalfa Aloe Vera Alpha Lipoic Acid Bilberry CoQ10 Chromium Garlic Ginkgo biloba Ginseng Green Tea Melatonin Milk Thistle Niacin St. John's wort Vitamin K₁

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<p>13. DIGIOXIN¹⁻³</p> <p>Ex: Cardoxin[®], Digitek[®], Lanoxicaps[®], Lanoxin[®] and others</p>	<p>Digoxin is derived from the leaves of the Digitalis lantata plant (a variety of foxglove). It is used to treat heart failure and atrial fibrillation.</p>	<p>DND: Calcium Magnesium Phosphorus Potassium Vitamin B₁ (Thiamin)</p> <p>RECOMMENDED SUPPLEMENTATION:</p> <ul style="list-style-type: none"> • Calcium: 500–1000 mg daily in divided doses • Magnesium: 250–400 mg daily • Potassium: ≤ 100 mg daily 		<p>Calcium: High levels of calcium increase the likelihood of a toxic reaction to digoxin. Low levels of calcium interfere with the function of digoxin. Consistent intake of calcium and monitoring of calcium levels by a healthcare professional is recommended.</p> <p>Hawthorn: The activity of digoxin may be enhanced by hawthorn supplements.</p> <p>St. John's wort: St. John's wort supplements may reduce serum levels of digoxin.</p>
<p>14. DIURETICS^{1-3,9}</p> <p>Ex: Aldactone[®], Diamox[®], Lasix[®], Microzide[®] (HCTZ), Zaroxolyn[®] and others</p>		<p>DND: Loop and thiazide diuretics deplete magnesium, potassium, and zinc. Potassium sparing diuretics deplete folic acid.</p> <p>RECOMMENDED SUPPLEMENTATION:</p> <ul style="list-style-type: none"> • Loop and Thiazide Diuretics- Magnesium: 250–400 mg daily • Potassium: ≤ 100 mg daily • Zinc: 11 mg daily • Potassium-Sparing Diuretics- Folic Acid: 240 mcg daily 		<p>Calcium: Thiazide diuretics reduce calcium excretion by the kidneys and may increase risk for hypercalcemia, metabolic alkalosis, and possible renal failure.</p> <p>CoQ10 and Fish Oil: When taken together with diuretics, these supplements may have additive blood pressure lowering effects and increase risk for hypotension.</p> <p>Ginkgo biloba: Ginkgo may reduce the effectiveness of some diuretics.</p>
<p>15. HORMONE REPLACEMENT THERAPY (Estrogens)³</p> <p>Ex: Estrace[®], Premarin[®], Prempro[®]</p>	<p>Hormone replacement therapy is used to replace female hormones that are no longer produced after menopause.</p>	<p>DND: Folic acid Magnesium Vitamin B₆ Vitamin B₁₂</p> <p>RECOMMENDED SUPPLEMENTATION:</p> <ul style="list-style-type: none"> • Folic acid: 240 mcg daily • Magnesium: 250–400 mg daily • Vitamin B₆: 5 mg daily • Vitamin B₁₂: 25–1000 mcg daily 		<p>Caffeine: The stimulating effects of caffeine may be increased due to inhibition of metabolism or clearance of caffeine by hormone replacement therapy.</p> <p>Calcium and Vitamin D: Calcium and vitamin D may increase absorption of hormone replacements. These supplements are recommended to improve bone mineral density during estrogen therapy.</p> <p>Red Clover Extract and Soy Isoflavones: These supplements may interfere with the activity or absorption of hormone replacement therapy.</p> <p>St. John's wort: St. John's wort may alter hormone metabolism including estrogen and progesterone. This supplement is not recommended during hormone replacement therapy.</p> <p>Zinc and Magnesium: Excretion of these minerals is reduced by hormone replacement therapy.</p>

*Suggested supplements that may support overall health and are not at all intended to replace any prescription medications.

**These supplements listed may have the potential to interact with the drug or drug classes. Use caution or avoid these supplements unless approved by your physician or preferred healthcare provider.

- a. Iron is depleted by H2 antagonists. However, iron should not be routinely supplemented while taking H2 antagonists. High levels of iron can cause unnecessary oxidative stress and other undesirable effects. Iron supplementation is only recommended for those with effects of iron depletion (i.e. anemia).
- b. Vitamin D is important for calcium absorption.
- c. Zinc is depleted by H2 antagonists. However, zinc supplementation may not be recommended for all individuals. One should be advised to consult their healthcare provider on best option for supplementation with consideration for health status, health history, and current medication use.
- d. Dilantin, Phenobarbital, and Tegretol can increase the metabolism/clearance of vitamin D, leading to a subsequent decrease in calcium absorption. Individuals taking these medications for 6 months or more should consider calcium and vitamin D supplements.
- e. Dilantin, Phenobarbital, and Mysoline have been reported to reduce vitamin B₁₂ absorption as well as serum and cerebrospinal fluid vitamin B₁₂ levels in some individuals. Megaloblastic anemia and neuropsychiatric side effects have been associated with these drugs.
- f. Vitamin C, taken in adjunct with atypical antipsychotics, may reduce oxidative stress.
- g. Endogenous melatonin is depleted by benzodiazepines.
- h. Calcium supplementation may be warranted with oral contraceptive use to help support bone health if dietary calcium intake is inadequate.
- i. Beta blockers can deplete CoQ10.
- j. Low dose ferrous sulfate supplements may help alleviate ACE inhibitor-related cough.
- k. Statins can deplete CoQ10 levels.
- l. EPA and DHA omega-3 fatty acids help support heart health.

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◇Additional references available upon request.



ABOUT PHARMAVITE LLC

For 45 years, Pharmavite has been a trusted leader in the wellness industry, recognized for providing high-quality vitamin, mineral and herbal supplements under its Nature Made® brand.

Nature Made® is the number one selling national vitamin and supplement brand in traditional retail scanning outlets.* Nature Made® adheres to strict manufacturing standards and was the first national supplement brand to have a product verified by United States Pharmacopeia (USP), and it is the national supplement brand with the most products carrying the USP Verified Mark-verification that products meet stringent quality criteria for purity and potency.

Additionally, Pharmavite's commitment to Good Manufacturing Practices (GMPs) and quality extends to every aspect of our production, from purchasing high-quality raw materials, to the meticulous production and testing of every product. The dietary supplement industry is regulated by the U.S. Food and Drug Administration and the Federal Trade Commission, as well as by government agencies in each of the 50 states.

Pharmavite's emphasis on health and nutrition knowledge, emerging scientific research and new technology has enabled us to forge compelling partnerships with many distinguished educational institutions. The end result is that Pharmavite stays on the leading edge of key scientific advancements and innovations that make a difference in people's lives. Based in Northridge, California, Pharmavite LLC operates as a subsidiary of Otsuka Pharmaceutical Co., Ltd. For more information, please visit <http://www.pharmavite.com>.

*Nature Made® is the #1 selling national vitamin and supplement brand in traditional retail scanning outlets (based in part on data reported by Nielsen through its Scantrack® service for the Total Vitamins category for the 52-week period ending 12/31/2016 in US xAOC and US Food Drug Mass channels. ©2017 The Nielsen Company).