
APPENDIX C

**INTERACTIONS OF DRUGS,
NUTRITIONAL SUPPLEMENTS
AND DIETARY COMPONENTS**

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TABLE C.1 — DRUG-NUTRIENT INTERACTIONS

Category	Drug Type	Affected Nutrients	Mechanism
Analgesic	Aspirin, salicylates	Vitamin C, Folic Acid, Glycine, Histidine, Potassium, Zinc, Vitamin K	Drug most likely to produce vitamin C deficiency in normal individuals. Chronic use can cause iron depletion due to blood loss in GI tract. Aspirin depletes folic acid by displacing bound serum folate. Causes urinary loss of potassium. Depletion-related symptoms: weakness & low energy from anemia. Salicylates in high doses can reduce vitamin K epoxide reductase, resulting in vitamin K deficiency. Detoxification effects: Salicylates can decrease histidine levels. Aspirin overdose depletes plasma glycine.
Female Hormone	Estrogens	Vitamin B ₆ , Folic Acid	Estrogen metabolism interferes with absorption of both folic acid and vitamin B ₆ . Since B ₆ is involved with synthesis of serotonin, depletion can cause anxiety, depression, sleep disturbances, and irritability. Anemia from folate depletion causes weakness and low energy. Low levels of folic acid are associated with increased incidence of birth defects, cervical dysplasia, and elevated homocysteine, which is a major risk factor for cardiovascular disease.
	Oral Contraceptives	Vitamins A, B ₂ , B ₆ , B ₁₂ , C, Folic Acid, Zinc, Magnesium	Studies show reduced serum levels of nutrients listed with use of OCs. Depletions of vitamins B ₆ , B ₁₂ , and C are not as frequently seen with the use of newer low dose estrogen OCs. Zinc deficiency can lead to depressed growth, poor immune function, and alopecia. OCs may increase serum retinol.
Diuretic	Hydralazine (Apresoline)	Vitamin B ₆ , Magnesium	These antihypertensives also are diuretics and block an enzyme which can cause vitamin depletion. B ₆ deficiency can cause depression and/or nerve damage causing numbness or tingling of hands or feet.
	Loop Diuretics: Furosemide (Lasix), Bumetamide (Bumex), Torsemide (Demadex), Ethacrynic acid (Edecrin)	Magnesium, Vitamin B ₁ , Vitamin B ₆ , Potassium, Zinc	Diuretic-induced magnesium and potassium deficiencies can cause increased irregularities in heartbeat blood pressure. Increased urination may also cause depletion of vitamins B ₁ and B ₆ . Chronic use of furosemide can cause B ₁ deficiency.
	Thiazide Diuretics: Hydrochlorothiazide (Esidrix, HydroDIURIL), Indapamide (Lozol), and Metolazone (Zaroxolyn)	Magnesium, Potassium, Sodium, Zinc	Urinary depletion of magnesium and potassium can exacerbate irregular blood pressure and cardiac function. Zinc depletion can suppress wound healing and immune function. Hyponatremia could also develop.
	Potassium-Sparing Diuretics: Amiloride (Midamor, Moduretic), Triamterene (Dyazide, Dyrenium, Maxzide), Spironolactone (Aldactazide, Aldactone)	Magnesium, Potassium, Sodium, Zinc	Inhibits enzyme necessary for folic acid synthesis. Chronic use can lead to folic acid depletion. Diuresis can also cause calcium depletion. CAUTION: taking potassium with potassium-sparing diuretics could cause hyperkalemia. <i>(Symptoms = weakness, impairment of speech cognition)</i>
Anti-hyperlipidemia	HMG-CoA Reductase Inhibitors: Lovastatin (Mevacor), Simvastatin (Zocor), Pravastatin (Pravachol), Fluvastatin (Lescol)	CoEnzyme Q ₁₀	These drugs block a liver enzyme necessary for synthesis of cholesterol and CoQ ₁₀ . CoQ ₁₀ depletion can affect cellular energy production, regulation of blood pressure, and cardiac function.
	Bile Acid Sequestrant: Cholestyramine (Questran) and Colestipol (Colestid)	Vitamins A, D, E, K, B ₂ , B ₃ , and B ₁₂ , β-Carotene, Folic Acid, Iron, Fat	Nutrient depletions caused by poor absorption. Long time intervals are required between nutritional supplements and pharmaceutical dosing. Fat absorption is also inhibited. May decrease enterohepatic resorption of vitamin B ₁₂ .

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Category	Drug Type	Affected Nutrients	Mechanism
Anti-seizure	Barbiturates: Phenobarbital (Luminal Sodium), Pentobarbital (Nembutal Sodium), Thiopental, Secobarbital (Seconal), Methohexital	Vitamin D, Calcium, Folic Acid	Long-term use interferes with vitamin D metabolism and may reduce the absorption of calcium. Phenobarbital may reduce plasma levels of vitamins D and E. Folic acid levels are lowered in both plasma and erythrocytes.
	Phenytoin (Dilantin), Carbamazepine (Tegretol), Primidone (Mysoline)	Vitamins D, E, Calcium, Folic Acid, Vitamin B ₁₂ , Biotin	Decreases vitamin D availability, reducing absorption of calcium. Decreases serum folate and Phenytoin may decrease vitamins D and E in plasma. Vitamin B ₁₂ and folic acid absorption are also decreased. Can increase biotin metabolism, decreasing biotin plasma levels. Carbamazepine inhibits folate absorption; long-term use could create anemia. Carbamazepine decreases plasma levels of vitamin E and pyridoxal 5'-phosphate. These depletions can result in bone disease, anemia, neurological problems, as well as gum and periodontal disease.
Anti-inflammatory	Corticosteroids: Prednisone (Meticorten), Dexamethasone (Decadron), Methylprednisolone (Medrol)	Calcium, Vitamin D, Potassium, Selenium	These drugs reduce levels of vitamin D and decrease the absorption of calcium, resulting in bone loss and skeletal problems. Long-term use may also deplete potassium, selenium, and zinc.
	Gout Medications: Colchicine (ColBENEMID), Probenecid (Benemid)	β-Carotene, Folate, Vitamin B ₂ and D, Potassium, Sodium	Colchicine inhibits the absorption of all these nutrients. Changes in pH cause GI symptoms and B ₁₂ malabsorption. Decreases folate blood levels. Probenecid may inhibit absorption of B ₂ and renal tubular secretion. Symptoms from these nutrient depletions include weakness and peripheral neuritis.
	Nonselective NSAIDs: Indomethacin, Indocin	Vitamin C, Folic Acid, Amino Acids, Iron	Decreases absorption of both vitamin C and folic acid. Increases rate of gastric emptying which decreases absorption of amino acids. Indocin can cause iron deficiency due to blood loss.
	Other Nonselective NSAIDs: Ibuprofen, Naproxen (Naprosyn), Sulindac (Clinoril)	Folic Acid	These anti-inflammatory drugs competitively inhibit the enzymatic synthesis of folic acid. Long-term use could lead to anemia. Low levels of folic acid are associated with increased incidence of birth defects, cervical dysplasia, and elevated homocysteine, a major risk factor for cardiovascular disease.
Anti-rheumatic	Sulfasalazine (Azulfidine)	Folic Acid	Intestinal absorption of folic acid is inhibited, which can lead to anemia-related weakness and low energy.
	Metal-binding: Penicillamine	Copper, Vitamin B ₆ , Zinc	When taken together, both these nutrients and penicillamine are poorly absorbed. By binding PSP, can result in functional vitamin B ₆ deficiency.

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Category	Drug Type	Affected Nutrients	Mechanism
Anti-bacterial	Broad-spectrum: Amoxicillin / Clavulanic Acid (Augmentin), Vancomycin Combination anti-fungal & anti-bacterial: Amphotericin B, nonlipid (Fungizone)	All B-Vitamins, Biotin, Vitamin C, Vitamin K	Antibiotics kill pathogenic and beneficial bacteria such as Acidophilus and Bifidus. The "friendly bacteria" produce vitamins B ₂ , B ₃ , B ₆ , B ₁₂ , K, biotin, folic acid, pantothenic acid, and a number of natural antibiotics in our intestines. Destroying acidophilus & bifidus bacteria can cause nutrient depletions and impair the immune system.
	Tetracycline Antibiotics: Demeclocycline, Doxycycline, Methacycline, etc.	Calcium, Magnesium, Manganese, Zinc, Vitamin B ₆ , Vitamin B ₁₂	Tetracyclines chelate calcium, magnesium, and zinc. Long term use can cause mineral depletions. Take manganese separately from antibiotic. Tetracyclines also interfere with the absorption of vitamins B ₆ and B ₁₂ .
	Cycloserine, Ethionamide, Isoniazid (INH)	Vitamin B ₆	Can cause functional vitamin B ₆ deficiency by binding P5P. Ethionamide increases vitamin B ₆ requirements.
	Cephalosporins: Cefoperazone, Cefotetan, Cefamandole, Latamoxef, Cefazolin	Vitamin K	Inhibit a liver enzyme that can result in vitamin K deficiency and hypoprothrombinemia.
	Fluoroquinolones: Ciprofloxacin, Gatifloxacin, Levofloxacin, Lomefloxacin, etc.	Zinc	When taken together, both Zn and these antibiotics have decreased absorption.
Bactrim (also Septra, Trimplex)	Folate	Mild folate antagonists with only minimal risk. However, long-term use and/or high dose usage may create a deficiency, especially in compromised patients.	
Anti-fungal	Ketoconazole (Nizoral)	Vitamin D	This antifungal may inhibit biosynthesis and breakdown of 1,25-dihydroxy-Vitamin D.
Anti-Diabetic Drugs	Sulfonylureas: Diabeta (Glynase, Micronase), Tolinase	Coenzyme Q ₁₀	Inhibition of the NADH-oxidase enzyme can lead to a coenzyme Q ₁₀ deficiency
	Biguanides: Metformin (Glucophage)	Vitamin B ₁₂	Competitive inhibition of vitamin B ₁₂ absorption could cause depletion in some individuals.
	Diabetic gastroparesis and heartburn: Metaclopramide HCl (Reglan)	Vitamin B ₂	May inhibit absorption and renal tubular secretion of vitamin B ₂ .
Antacid	Aluminum-containing (Gaviscon, Maalox, Mylanta), Calcium-containing (Mylanta, Roloids, Tums), Magnesium-containing (Gaviscon, Maalox, Mylanta), Sodium Bicarbonate (Alka Seltzer)	Calcium, Phosphorus, Copper, Iron, Magnesium, Manganese, Potassium, Zinc, Protein, Folic acid, Vanadium	An alkaline pH inhibits the absorption of these nutrients. Chronic use can lead to skeletal problems due to calcium & phosphate depletion. The digestion of protein is also diminished. Sodium bicarbonate-altered intestinal pH specifically inhibits the absorption of folic acid. Magnesium-containing antacids can decrease manganese absorption if taken concomitantly. Aluminum hydroxide may decrease vanadium absorption.
	H-2-Receptor Antagonists: Cimetidine (Tagamet), Famotidine (Pepcid), Nizatidine (Axid), Ranitidine (Zantac)	Vitamin B ₁₂ , Calcium, Folic Acid, Vitamin D, Iron, Zinc, Protein	Malabsorption of dietary B ₁₂ , iron, and folic acid by H-2 antagonists may contribute to nutrient depletions. Altered pH may also reduce absorption of calcium, vitamin D, and zinc. Altering gastric pH also interferes with digestion of protein. Folic acid depletion is associated with increased incidence of birth defects, cervical dysplasia, and elevated homocysteine, a major risk factor for cardiovascular disease.

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Category	Drug Type	Affected Nutrients	Mechanism
Antacid	Proton Pump Inhibitors: Omeprazole (Prilosec), Lansoprazole (Prevacid), Rabeprazole (Aciphex)	Calcium, Vitamin B ₁₂ , Protein	By altering the gastric pH, these drugs may cause malabsorption of vitamin B ₁₂ . Probable interference with protein digestion. Concomitant use of these medications with calcium may reduce calcium absorption.
Anti-arrhythmia	Digoxin (Lanoxin)	Calcium, Magnesium	Increased urinary excretion of both calcium and magnesium can lead to deficiencies. Magnesium deficiencies increase likelihood of cardiac dysrhythmias and atrial fibrillation.
	Beta Blockers: Propranolol (Inderal), Metoprolol (Lopressor), etc.	Coenzyme Q ₁₀	These drugs antagonize the activity of the enzymes involved in the synthesis of coenzyme Q ₁₀ . Deficiency can cause heart, blood pressure, and immune system-related problems.
Psychiatric Medications	Tricyclic Antidepressants: Amitriptyline (Elavil), Nortriptyline (Pamelor), Imipramine (Tofranil), Desipramine (Norpramin), Doxepin (Sinequan), etc.	Coenzyme Q ₁₀ , Vitamin B ₂	Tricyclics inhibit enzymes necessary for production of coenzyme Q ₁₀ . Deficiency can cause cardiovascular symptoms. Both Elavil & Tofranil deplete vitamin B ₂ by interfering with absorption. Deficiency can cause skin, neurological and energy problems.
	Antipsychotic Agents: Chlorpromazine (Thorazine), Thiothexane (Navane), Thioridazine (Mellaril), Fluphenazine esters (Prolixin), etc.	Vitamin B ₂ , Coenzyme Q ₁₀	These drugs inhibit the absorption of vitamin B ₂ & coenzyme Q ₁₀ . May inhibit conversion of riboflavin (to FMN and FAD). Depletion of these vitamins can cause skin, neurological, and energy-related problems.
	Mood Stabilizer: Valproic acid	Vitamin B ₆	Can reduce plasma P5P.
Weight management	Orlistat (Xenical)	Vitamins A, D, E, K	May decrease exocrine output and reduces fat absorption.
	Sibutramine (Meridia)	Tyrosine, Tryptophan	Simultaneous inhibition of serotonin (by 53%), norepinephrine (by 54%), and dopamine (by 16%)
Laxative	Mineral Oil, Sennosides (Agoral, Haley's M-O)	Vitamins A, D, E, and K, β-Carotene	Inhibits absorption—fat soluble nutrients dissolve in the mineral oil and are lost when the oil is excreted.
	Docusate/ Phenolphthalein (Feen-a-Mint)	Potassium	Causes decreased nutrient absorption due to increased intestinal motility and mucosal permeability.
	Bisacodyl (Correctol, Dulcolax)	Potassium	Intense peristalsis and rapid bowel emptying can cause hypokalemia.
Anti-proliferative (Chemotherapy)	Chemotherapy drugs	Most Nutrients	Many chemotherapy drugs cause nausea, vomiting, and significant damage to gastric and intestinal mucosa. These factors cause decreased appetite and malabsorption leading to a wide variety of nutrient depletions.
Anti-asthmatic	Theophylline (Theo-Dur)	Vitamin B ₆	Inhibits enzyme pyridoxal kinase causing vitamin B ₆ depletion.
Anti-clotting	Warfarin sodium (Coumadin)	Vitamin K	Interferes with the enzyme responsible for the synthesis of vitamin K.
Anti-viral	Zidovadine, Retrovir (AZT)	Copper, Zinc	Drug causes specific depletion of both copper and zinc.
Anti-bone resorptive	Bisphosphonates: Etidronate (Didronel), Pamidronate (Aredia), Alendronate (Fosamax), Risedronate (Actonel), Tiludronate (Skelid)	Zinc	When taken together, both zinc and the bisphosphonate have reduced absorption.

TABLE C.2 — NUTRIENT SUPPLEMENTS

Supplement Component	Affected Nutrient(s)	Mechanism
Boron, boric acid	Vitamin B ₂	Displaces riboflavin binding and increases excretion.
Calcium	Iron, Magnesium, Manganese, Zinc	May depress zinc absorption in postmenopausal women. Calcium (over 2g) can decrease absorption of magnesium. Calcium and manganese taken together result in decreased absorption of manganese.
Chromium	Vanadium	May decrease vanadium absorption.
Copper	Zinc	Taking these essential minerals together may decrease copper absorption.
Iron	Copper, Manganese, Vanadium, Zinc	When taken together, absorption of both iron and these essential minerals can be reduced. High-dose nonheme iron can decrease copper status. Ferrous ion can decrease absorption of vanadium.
Magnesium	Manganese	Concomitant intake of these nutrients can reduce absorption of manganese.
Molybdenum	Copper	High intake of molybdenum can decrease copper status.
Pantothenic acid (high-dose)	Biotin	Can decrease absorption of biotin by competing for the same uptake mechanism in colonocytes.
Phosphate salts	Magnesium, Zinc	When taken together, mineral absorption can be inhibited.
Phytosterols and phytostanols	Vitamin E	May lower plasma vitamin E.
Potassium (Chloride): Kaon-CL, Klor-Con, K-Dur, K-Tab, Slow-K, etc.	Vitamin B ₁₂	Slow release of potassium chloride salts alters intestinal pH, which decreases absorption of vitamin B ₁₂ . Depletion can cause weakness and tiredness associated with anemia.
Psyllium	Vitamin B ₂	Decreases absorption of riboflavin when taken together.
Sodium alginate	Calcium, Magnesium	Decreases absorption of these minerals.
Squalene	Vitamin K	May decrease absorption of vitamin K if taken together.
Vitamin A (high-dose)	Vitamin K	High doses of vitamin A may decrease vitamin K.
Vitamin C	Copper	1500 mg vitamin C has been shown to decrease copper transporting protein.
Vitamin E (high-dose)	Vitamin K	A vitamin E metabolite can inhibit vitamin K-dependent gamma-glutamyl carboxylase activity.

TABLE C.3 — DIETARY COMPONENTS

Food Component	Affected Nutrient	Mechanism
Alcohol	Vitamin B ₆	High alcohol intake increases P5P catabolism.
Chloride	Vanadium	May decrease absorption of vanadium.
EDTA	Vanadium	May decrease absorption of vanadium.
Fructose	Copper	High-fructose diets can decrease copper.
Phytic Acid or Inositol hexaphosphate	Calcium, Chromium, Copper, Manganese, Magnesium, Zinc	Foods high in phytic acid can reduce absorption of these minerals. Inositol hexaphosphate may depress absorption of calcium, magnesium, and zinc.
Olestra	Vitamins A, D, E, K	Inhibits absorption of vitamins.
Oxalic acid	Calcium, Magnesium, Manganese, Zinc	Foods high in oxalic acid can reduce absorption of these minerals.
Sulfites, Tea, coffee, and decaf coffee	Vitamin B ₁ (Thiamin), Zinc	Taken together with vitamin B ₁ , these foods can inactivate the vitamin. Caffeine and tannins can decrease zinc absorption.



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>

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)**
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>

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>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. Anticoagulants decrease the potential for clotting via the Prothrombin-Thrombin-Fibrinogen cascade. 2. Antiplatelets 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>

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)**
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

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>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>