

Calcium

What it does

Everyone knows that calcium is important for bone & teeth health, and that is where 99% of it is found within the body. It is important to get enough calcium during the teen and early adult years which is the time when one's body is rapidly building bone tissue that will serve a person for the rest of their life. This is also the age group that is most likely to fall short of calcium intake. After age 30 bone mass and density starts to gradually fall, and it is especially so for women after menopause. Keeping calcium intake up for the second half of life can help slow down the risk of osteoporosis and fractures. Vitamin C can help with the absorption of calcium.

It is also involved with nerve transmission, muscle contraction, blood clotting, enzyme function, and the cardiovascular system. The functioning of the nervous system is calcium's primary role.

There is some research that calcium from diet but not supplements is associated with lower risk of macular degeneration. Getting it from supplements has led to inconsistent findings, meaning some found an association with higher, some with lower rates of macular degeneration. It may also help with PMS symptoms, and high calcium intake is associated with lower risk of colon cancer, but there is conflicting research from other studies. Dairy increases insulin-like growth factor (IGF-1) which is involved with cell proliferation and growth. And so IGF-1 levels have a positive correlation with cancer and especially prostate. Observations have been made that there is a high risk for prostate cancer among those who have the highest dairy intake and animal protein.

Symptoms of deficiency

- ❖ muscle cramps or spasms
- ❖ numbness
- ❖ tingling sensation
- ❖ poor appetite
- ❖ seizures
- ❖ aching or tenderness in the bones
- ❖ PMS cramps
- ❖ fatigue
- ❖ osteoporosis symptoms (e.g. backaches, spinal fractures, postural stoop). Hip fractures are one of the more serious consequences of osteoporosis with about a third who experience one entering a nursing home, and a quarter dying within a year of the fracture. (Injury, "Mortality following hip fracture: trends and geographical variations over the last 40 years" S. Haleem et al, 2008). Lifelong physical activity and weight-bearing exercise in particular, along with adequate calcium and vitamin D can slow the rate of bone loss in the later years. (Calcium is also only part of what goes into making bones and constitutes about 20% of them. Other important elements for bone health include collagen, along with magnesium, phosphorous, vitamin D, and boron.)
- ❖ brittle nails, toothaches
- ❖ cataracts

Who is at risk

- ❖ those not getting enough vitamin D (from the sun, food, or supplements). Vitamin D deficiency is said to be the most common cause of low calcium levels, and there is evidence that up to 90% of people may have insufficient levels of vitamin D.
- ❖ those with low magnesium which impacts the parathyroid hormone levels
- ❖ low parathyroid hormones levels (the parathyroid hormone is controlled by blood calcium levels, but magnesium can impact it too in a similar way. Low levels of magnesium stimulate the parathyroid hormone secretion, but very low levels paradoxically block it which can lead to low calcium levels in people with very low magnesium levels.)
- ❖ those with high phosphorous levels (e.g. rhabdomyolysis)
- ❖ low vitamin K levels
- ❖ those with kidney disease
- ❖ pancreatitis
- ❖ low protein levels (e.g. found in liver disease, alcoholism, malnutrition, infections)
- ❖ boys ages 9-13 years
- ❖ girls ages 9-18
- ❖ women over age 50
- ❖ menopausal women
- ❖ men over age 70
- ❖ those with gastric bypass surgery
- ❖ vegans
- ❖ those with lactose intolerance
- ❖ those who use laxatives
- ❖ use of proton pump inhibitors (e.g. Prilosec)
- ❖ use of bisphosphonates (e.g. Fosamax)
- ❖ women who don't have periods such as from low body weight due to reduced circulating estrogen levels which can impact calcium balance

Minerals and vitamins that are said to be antagonistic to calcium include:

- ❖ lead
- ❖ zinc
- ❖ manganese
- ❖ iron
- ❖ phosphorous
- ❖ magnesium
- ❖ sodium
- ❖ potassium

- ❖ cadmium
- ❖ vitamin A
- ❖ vitamins B2, B3, B6
- ❖ vitamin D
- ❖ vitamin E

Hard water (having calcium + magnesium levels of ≥ 100 -200 mg/liter) can help protect us again lead and cadmium absorption. Minerals from water be it 'hard water,' or 'mineral water' bought at a store are more bioavailable than from food and supplements. Some of these can also be synergistic with calcium, such as magnesium. i.e. If the amounts are at the 'Goldilocks' just right level they support each other, but having too much causes problems. One example of a problem arising from too much calcium relative to magnesium is muscle aches and pains because the muscles are in a constant state of contraction.

Drugs than can adversely impact calcium levels include:

Acid blockers

- ❖ Cimetidine/Tagamet
- ❖ Esomeprazole/Nexium
- ❖ Famotidine/Pepcid
- ❖ Lansoprazole/Prevacid
- ❖ Nizatidine/Axid
- ❖ Omeprazole/Prilosec
- ❖ Pantoprazole/Protonix
- ❖ Rabeprazole/Aciphex
- ❖ Ranitidine/Zantac

Analgesics

- ❖ Butalbital-containing drugs (Fioricet, Fiorinal, Zebutal)

Antacids

- ❖ Aluminum & magnesium hydroxide/Maalox, Mylanta
- ❖ Aluminum carbonate gel/Basaljel
- ❖ Aluminum hydroxide/Amphojel, AlternaGEL
- ❖ Calcium carbonate/Tums, Rolaids
- ❖ Magnesium hydroxide/Milk of Magnesia
- ❖ Sodium bicarbonate/Alka-Seltzer, baking soda

Antibiotics (some examples, not all)

- ❖ Amoxicillin/Amoxil
- ❖ Azithromycin/Z-pak
- ❖ Cefaclor/Ceclor
- ❖ Cefdinir/Omnicef
- ❖ Cephalexin/Keflex

- ❖ Clarithromycin/Biaxin
- ❖ Doxycycline/Doryx
- ❖ Erythromycin/EES
- ❖ Levofloxacin/Levaquin
- ❖ Minocycline/Minocin
- ❖ Sulfamethoxazole and trimethoprim/Bactrim, Septra
- ❖ Tetracycline/Sumycin

Anticonvulsants

- ❖ Carbamazepine/Tegretol
- ❖ Ethosuximide/Zarontin
- ❖ Gabapentin/Neurontin
- ❖ Methsuximide/Celontin
- ❖ Oxcarbazepine/Trileptal
- ❖ Phenobarbital/Solfoton
- ❖ Phenytoin/Dlantin
- ❖ Primidone/Mysoline
- ❖ Valproic acid/Depakene

Antigout

- ❖ Colchicine/Colcrys

Antiviral

- ❖ Delavirdine/Rescriptor
- ❖ Foscarnet/Foscavir
- ❖ Lamivudine/Epivir
- ❖ Nevirapine/Viramune
- ❖ Zidovudine, AZT/Retrovir
- ❖ Zidovudine and Lamivudine/Combivir

Blood pressure

ACE Inhibitors:

- ❖ Captopril/Capoten
- ❖ Enalapril/Vasotec
- ❖ Lisinopril/Prinivil, Zestril
- ❖ Quinapril/Accupril

Calcium channel blockers: these may interfere with calcium supplements, but this is a controversial issue. Taking the supplement at least 2 hours apart from medication is advised. Drugs in this class include Verapamil and any drug ending in -dipine (e.g. nifedipine, amlodipine, etc.).

Diuretics, loop:

- ❖ Bumetanide/Bumex

- ❖ Ethacrynic acid/Edecrin
- ❖ Furosemide/Lasix

Diuretics, thiazide:

- ❖ Chlorothiazide/Diuril
- ❖ Chlorthalidone/Hygroton
- ❖ HCTZ/Hydrodiuril
- ❖ Methylchlorothiazide/Enduron
- ❖ Metolazone/Zaroxolyn
- ❖ any combination drug that has HCTZ in it

Diuretics, potassium sparing:

- ❖ This is possible, but not conclusive

Diuretics, sulfonamide:

- ❖ Indapamide/Lozol

Cardiac glycoside:

- ❖ Digoxin/Digitek, Lanoxicaps, Lanoxin (high levels of calcium might increase the likelihood of digoxin toxicity, and lower levels of calcium reduce the drug's effectiveness. Hence, if you are on digoxin your doctor should watch your calcium levels closely.)

Corticosteroids:

- ❖ Betamethasone/Diprolene, Luxiq)
- ❖ Dexamethasone/Decadron
- ❖ Fluocinolone/Synalar topical
- ❖ Methylprednisone/Medrol
- ❖ Mometasone/Elocon
- ❖ Prednisolone/Prednisol
- ❖ Prednisone/Deltasone
- ❖ Triamcinolone/Aricin

Inhaled corticosteroids:

- ❖ Budesonide/Rhinocort, Symbicort
- ❖ Flunisolide/Nasarel, Nasacort
- ❖ Fluticasone/Flonase

Hormone replace therapy/oral contraceptives:

- ❖ Estradiol/Activella, Climara, Combipatch, Estrace, Estraderm, Estring, EstroGel, Femring, Menostar, and many others)
- ❖ Estrogen conjugated/Premphase, Prempro
- ❖ Estrogen-containing drugs (hormone replacement and birth control pills)
- ❖ Ethinyl estradiol (found in many birth control pills)

Laxatives that contain magnesium (e.g. milk of magnesia)

Nonsteroidal aromatase inhibitors for breast cancer:

- ❖ Anastrozole/Arimidex

Salicyclates (a partial list)

- ❖ Caffeine and aspirin/Fiorinal
- ❖ Magnesium salicyclate/Mobidin
- ❖ Oxycodone and aspirin/Percodan
- ❖ Salicycllic acid or aspirin/Bayer, Ecotrin, St. Joseph
- ❖ Salsalate/Disalcid

Selective estrogen receptor modulators used for breast cancer:

- ❖ Raloxifene/Evista
- ❖ Tamoxifen/Nolvadex
- ❖ Toremifene/Fareston

Sulfonamides:

- ❖ Sulfa antibiotics, some diabetic medications

Thyroid (separate calcium from thyroid meds by at least 4 hours)

- ❖ Levothyroxine/Synthroid

Miscellaneous

- ❖ Benzoates
- ❖ Beta hydroxy acid
- ❖ Estrogen dominance
- ❖ Many artificial food colors and flavors
- ❖ Mineral oil
- ❖ Menthol
- ❖ Mint, peppermint, spearmint
- ❖ Phenylethyl salicylate (a fragrance)

Sources

- ❖ almonds (80 mg/1 oz.)
- ❖ bok choy (150 mg/1 cup cooked)
- ❖ Brazil nuts (186 mg/100 g)
- ❖ broccoli (60 mg/1 cup cooked)
- ❖ cheddar cheese (750 mg/100 g)
- ❖ chia seeds (179 mg/2 T)
- ❖ chickpeas
- ❖ collard greens (270 mg/1 cup)

- ❖ dairy
- ❖ dried figs (120 mg/ half cup)
- ❖ edamame (100 mg/1 cup, shelled, cooked)
- ❖ fish with soft bones (e.g. canned sardines, salmon)
- ❖ fortified foods (e.g. breakfast cereal, orange juice, fruit juice)
- ❖ kale (100 mg/1 cup cooked)
- ❖ kelp (1093/100 g)
- ❖ milk
- ❖ molasses (117 mg/1 T)
- ❖ oats, instant (100 mg/1 serving)
- ❖ okra (82 mg/1 cup)
- ❖ pinto beans (50 mg/half cup cooked)
- ❖ poppy seeds (127 mg/1 T)
- ❖ rhubarb
- ❖ sardines
- ❖ sesame seeds (88 mg/1 T)
- ❖ soy beans
- ❖ shrimp
- ❖ sunflower seeds (109 mg/1 cup)
- ❖ swiss cheese (925 mg/100 g)
- ❖ tahini
- ❖ tempeh (120 mg/4 oz.)
- ❖ tofu (100-150 mg/3 oz. extra-firm)
- ❖ wakame
- ❖ white beans (161 mg/1 cup cooked)
- ❖ yogurt

There are also amino acids that improve calcium absorption, being lysine, arginine, and histadine. Foods that are high in such amino acids include:

- ❖ bass
- ❖ beef stew
- ❖ Canadian bacon
- ❖ chickpeas
- ❖ chuck roast
- ❖ cod
- ❖ cottage cheese
- ❖ flounder
- ❖ ham
- ❖ lamb
- ❖ lentils
- ❖ lima beans
- ❖ liverwurst
- ❖ peanuts

- ❖ rump roast
- ❖ salami
- ❖ sausage (lean)
- ❖ skim milk
- ❖ spare ribs

Recommended doses

The US Preventive Services Task Force as of 2013 recommended that calcium supplements not be taken by most people. There are many reasons for suggesting this. One is that some supplements may be contaminated with lead, such as those coming from oyster shells, dolomite, or bonemeal. Calcium from supplements can increase the risk of heart attacks (typically at levels over 1000 mg/day or from 805+ mg/day from diet. More recent research (Clinical Pharmacology & Therapeutics, Feb. 2020) concluded that calcium supplements containing high dose vitamin D appear to reduce the risk of acute heart attacks, but with a daily dose of 1000 mg or higher there is an increased risk of stroke. They can also increase the likelihood of kidney stones in postmenopausal women. Supplement use may actually increase the likelihood of hip fractures by 64% compared to taking a placebo.

Calcium intake above 1500 mg/day may increase the risk of prostate cancer, although too little calcium may also increase the risk of it, according to one study. So, getting the Goldilocks right amount is best in this case. Daily supplementation over 1000 mg/day doubled the risk of ischemic stroke in people age 40-89, but this was an association and not causation. There is said to be a U-shaped curve for dietary calcium intake, with levels below 800 mg/day or above 1,200 mg/day being sharply associated with increased risk of cardiovascular mortality. There may also be a higher risk of developing dementia from use of supplements. A study looking at 227 older (age 60 on up) people was done (British Journal of Nutrition, “Elevated brain lesion volumes in older adults who use calcium supplements: a cross-sectional clinical observational study” Martha Payne et al, July 2014). Key findings included that use of calcium supplements was comparable in causing brain damage as that of high blood pressure. The amount of calcium used was not a relevant factor, and even low-dose supplements can cause problems. It is thought that use of the supplement causes calcium deposits in the brain’s blood vessels (i.e. calcification, ‘hardening of the arteries’) leading to blockages and oxygen deprivation.

Excessive levels of calcium during pregnancy may cause fetal abnormalities. Taking more than 900 mg/day through supplements has been associated with increased risk of early menopause.

There also has been a massive wrinkle introduced into the ‘drink milk to have strong bones’ mantra that has been offered for so many decades. The Harvard Nurses’ Study took 77,761 women (ages 34-59) and over a 12-year period found that those who had the highest intake of calcium from dairy broke more bones than those who rarely drank milk (American Journal of Public Health, “Milk, dietary calcium and bone fractures in women: a 12-year prospective study” 1997, D. Feskanich et al). Another study on 331,234 men (ages 40-75) done in the Health Professionals Follow-up Study found that forearm and hip fractures was most common in those in the highest quintile of calcium intake (food plus supplements) compared to those in the lowest quintile. Adjustments were made for age, smoking, BMI, physical activity, alcohol consumption,

and total caloric intake (Journal of Nutrition, “Calcium intake and the incidence of forearm and hip fractures among men” 1997, W. Owusu et al). Moreover, compared to American women Chinese women have much less osteoporosis and they get most of their calcium from vegetables rather than dairy.

The overuse of calcium supplements in post-menopausal women may lead to fatigue, exhaustion, headaches, depression, anxiety, and insomnia. Taking too much calcium can also inhibit the absorption of zinc, phosphorous, and copper.

The bioavailability of calcium from dark leafy greens is twice that of what can be obtained from milk. Such studies offer associations or correlations and not necessarily causation. But they point out that where calcium intake comes from may be an important factor to consider and not just the total amount of milligrams obtained every day.

The ability to absorb calcium at any point of time is limited to about 500 mg, so if amounts larger than that are consumed it should be divided up across the day. Vitamin D is also needed to help absorb and utilize calcium. However, use of calcium even with vitamin D has generally not been found to reduce hip fractures in older adults (living outside of nursing homes or hospitals).

Calcium comes in different forms, with the most common being carbonate. Calcium citrate and malate might be more easily absorbed, which may be important to people who have reduced stomach acid (such as from using drugs like Nexium or Prilosec, or Zantac). However, these two types plus others like lactate and gluconate are larger in size and tend to be more expensive.

Recommended amounts:

	Daily dosage	Upper tolerable limit
0-6 months	200 mg	1000 mg
7-12 months	270 mg	1500
1-3 years	500 mg	2500
4-8	700 mg	2500
9-11	1000 mg	3000
12-18	1300 mg	3000
19-50	1000 mg	2500
51-70 (men/women)	1000/1200 mg	2000
Pregnant & breastfeeding 14-18 years	1300 mg	3000
Pregnant & breastfeeding 19-50 years	1000 mg	2500
71+	1200 mg	

Interactions

Calcium can interfere with the absorption of other minerals such as iron and zinc, so it is best to take it at least 2 hours apart from when an iron supplement or iron-containing meal is consumed.

Some calcium supplements also contain boron which might reduce the amount that is lost in the urine. There is no established RDA for boron but the upper tolerable limit is 20 mg. Moreover,

boron at levels of 3-10 mg/day may increase estrogen levels in males and females, and for women that may be of concern if they have estrogen-sensitive cancer.

One study found that calcium supplements had the most potential drug interactions. It can impair absorption of

- ❖ thyroid hormone
- ❖ antibiotics in the Cipro and tetracycline families
- ❖ drugs like Fosamax
- ❖ Dilantin (used for seizures).

Mineral oil and laxatives reduce calcium absorption. Drugs like prednisone can cause calcium deficiency and may lead to osteoporosis if used for months at a time.

Proton pump inhibitors (e.g. Prilosec) reduce the absorption of calcium.

Supplements especially in high doses taken with thiazide diuretics (e.g. HCTZ) are at risk of hypercalcemia. Some symptoms of this disorder may include muscle weakness, fatigue, constipation, nausea, mood changes, or confusion. Or, it may not cause any symptoms but over time it can lead to osteoporosis, kidney stones, kidney failure, abnormal heart rhythm, mental confusion, and coma.

Loop diuretics (e.g. Lasix) increase calcium excretion and so can lead to deficiency.

Calcium citrate taken with aluminum containing drugs (e.g. Maalox) can increase the absorption of aluminum, which is not needed in the diet whatsoever. There is also lingering concern that aluminum might be a contributing factor to Alzheimer's.

Some of the drugs that calcium carbonate can interact with (red indicates serious, blue moderate, black milder interactions) include:

- ❖ **acalabrutinib**: by reducing stomach acid it may reduce absorption of the drug and hence its effectiveness. The drug should be taken at least two hours prior to calcium.
- ❖ **acebutolol**: separate the time you take calcium and the drug by at least two hours. You may need a dose adjustment or special test to use both.
- ❖ **acetohexamide**: to prevent problems with absorption and the drug's effects on blood sugar the drug should be taken 2 hours before or after the calcium. You should monitor your blood sugar as to possible hypoglycemia (low blood sugar) developing.
- ❖ **alendronate**: you should take calcium at least 30 minutes after the drug to prevent absorption problems.
- ❖ **alprazolam**: there may be a minor effect on absorption and separating when the calcium and drug are taken by 2-3 hours might be considered.
- ❖ **amlodipine**: use of calcium may decrease the effects of the drug. Talk to your doctor as to if you need a dose adjustment or your b/p checked more often.

- ❖ **amphetamine**: the calcium might increase the absorption of the drug and increase its effects which could lead to restlessness, tremor, rapid breathing, confusion, panic, aggressiveness, nausea, vomiting, diarrhea, an irregular pulse, or seizures.
- ❖ **aprenavir**: calcium may lower the effectiveness of the drug. The drug should be administered at least an hour before or after the calcium. A dose adjustment or special test may be needed.
- ❖ **aspirin**: calcium may decrease the effectiveness of the aspirin. A dose adjustment may be needed.
- ❖ **atazanavir**: calcium may decrease the drug's effectiveness. The drug should be administered 2 hours before or an hour after calcium. A dose adjustment or special test may be needed.
- ❖ **atenolol**: calcium may decrease the drug's effectiveness. Separating when they are taken by at least 2 hours is advised. A dose adjustment or special test may be needed.
- ❖ **atropine**: calcium may decrease the drug's effectiveness. Separating when they are taken by 3-4 hours is advised. A dose adjustment or special test may be needed.
- ❖ **bacampicillin**: by reducing stomach acid the absorption and effectiveness of the drug may be reduced and it is not advised to use them together. You may need to not use calcium while on the drug, or your doctor may want to prescribe a different antibiotic.
- ❖ **baloxavir marboxil**: the drug should not be taken with calcium due to reduction of absorption and effectiveness issues.
- ❖ **benazepril**: a minor reduction in the drug's bioavailability might result. You may want to separate taking the drug and calcium by 1-2 hours.
- ❖ **bendroflumethiazide**: calcium levels may become too high leading to symptoms such as dizziness, drowsiness, weakness, lethargy, headache, nausea, vomiting or seizures. A dose adjustment or special test may be needed.
- ❖ **benzphetamine**: the calcium might increase the absorption of the drug and increase its effects which could lead to restlessness, tremor, rapid breathing, confusion, panic, aggressiveness, nausea, vomiting, diarrhea, an irregular pulse, or seizures.
- ❖ **benzthiazide**: calcium levels may become too high leading to symptoms such as dizziness, drowsiness, weakness, lethargy, headache, nausea, vomiting or seizures. A dose adjustment or special test may be needed.
- ❖ **bepiridil**: you may need a dose adjustment or your b/p checked more often if calcium is taken with it.
- ❖ **betaxolol**: use of calcium may reduce the drug's effects. Separate their administration times by at least 2 hours. A dose adjustment or special test may be needed.
- ❖ **bisacodyl**: administration time of these should be separated by at least one hour. A dose adjustment or special test may be needed to take them together.
- ❖ **bisoprolol**: calcium may decrease effects of the drug. Separate their administration times by at least 2 hours. A dose adjustment or special test may be needed.
- ❖ **bosutinib**: you should take calcium at least 2 hours before or after the drug to prevent absorption issues and reduced effectiveness of the drug.
- ❖ **cabotegravir**: to prevent absorption and reduced effectiveness of the drug you should take calcium at least 2 hours before or 4 hours after the drug.

- ❖ **calcipotriene/calcitriol topical**: calcium levels may become too high leading to symptoms such as dizziness, weakness, lethargy, muscle pain, headache, loss of appetite, nausea, vomiting, or seizures. A dose adjustment or more frequent monitoring by your doctor may be needed.
- ❖ **captopril**: a minor effect on the drug's bioavailability may result. You may want to separate administration times of the drug and calcium by 1-2 hours.
- ❖ **carbonyl iron**: decreased effects of the drug may result. Separate the drug's administration time by at least 2 hours before or 6 hours after the calcium.
- ❖ **carteolol**: to prevent reduction of drug effectiveness separate their administration times by at least 2 hours. A dose adjustment or special test may be needed.
- ❖ **carvedilol**: to prevent reduction of drug effectiveness separate their administration times by at least 2 hours. A dose adjustment or special test may be needed.
- ❖ **cefditoren**: calcium may reduce the drug's effectiveness and using the two together should generally be avoided.
- ❖ **cefpodoxime**: calcium should be taken at least two hours before or 2 hours after the drug to prevent absorption and effectiveness of the drug.
- ❖ **cefuroxime**: calcium should be taken at least two hours before or 2 hours after the drug to prevent absorption and effectiveness of the drug.
- ❖ **ceritinib**: a dose adjustment or more frequent monitoring may be needed due to calcium potentially reducing absorption and effectiveness of the drug.
- ❖ **chlorthalidone**: a minor effect as to absorption may result. Calcium might be taken 2-3 hours apart from the drug as a result.
- ❖ **chloroquine**: due to potential absorption and reduced effectiveness of the drug issues they should be taken at least four hours apart from each other.
- ❖ **chlorothiazide**: calcium levels may become too high leading to symptoms such as dizziness, drowsiness, weakness, lethargy, headache, nausea, vomiting or seizures. A dose adjustment or special test may be needed.
- ❖ **chlorpropamide**: to prevent problems with absorption and the drug's effects on blood sugar the drug should be taken 2 hours before or after the calcium. You should monitor your blood sugar as to possible hypoglycemia (low blood sugar) developing.
- ❖ **chlorthalidone**: calcium levels may become too high leading to symptoms such as dizziness, drowsiness, weakness, lethargy, headache, nausea, vomiting or seizures. A dose adjustment or special test may be needed.
- ❖ **choline salicylate**: a dose adjustment or special test may be needed to prevent reduction in the drug's effectiveness.
- ❖ **cimetidine**: calcium might reduce drug levels to a minor degree. Taking the drug 1-2 hours before calcium might be considered.
- ❖ **cinoxacin**: it may be best to avoid using the two together as to reducing the drug's effectiveness. Otherwise, taking the drug 2-4 hours before or at least 6 hours after calcium is advised.
- ❖ **cipro**: it may be best to avoid using the two together as to reducing the drug's effectiveness. Otherwise, taking the drug 2-4 hours before or at least 6 hours after calcium is advised.

- ❖ clobazam: a minor reduction in effectiveness of the drug might result. Separating administration times by 2-3 hours might be considered.
- ❖ clonazepam: a minor reduction in effectiveness of the drug might result. Separating administration times by 2-3 hours might be considered.
- ❖ clorazepate: a minor reduction in effectiveness of the drug might result. Separating administration times by 2-3 hours might be considered.
- ❖ dabigatran: to prevent absorption issues and reduction of effectiveness, the drug should be taken at least 2 hours before calcium. Also, calcium should not be taken within 24 hours after orthopedic surgery.
- ❖ dabrafenib: to prevent absorption and reduction of the drug's effectiveness a dose adjustment and more frequent monitoring by your doctor may be needed.
- ❖ dasatinib: to prevent absorption and reduced effectiveness of the drug separating their administration times by at least two hours is advised.
- ❖ deferiprone: to prevent absorption and reduced effectiveness of the drug separating their administration times by at least four hours is advised.
- ❖ delafloxacin: it may be best not to take them at the same time due to reduced effectiveness of the drug. Otherwise, the drug should be taken 2-4 hours before or 6 hours after the calcium.
- ❖ delavirdine: taking them at least one hour apart is advised. A dose adjustment or special test may be needed.
- ❖ demeclocycline: it may be best not to take them at the same time due to reduced effectiveness of the drug. Otherwise, the drug should be taken 2-4 hours before or 6 hours after the calcium.
- ❖ dextroamphetamine: the calcium might increase the absorption of the drug and increase its effects which could lead to restlessness, tremor, rapid breathing, confusion, panic, aggressiveness, nausea, vomiting, diarrhea, an irregular pulse, or seizures.
- ❖ diazepam: a minor reduction in the drug's effectiveness might result. Consider separating their administration by 2-3 hours.
- ❖ digitoxin: high levels of calcium may increase the drug's effects. Do not exceed the calcium dosage prescribed by your doctor. You should also consult your doctor before using OTC calcium supplements.
- ❖ digoxin: high levels of calcium may increase the drug's effects. Do not exceed the calcium dosage prescribed by your doctor. You should also consult your doctor before using OTC calcium supplements.
- ❖ diltiazem: calcium may decrease the drug's effectiveness. A dose adjustment or more frequent checking of your b/p may be needed.
- ❖ dolutegravir: they should not be taken together as to reducing the drug's effectiveness. If they are taken together, the drug should be used at least 2 hours before or 6 hours after calcium.
- ❖ doxycycline: it may be best not to take them at the same time due to reduced effectiveness of the drug. Otherwise, the drug should be taken 2-4 hours before or 6 hours after the calcium.

- ❖ **eltrombopag**: to prevent problems with absorption and effectiveness of the drug you should take the drug on an empty stomach at least 2 hours before or 4 hours after calcium is taken.
- ❖ **elvitegravir**: calcium should be taken 2 hours before or after the drug to prevent absorption and blood level issues with the drug.
- ❖ **enalapril/enalaprilat**: a minor decrease in the drug's bioavailability may result with calcium use. Consider separating when it and calcium are taken by 1-2 hours.
- ❖ **enoxacin**: it may be best not to take them at the same time due to reduced effectiveness of the drug. Otherwise, the drug should be taken 2-4 hours before or 6 hours after the calcium.
- ❖ **erdafitinib**: use of calcium with this drug can alter phosphate levels in the blood, and your doctor will check such levels periodically and may change your dose. If you develop signs of high phosphate levels such as through symptoms like muscle cramps, convulsions, tingling or numbness around the mouth, or bone pain tell your doctor as soon as possible.
- ❖ **erlotinib**: to prevent problems with absorption and effectiveness of the drug calcium should be taken at least 4 hours before or 2 hours after the drug.
- ❖ **estazolam**: there may be a minor effect on absorption and separating when the calcium and drug are taken by 2-3 hours might be considered.
- ❖ **estramustine**: calcium may decrease the effectiveness of the drug. Taking the drug at least 1 hour before or 2 hours after meals, milk, or calcium should be done.
- ❖ **etidronate**: to prevent absorption and effectiveness of the drug calcium should be taken at least 2 hours before or 2 hours after the drug.
- ❖ **famotidine**: calcium may decrease the effectiveness of the drug. Taking the drug 1-2 hours before calcium might be considered.
- ❖ **felodipine**: use of calcium may decrease the effects of the drug. Talk to your doctor as to if you need a dose adjustment or your b/p checked more often.
- ❖ **ferrous fumarate/gluconate/sulfate**: they should not be taken together as to reducing the drug's effectiveness. If they are taken together, the drug should be used at least 2 hours before or 6 hours after calcium.
- ❖ **flurazepam**: a minor reduction in effectiveness of the drug might result. Separating administration times by 2-3 hours might be considered.
- ❖ **fosinopril**: a minor reduction in the drug's bioavailability might result. You may want to separate taking the drug and calcium by 1-2 hours.
- ❖ **gatifloxacin/gemifloxacin/grepafloxacin**: it may be best to avoid using the two together as to reducing the drug's effectiveness. Otherwise, taking the drug 2-4 hours before or at least 6 hours after calcium is advised.
- ❖ **glimepiride/glipizide/glyburide**: to prevent problems with absorption and the drug's effects on blood sugar the drug should be taken 2 hours before or after the calcium. You should monitor your blood sugar as to possible hypoglycemia (low blood sugar) developing.
- ❖ **halazepam**: a minor reduction in effectiveness of the drug might result. Separating administration times by 2-3 hours might be considered.

- ❖ **heme iron polypeptide/iron polysaccharide/iron protein succinylate**: it may be best to avoid using the two together as to reducing the drug's effectiveness. Otherwise, taking the drug 2-4 hours before or at least 6 hours after calcium is advised.
- ❖ **hydrochlorothiazide/hydroflumethiazide**: calcium levels may become too high leading to symptoms such as dizziness, drowsiness, weakness, lethargy, headache, nausea, vomiting or seizures. A dose adjustment or special test may be needed.
- ❖ **hydroxychloroquine**: to reduce absorption and effectiveness issues of the drug separating the drug from calcium by at least 4 hours is advised.
- ❖ **ibandronate**: to reduce absorption and effectiveness issues of the drug taking calcium at least 30 minutes before the drug is advised.
- ❖ **indapamide**: calcium levels may become too high leading to symptoms such as dizziness, drowsiness, weakness, lethargy, headache, nausea, vomiting or seizures. A dose adjustment or special test may be needed.
- ❖ **isradipine**: you may need a dose adjustment or your b/p checked more often.
- ❖ **ketoconazole**: separating the calcium from the drug by 2 or more hours is advised.
- ❖ **labetalol**: separating the calcium from the drug by 2 or more hours is advised. A dose adjustment or special test may be needed.
- ❖ **levamlodipine**: you may need a dose adjustment or your b/p checked more often.
- ❖ **levodopa**: calcium may increase absorption of the drug but may be difficult to predict and monitor. Spacing the two apart by 2 hours might be done to prevent this issue.
- ❖ **levofloxacin/lomefloxacin**: it may be best to avoid using the two together as to reducing the drug's effectiveness. Otherwise, taking the drug 2-4 hours before or at least 6 hours after calcium is advised.
- ❖ **levothyroxine**: you should separate calcium and the drug by at least 4 hours to prevent decrease in the drug's effectiveness. A dose adjustment or special test may be needed.
- ❖ **liothyronine**: you should separate calcium and the drug by at least 4 hours to prevent decrease in the drug's effectiveness. A dose adjustment or special test may be needed.
- ❖ **liotrix**: you should separate calcium and the drug by at least 4 hours to prevent decrease in the drug's effectiveness. A dose adjustment or special test may be needed.
- ❖ **lisdexamphetamine**: the calcium might increase the absorption of the drug and increase its effects which could lead to restlessness, tremor, rapid breathing, confusion, panic, aggressiveness, nausea, vomiting, diarrhea, an irregular pulse, or seizures.
- ❖ **lisinopril**: a minor reduction in the drug's bioavailability might result. You may want to separate taking the drug and calcium by 1-2 hours.
- ❖ **magnesium salicylate**: calcium may lower the effects of the magnesium. A dose adjustment or special test may be needed.
- ❖ **methamphetamine**: the calcium might increase the absorption of the drug and increase its effects which could lead to restlessness, tremor, rapid breathing, confusion, panic, aggressiveness, nausea, vomiting, diarrhea, an irregular pulse, or seizures.
- ❖ **methenamine**: calcium may reduce the drug's effectiveness. A dose adjustment or more frequent monitoring may be needed.
- ❖ **methyclothiazide**: calcium levels may become too high leading to symptoms such as dizziness, drowsiness, weakness, lethargy, headache, nausea, vomiting or seizures. A dose adjustment or special test may be needed.

- ❖ **metolazone**: calcium levels may become too high leading to symptoms such as dizziness, drowsiness, weakness, lethargy, headache, nausea, vomiting or seizures. A dose adjustment or special test may be needed.
- ❖ **metoprolol**: separating taking them by at least 2 hours is advised. A dose adjustment or special test may be needed.
- ❖ **mibefradil**: a dose adjustment or checking your b/p more often may be needed.
- ❖ **midazolam**: a minor reduction in effectiveness of the drug might result. Separating administration times by 2-3 hours might be considered.
- ❖ **minocycline**: to prevent absorption and reduction of the drug's effectiveness the drug should be taken at least 2 hours before or at least 6 hours after calcium.
- ❖ **moexril**: a minor reduction in the drug's bioavailability might result. You may want to separate taking the drug and calcium by 1-2 hours.
- ❖ **moxifloxacin**: the drug should be taken 2-4 hours before or at least 6 hours after calcium.
- ❖ **multivitamin with iron/with iron and fluoride/prenatal multivitamin**: the multivitamin should be taken at least 2 hours before or at least 6 hours after calcium.
- ❖ **mycophenolate mofetil/mycophenolic acid**: to prevent decrease in the drug's effectiveness they should be separated by at least 2 hours. A dose adjustment or special test may be needed.
- ❖ **nadolol/nebivolol**: to prevent decrease in the drug's effectiveness they should be separated by at least 2 hours. A dose adjustment or special test may be needed.
- ❖ **nalidixic acid**: it may be best not to use these together. Otherwise, you should take the drug 2 hours before or after the calcium.
- ❖ **naproxen**: separating taking them by at least 2 hours is advised.
- ❖ **neratinib**: you should take the drug three hours after using calcium to prevent absorption and reduced effectiveness of the drug.
- ❖ **nicardipine/nifedipine/nimodipine/nisoldipine**: you may need a dose adjustment or your b/p checked more often.
- ❖ **nilotinib**: to prevent absorption and reduced effectiveness of the drug separate their dosing by at least two hours.
- ❖ **nizatidine**: calcium might reduce drug levels to a minor degree. Taking the drug 1-2 hours before calcium might be considered.
- ❖ **norfloxacin/ofloxacin**: the drug should be taken 2-4 hours before or at least 6 hours after calcium.
- ❖ **omadacycline**: it may be best not to take them at the same time due to reduced effectiveness of the drug. Otherwise, the drug should be taken 2-4 hours before or 6 hours after the calcium.
- ❖ **oxazepam**: a minor reduction in effectiveness of the drug might result. Separating administration times by 2-3 hours might be considered.
- ❖ **oxytetracycline**: it may be best not to take them at the same time due to reduced effectiveness of the drug. Otherwise, the drug should be taken 2-4 hours before or 6 hours after the calcium.
- ❖ **pancreatin/pancrelipase**: taking them should be separated by at least one hour. A dose adjustment or special test may be needed.

- ❖ **patiromer**: use of these together may increase the risk of metabolic alkalosis as a pH imbalance, and this is more likely to occur if there is kidney impairment. Symptoms may include nausea, vomiting, lightheadedness, twitching muscles, numbness or tingling, prolonged muscle spasms, irregular pulse, confusion, or stupor. Severe cases could cause seizure or coma. Do not take OTC antacids or laxatives without talking to a doctor first.
- ❖ **pazopanib**: to prevent absorption and drug effectiveness issues take the drug at least 1 hour before or two hours after calcium.
- ❖ **penbutolol**: separating the times they are taken by at least 2 hours is advised. A dose adjustment or special test may be needed.
- ❖ **pencillamine**: to prevent problems with absorption and the drug's effectiveness the drug should be taken at least 2 hours before or at least 6 hours after calcium.
- ❖ **perindopril**: a minor reduction in the drug's bioavailability might result. You may want to separate taking the drug and calcium by 1-2 hours.
- ❖ **pexidartinib**: to prevent problems with absorption and reduced effectiveness of the drug, it should be taken at least 2 hours before or 2 hours after calcium.
- ❖ **phenytoin**: to prevent problems with absorption and reduced effectiveness of the drug, they should be separated by at least 2-3 hours. A dose adjustment or special test may be needed.
- ❖ **pindolol**: to prevent problems with absorption and reduced effectiveness of the drug, they should be separated by at least 2 hours. A dose adjustment or special test may be needed.
- ❖ **polythiazide**: calcium levels may become too high leading to symptoms such as dizziness, drowsiness, weakness, lethargy, headache, nausea, vomiting or seizures. A dose adjustment or special test may be needed.
- ❖ **proguanil**: to prevent problems with reduced effectiveness of the drug they should be taken at least 2-3 hours apart. A dose adjustment or special test may be needed.
- ❖ **propantheline**: to prevent problems with reduced effectiveness of the drug they should be taken at least 2-3 hours apart. A dose adjustment or special test may be needed.
- ❖ **propranolol**: to prevent problems with reduced effectiveness of the drug they should be taken at least 2 hours apart. A dose adjustment or special test may be needed.
- ❖ **pyrimethamine**: to prevent problems with reduced effectiveness of the drug they should be taken at least 2-3 hours apart. A dose adjustment or special test may be needed.
- ❖ **quazepam**: a minor reduction in the drug's effectiveness might result. Consider separating their administration by 2-3 hours.
- ❖ **quinapril**: a minor reduction in the drug's bioavailability might result. You may want to separate taking the drug and calcium by 1-2 hours.
- ❖ **quinidine**: calcium may increase blood levels and effects of the drug. Contact your doctor if you have experience ringing in the ears, hearing loss, visual problems, diarrhea, headache, dizziness, lightheadedness, fainting, fast or pounding heart. A dose adjustment or special test may be needed.
- ❖ **raltegravir**: calcium may interfere with the drug even if they are taken at different times of the day, and this could lead to the drug being less effective. So you should not use calcium while on the once-daily drug, but may be used with other products for this drug. Talk to a doctor to discuss your concerns.

- ❖ ramipril: a minor reduction in the drug's bioavailability might result. You may want to separate taking the drug and calcium by 1-2 hours.
- ❖ ranitidine/ranitidine bismuth citrate: calcium might reduce drug levels to a minor degree. Taking the drug 1-2 hours before calcium might be considered.
- ❖ rifampin: the drug should be taken at least one hour before calcium to avoid loss of the drug's effectiveness. A dose adjustment or special test may be needed.
- ❖ rilpivirine: calcium should be taken at least 2 hours before or 4 hours after taking the drug to avoid the drug becoming less effective.
- ❖ riociguat: avoid taking calcium within one hour of the drug to avoid reduction of absorption or drug effectiveness.
- ❖ risedronate: to avoid problems with absorption or drug effectiveness calcium should be taken at least 30 minutes after the drug.
- ❖ rosuvastatin: to avoid absorption or drug effectiveness issues they should be taken at least 2 hours apart from each other.
- ❖ salsalate: a dose adjustment or special test may be needed if these are used together.
- ❖ sarecycline: it may be best not to take them at the same time due to reduced effectiveness of the drug. Otherwise, the drug should be taken 2-4 hours before or 6 hours after the calcium.
- ❖ selpercatinib: it is best to avoid taking these two together. If needed, the drug should be taken 2 hours before or 2 hours after the calcium.
- ❖ sodium polystyrene sulfonate: use of these together may increase the risk of metabolic alkalosis as a pH imbalance, and this is more likely to occur if there is kidney impairment. Symptoms may include nausea, vomiting, lightheadedness, twitching muscles, numbness or tingling, prolonged muscle spasms, irregular pulse, confusion, or stupor. Severe cases could cause seizure or coma. Do not take OTC antacids or laxatives without talking to a doctor first.
- ❖ sodium salicylate/sodium thiosalicylate: to avoid decreased effectiveness of the drug a dose adjustment or special test may be needed.
- ❖ sotalol: their dosing should be separated by at least 2 hours to avoid a decrease in the drug's effectiveness. A dose adjustment or special test may be needed.
- ❖ sparfloxacin: it may be best to avoid using the two together as to reducing the drug's effectiveness. Otherwise, taking the drug 2-4 hours before or at least 6 hours after calcium is advised.
- ❖ strontium-89 chloride: calcium should not be taken for 2 weeks before and 2 weeks after administering the drug. A dose adjustment or special test may be needed.
- ❖ sucralfate: calcium can decrease the effects of the drug and so they should be separated by at least thirty minutes. A dose adjustment or special test may be needed.
- ❖ temazepam: a minor reduction in effectiveness of the drug might result. Separating administration times by 2-3 hours might be considered.
- ❖ tetracycline: it may be best not to take them at the same time due to reduced effectiveness of the drug. Otherwise, the drug should be taken 2-4 hours before or 6 hours after the calcium.
- ❖ thyroid dessicated: to avoid the drug being less effective they should be separated by at least 4 hours. A dose adjustment or special test may be needed.

- ❖ ticlopidine: they should be separated by at least hours to avoid the drug being less effective.
- ❖ **tiludronate**: to prevent absorption and effectiveness of the drug calcium should be taken at least 2 hours before or 2 hours after the drug.
- ❖ **timolol**: to avoid decreasing the effectiveness of the drug separate the time they are taken by at least 2 hours. A dose adjustment or special may be needed.
- ❖ **tipranavir**: their administration times should be separated to avoid decreased effectiveness of the drug. A dose adjustment or special test may be needed.
- ❖ **tolazamide/tolbutamide**: to prevent problems with absorption and the drug's effects on blood sugar the drug should be taken 2 hours before or after the calcium. You should monitor your blood sugar as to possible hypoglycemia (low blood sugar) developing.
- ❖ **trandolapril**: a minor effect on the drug's bioavailability may result. You may want to separate administration times of the drug and calcium by 1-2 hours.
- ❖ **triazolam**: there may be a minor effect on absorption and separating when the calcium and drug are taken by 2-3 hours might be considered.
- ❖ **trichlormethiazide**: calcium levels may become too high leading to symptoms such as dizziness, drowsiness, weakness, lethargy, headache, nausea, vomiting or seizures. A dose adjustment or special test may be needed.
- ❖ **trientine**: ask your doctor before using them together to avoid the drug being less effective.
- ❖ **trovafloxacin**: it may be best to avoid using the two together as to reducing the drug's effectiveness. Otherwise, taking the drug 2-4 hours before or at least 6 hours after calcium is advised.
- ❖ **verapamil**: use of calcium may decrease the effects of the drug. Talk to your doctor as to if you need a dose adjustment or your b/p checked more often.

- ❖ **calcium/phosphate**: use of calcium with anyone who has high phosphate levels such as from hypoparathyroidism or severe kidney impairment should be done with extreme caution. Clinical monitoring of serum calcium and phosphate levels is necessary.
- ❖ **cardiac contraction/conduction**: calcium therapy, especially IV, should be done cautiously for anyone with cardiac disease. Anyone who is getting glycosides and IV calcium may experience cardiac arrhythmias.
- ❖ **malabsorption**: reduced calcium can occur for anyone who has malabsorption issues such as from celiac disease, GI resection, vitamin D deficiency, parathyroid hormone, calcitonin, or alkaline gastric pH.
- ❖ **renal dysfunction**: clinical monitoring of kidney function is necessary along with the concentration of phosphate.
- ❖ **sarcoidosis**: calcium should be used cautiously and only if necessary for anyone with sarcoidosis.