

Medications



Learner's Guide

How Chemicals Affect the Human Body

Everything is made of chemicals. Every human being, every animal, every plant, and every part of the environment are made of chemicals. More than 100 known natural elements combine in many different ways to produce compounds, which account for all the living and nonliving substances in our world. Chemicals, therefore, are neither good nor bad. They are simply different kinds of substances that work together with different results.

There are as many different chemical effects on the human body as there are chemicals and people. Every food, every medicine, everything we breathe, everything we touch can affect each of us in different ways. Many chemicals have the same effect on most people, though, and we have learned how to use these chemicals to help us.

Food and medicine are two categories of chemicals that have important effects on the human body. Food is essential to our survival, but it can also make us sick if we eat the wrong things, eat too much, or are allergic to it. Food can be a type of medicine, because the right foods can make us healthier and the wrong foods can cause disease.

Medicines, which are chemical substances we take to treat illness, reduce symptoms, or stay healthy, can have a good effect, such as when we use a medicine to relieve pain. The same medicine can have a bad effect, such as when a pain-relieving drug is taken too often and too long so that a person becomes addicted to it.

When we are responsible for taking care of other people, we often must help with the medications they take and the food they eat. It is our job to learn as much as we can about how medicine and food affect the human body.

Medications: Chemical Names and Brand Names



All medicines have a chemical name, also called the **generic** name. The generic name is the name of the main chemicals in the medication, and it does not change depending on which company makes the drug.

All medicines also have a **brand** name or trade name. The company that makes the drug gives it a brand name. Sometimes the brand name of a medication is more familiar than the chemical name, and often it is simpler to pronounce. The brand name changes, however, depending on who makes the drug. The same medication might have many different brand names, but only one chemical or generic name.

When handling medications, always be aware of the different kinds of names a drug can have. Be sure that any medicine you are taking or giving has the same name as that ordered by the physician or nurse practitioner.



Common Medications

Everyone should learn a little about these common medicines.

Diuretics

A **diuretic** (sometimes called a water pill) increases the rate at which the body produces urine. Diuretics pull fluid out of the body and raise the amount of urine the body passes.

People with weak hearts often take diuretics, because the poor pumping action of their hearts causes excess fluid to accumulate in their bodies. The diuretic helps remove extra fluid, decreases the amount of fluid circulating in the blood, lowers the blood pressure, and gives the heart less work to do.



Some foods work as mild diuretics, such as alcohol and cranberry juice. Foods containing caffeine, such as coffee, cola, and chocolate, also have a diuretic effect.

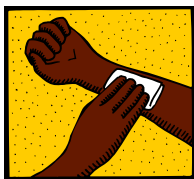
Common Water Pills: Generic and Brand Names

- ♦ Furosemide (Lasix)
- ♦ Bumetanide (Bumex)
- ♦ Hydrochlorothiazide (HCTZ)
- ♦ Triamterene + HCTZ (Dyazide)

Side Effects

- Frequent urination: To prevent frequent bathroom trips at night, take early in the day, or take the last dose before 6 pm.
- Stomach upset: Take with food or milk.
- Dizziness, which can cause falling
- Imbalance of sodium or potassium: Some people take potassium with their water pills; with others it is important not to eat high potassium or low sodium foods or use salt substitutes.

Blood Thinners



Blood thinners prevent blood from clotting. Normally, we want our blood to clot when we are injured. When you cut yourself, for example, a blood clot forms on the cut and stops the bleeding. A scab is a blood clot we can see, but blood clots can also form on the inside. A bruise, or a black-and-blue mark, is the result of a blood clot. These clots help us heal and keep us from losing too much blood.

Some clots can be extremely dangerous. A blood clot that forms inside a blood vessel can be deadly because it blocks the flow of blood, cutting off the supply of oxygen to organs such as the heart or the brain. Without oxygen, these vital organs begin to die. Blood thinners cannot dissolve a blood clot that has already formed, but they can stop clots from forming or growing.

Common Blood Thinners

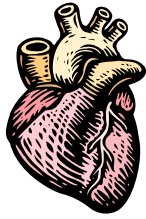
- Heparin
- Warfarin (Coumadin)
- Aspirin
- Plavix

Side Effects

- Bleeding or bruising
- Bloody or black bowel movements
- Blood in the urine

If you are caring for someone who is taking a blood thinner, watch for signs that the person is bleeding. Report these symptoms immediately. Blood that does not clot can cause a person to bleed internally or bleed too much if injured. This can be fatal.





Heart Rhythm Regulators

Heart rhythm regulators slow the heart and either decrease the heart's workload or increase the strength of the heart's contractions. These drugs are only useful for fast or irregular heartbeats. Doctors usually treat hearts that beat too slowly with pacemakers, not medicine. There are two common types of rhythm regulators.

- Beta blockers** slow the heart and make it beat with less contracting force, so blood pressure drops and the heart works less hard. They are used for high blood pressure, chest pain, and to prevent a repeat heart attack.

Common Beta Blockers: Generic and Brand Names

- Acebutolol (Sectral)
- Atenolol (Tenormin)
- Bisoprolol (Zebeta)
- Carvedilol (Coreg)
- Metoprolol (Lopressor LA; Toprol XL)
- Nadolol (Corgard)
- Timolol (Blocadren)

Uses

- Lowers blood pressure
- Treats fast or irregular heartbeats known as arrhythmias
- Slows the heart
- Prevents chest pain (angina)
- Treats congestive heart failure
- Reduces the workload of the heart
- Reduces the likelihood of further heart attacks
- Improves survival after a person has had a heart attack

Side Effects

- Fatigue
- Dizziness
- Drowsiness
- Cold hands or feet
- Very slow heart rate (bradycardia)
- Dizziness, weakness, fatigue

Caution

- Do not stop this medication abruptly.
- Can aggravate breathing difficulties in people with asthma, chronic bronchitis, or emphysema
- Use with caution in persons with slow heart rates or heart blocks
- Diabetes: This drug can mask early warning symptoms of low blood sugar, especially for persons on insulin.
- Do not take antacids or calcium supplements less than 2 hours before or 6 hours after this medicine.

- Digitalis** makes the heart contract harder and slows fast heart rhythms. Often prescribed when the heart's pumping function is weak.

Common Digitalis Brand Names

Digitek, Lanoxin, Digoxin, Lanoxicaps

Uses

- Causes the heart muscle to beat stronger and more efficiently
- Treats abnormal heart rhythms and congestive heart failure
- Slows the heart rate
- Helps eliminate fluid from the body

Side Effects

- If the level of this drug in the blood gets too high, the first symptoms are usually nausea and vomiting.
- Check a person's heart rate before helping him or her take this drug. Report a pulse below 60 to the person's healthcare provider, and do not give the medicine without approval if the pulse stays below 60.



Blood Vessel Relaxers

These medications work in different ways to relax blood vessels. When the blood vessels relax, blood flows more easily through them, the heart does not have to work as hard, and the blood pressure goes down. There are three main types of these drugs.

- Nitrates** relax blood vessels and stop chest pain that occurs when the blood vessels around the heart narrow or constrict (this kind of pain is called **angina**). Nitroglycerin dilates blood vessels by relaxing the smooth muscles surrounding them, increasing blood flow.



Common Nitrates

- Isosorbide dinitrate (Dilatrate, Isordil, IsoBid, Sorbitrate)
- Isosorbide mononitrate

(Imdur, Ismo)

- Nitroglycerin (Nitrogard, Nitrolingual, Nitrostat, Nitrobid, Nitro-Dur)

Side Effects

- Headache
- Dizziness
- Flushing

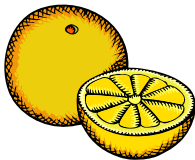
Caution: Persons taking Viagra (sildenafil) should not use nitroglycerin. This combination can be fatal.



- Calcium channel blockers** relax blood vessels, lower blood pressure, increase the supply of blood to the heart, reduce the heart's workload, and relieve chest pain. They do this by affecting the movement of calcium into the cells of the heart and blood vessels.

Common Calcium Channel Blockers

- Amlodipine (Norvasc)
- Diltiazem (Cardizem, Tiazac)
- Felodipine (Plendil, Renedil)
- Nifedipine (Adalat)
- Verapamil (Isoptin)



Caution

- Do not take with grapefruit or grapefruit juice.

Side Effects

- Headache that won't go away
- Constipation
- Dizziness
- Odd heart beats
- Swelling of hands or feet
- Shortness of breath
- Chest pain that gets worse, lasts longer or occurs more often
- Tiredness and nausea
- Swollen or tender gums

- ACE inhibitors** do two important things. They relax and expand the blood vessels, and they reduce the overall amount of blood in the body. They do this by blocking the production of a chemical that makes blood vessels narrow.

Common ACE Inhibitors

- Benazepril (Lotensin)
- Captopril (Capoten) *Take on empty stomach*
- Enalapril (Vasotec)
- Lisinopril (Prinivil, Zestril)
- Quinapril (Accupril)

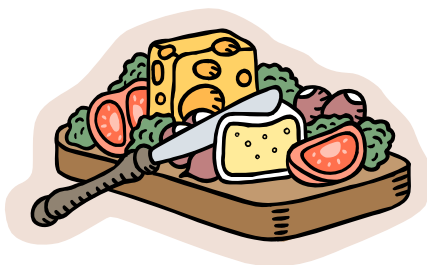
Caution

- May increase blood potassium levels

Side Effects

- Cough
- Loss of taste
- Dizziness
- Rash
- Swelling of hands or feet
- Fatigue

Medications and Food



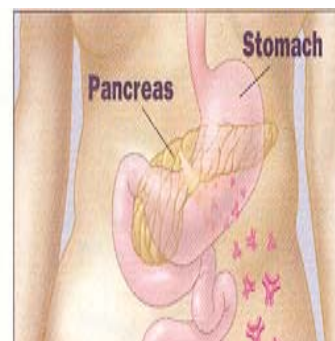
There are times when foods interact with drugs by making the drugs less effective or more powerful, or by triggering unwanted side effects. Learn to avoid mixing common drugs with foods that can cause problems.

Food/drug interactions tend to be unpredictable because people vary in their responses to medications and no two people eat exactly the same diet. Those at greatest risk for an interaction are:

1. The elderly, who are likely to take one or more types of medication and have other health and nutrition problems
2. People with liver or kidney disorders
3. People with cancer
4. People with gastrointestinal disorders
5. People who drink alcohol

How Food Affects Medicine

Many medications need to be taken with food for several reasons. Some medications, such as aspirin and ibuprofen, can irritate the lining of the stomach unless food is eaten to soften the effect. Other medicines, including some blood pressure drugs and water pills, work better and more effectively on a full stomach.



Sometimes food prevents the stomach from absorbing a medication. For example, the drug *Fosamax* (for brittle bones) must be taken first thing in the morning with plain water, on an empty stomach, at least 30 minutes before consuming any food, beverage, or medications. Even coffee or orange juice hinders its absorption.

The amount of food in the stomach when a person takes a medication can influence the amount of medicine absorbed and the time it takes to reach the bloodstream. Some drugs should be taken on an empty stomach so there is nothing to interfere with the breakdown of the medicine or slow its delivery.

Foods Containing Caffeine



Coffee, cola, tea, and chocolate can cause problems if they are taken with certain medications. The caffeine from these foods can cause symptoms of caffeine overdose, such as excitability, rapid heartbeat, and headache, when taken with drugs that contain caffeine. It is wise to avoid caffeine if a person is taking certain medicines, since caffeine can raise blood pressure.

→ People taking the drug *theophylline* (for asthma) should avoid foods containing caffeine. Both theophylline and caffeine are stimulants.

Charcoal-Broiled Meats

These can decrease the effectiveness of some drugs, such as theophylline.





Foods that Contain Calcium (Milk, Yogurt, Cheese)

→ The calcium in dairy products binds to and inhibits the absorption of some medications, such as *iron* and the antibiotics *tetracycline* and *Cipro*. As a result, less medicine is absorbed and it may not work. Take iron, Cipro, and all tetracycline derivatives at least 2 hours before or 2 hours after consuming any dairy products. There is one exception:

Dairy products do not affect the antibiotic *doxycycline*, which comes from tetracycline.

- Orange juice with calcium can have the same effect as dairy products. In one test, calcium-fortified orange juice reduced the level of Cipro in the blood by 40%.
- Some *antacids* contain calcium. Take medications like Cipro, tetracycline, and iron at least 2 hours before or 6 hours after taking antacids.

Alcohol

Avoid alcohol when taking:

- **Claritin or Zyrtec** (for allergies), because alcohol may increase drowsiness
- **Prozac, Zoloft, Paxil** (antidepressants), because alcohol may increase drowsiness, dizziness, and depression
- **Insulin, Glucophage, or Glucotrol XL** (for diabetes), because alcohol combined with these drugs may cause a rapid drop in blood sugar.
- **Coumadin** (a blood thinner), because alcohol may increase the effect and cause bleeding
- **Lipitor, Zocor, Pravachol** (decrease cholesterol), because alcohol may cause liver damage
- **Ambien** (for insomnia), because alcohol may increase drowsiness



Fruit Juices

Grapefruit Juice

Drinking grapefruit juice with some drugs may block the release of stomach enzymes that help the body absorb the drugs. Taking grapefruit juice also slows the breakdown of certain drugs by the liver. This can cause the medicine to build up in the system, creating increased blood levels that may lead to side effects.

Avoid grapefruit juice for at least 2 hours before and after taking these drugs:

- Norvasc, Cardizem, Procardia, Plendil, or Adalat (for high blood pressure or angina)
- Lipitor, Zocor, or Pravachol (to lower cholesterol)
- Antihistamines such as Hismanal (for allergies)
- Xanax and Halcion (for anxiety)
- Estrogens (female hormones)
- Invirase (for HIV and AIDS)



Cranberry Juice

- Cranberry juice can slow down the action of *Valium*, a medicine given to reduce anxiety. It may also increase the excretion of Valium from the body. As a result, cranberry juice can reduce the drug's calming effect.

Other Fruit Juices and Acidic Foods

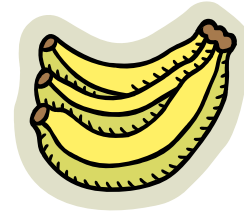


- People taking the antibiotics *penicillin* or *erythromycin* should avoid fruit juices and acidic foods because they cause the drugs to break down too fast, making them less effective.
- Acidic foods include mayonnaise, yogurt, pickles, sauerkraut, cucumbers, and fruit.



Potassium-Rich Foods and Salt Substitutes

Diuretics may wash potassium out of the body. Eating plenty of potassium-rich foods such as *bananas*, *orange juice*, *potatoes*, and *green leafy vegetables* can prevent the body's potassium level from dropping too low.



Some diuretics do not wash potassium from the body and may even block potassium loss. The danger with these drugs is that too much potassium can build up, which can alter the heart's rhythm and cause weakness. People that take this kind of diuretic should avoid potassium-rich foods and salt substitutes containing potassium. Other kinds of medicines used to treat high blood pressure can cause heart problems if there is too much potassium in the diet. Examples of drugs that should not be taken with diets high in potassium include:

- ACE inhibitors
- Capoten
- Dyazide
- Maxzide
- Moduretic
- Vasotec



How do you know which kind of medication a person is taking, and which foods to encourage or avoid?

Read the labels
Check the medication record

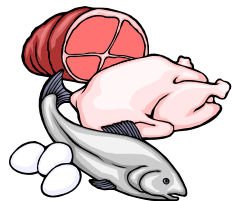
Ask the doctor, pharmacist, or nurse
Read the written material with the drug

Medicines with Special Food Requirements

Some medications have very specific requirements for foods to take or foods to avoid.

Coumadin (*warfarin*--thins the blood to prevent blood clots)

- Avoid large amounts (small amounts are OK) of asparagus, broccoli, cabbage, cauliflower, kale, lettuce, liver, onions, spinach, turnip greens, egg yolk, green tea, and soybean oil. These foods are high in vitamin K, which may undesirably increase blood clotting.
- Large doses of vitamin E can increase the effects of the drug too much, possibly causing excessive bleeding.



Sinemet (*levodopa*—used to treat Parkinson's disease)

- Avoid high-protein foods (meat, fish, and eggs). These foods can reduce the effectiveness of the medication.

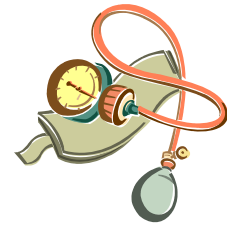
Synthroid (for low thyroid hormone levels)

- Avoid a high-fiber diet and soy products, which might decrease the amount of the drug that is absorbed. Do not eat soy products within 4 hours of taking Synthroid or any medication for low thyroid levels.
- Avoid foods containing large amounts of iodine, such as spinach, shellfish, saltwater fish, and iodized salt. Iodine can affect thyroid hormone levels. Aim for consistent amounts of iodine in the diet.



Monoamine Oxydase Inhibitors (MAOIs) (antidepressant drugs)

- These drugs are given for depression, inability to sleep, panic disorders, and anxiety. They can be dangerous if taken with certain foods. Examples of these medicines are *Nardil*, *Parnate*, and *Manerix*.
- Tyramine, an amino acid found in various foods, can cause a dangerous rise in blood pressure in persons receiving MAOI therapy. People taking these drugs must avoid foods containing tyramine (see chart).



| Foods Containing Tyramine to be Avoided by Persons Receiving MAOI Therapy | | |
|---|---|--|
| → Smoked or pickled herring → Aged fish or meat | → Yeast vitamin supplements or yeast extracts | → Alcohol → Alcohol-free beer and wines |
| → Sausage, bologna, pepperoni, salami | → Cheese, sour cream, yogurt | → Broad (Fava) bean pods |
| → Soups with protein extracts | → Spinach in large amounts | → Chocolate in large amounts |
| → Coffee, tea, colas | → Bean curd | → Nuts in large quantities |
| → Sauerkraut | → Ginseng | → Avocados |

Important Information About Medications

- Medicine should usually be taken with a full glass of plain water.
- Never stir medicine into food or take capsules apart, unless the physician has ordered it this way and the pharmacist has approved it. Mixing medicine with food or taking capsules apart may change the way the drug works.
- Do not mix medications into hot drinks. The heat from the drink may destroy the drug.
- Medicine should never be taken with alcoholic drinks.
- Vitamin pills should usually not be taken at the same time as other medications. Vitamins and minerals can interact with some drugs.



- A person's pharmacist and physician should know about all the medications a person is taking, both prescription and non-prescription. Non-prescription drugs can interact with prescription drugs and change the way one or both medicines affect the person.
- Labels on packages and containers are meant to be read and followed. If you do not understand something, or think you need more information, ask your supervisor, the nurse, the physician, or the pharmacist.
- Read directions, warnings, and interaction precautions printed on all medicine labels and package inserts. Even over-the-counter medications can cause problems.
- Know the allergies of the people you help with their medications. Are they allergic to any medications? Make sure these allergies are noted on all medication paperwork.
- Check expiration dates on medicines, including vitamins and other nonprescription drugs. Taking medicines after their expiration date can be harmful.
- Every detail on a medicine label is important. Every number, dot, and letter means something.



Food and Drug Interactions: Quick Reference

| This drug | with these foods | can lead to: |
|--|---|---|
| Accupril (Ace inhibitor, to treat high blood pressure) | Salt substitutes containing potassium; large amounts of potassium-rich foods such as bananas, oranges, potatoes, leafy green vegetables | May result in increased potassium, which could cause an irregular heartbeat or muscle weakness |
| Achromycin (tetracycline) | Dairy products | Reduced effectiveness of medicine |
| Altace (ramipril) | Salt substitutes containing potassium | Heart rhythm problems |
| Ambien | Alcohol | Increase the drowsiness effect of the drug |
| Antihistamines (Claritin, Allegra, Benadryl, Hismanal) | Grapefruit juice | Heart problems |
| Capoten (captopril) | Salt substitutes containing potassium | Heart rhythm problems |
| Cardizem | Grapefruit juice | Drug levels too high or too low |
| Cipro | Dairy products, calcium-containing antacids, orange juice fortified with calcium | Reduced effectiveness |
| Coumadin (warfarin) | Foods high in vitamin K (leafy green veg.); foods high in vitamin E (onions) | Reduced effectiveness of medicine Bleeding problems |
| Cyclosporin | Grapefruit juice | Confusion and trembling |
| Declomycin | Dairy products | Reduced effectiveness of medicine |
| Dyazide (triamterene) | Salt substitutes containing potassium | Heart rhythm problems |
| Eldepryl (selegiline) | Tyramine-containing foods | Dangerously high blood pressure |
| Erythromycin & Penicillin | Acidic foods (citrus fruits & juices, pickles, tomatoes, vinegar, caffeine) | Reduces effectiveness of medicine |
| Estrogens | Grapefruit juice | Problem with absorption or utilization |
| Fosamax | Orange juice, coffee, and tea | Decreased effectiveness. Take on empty stomach. |
| Halcion (benzodiazepines) | Grapefruit juice | Drug levels too high or too low |
| Invirase (antiviral for HIV) | Grapefruit juice | Problem with absorption or utilization |
| Isoniazid | Tuna, sauerkraut, yeast extract | Headache, palpitations, flushing, diarrhea |
| Larodopa (levodopa) | High-protein foods (meat, fish, eggs) | Reduced effectiveness of medicine |
| Lipitor | Grapefruit juice | Problem with absorption or utilization |
| Lotensin (ACE inhibitor, to treat high blood pressure) | Salt substitutes containing potassium; large amounts of potassium-rich foods | May result in increased potassium, which could cause an irregular heartbeat or muscle weakness |
| MAOIs (antidepressants) | Tyramine-containing foods | Dangerously high blood pressure |
| Marplan (isocarboxazid) | Tyramine-containing foods | Dangerously high blood pressure |
| Maxzide (triamterene) | Salt substitutes containing potassium | Heart rhythm problems |
| Moduretic (amiloride) | Salt substitutes containing potassium | Heart rhythm problems |
| Nardil (phenelzine) (MAOI) | Tyramine-containing foods | Dangerously high blood pressure |
| Norvasc | Grapefruit juice | Drug levels too high or too low |
| Orap (pimozide) | Grapefruit juice | Disturbed heart rhythm |
| Parnate (MAOI) | Tyramine-containing foods | Dangerously high blood pressure |
| Paxil (antidepressant) | Alcohol | May increase drowsiness, dizziness, depression |
| Plendil (felodipine) | Grapefruit juice | Disturbed heart rhythm |
| Pravachol | Grapefruit juice | Problem with absorption or utilization |
| Prinivil (lisinopril) | Salt substitutes containing potassium | Heart rhythm problems |
| Procardia | Grapefruit juice | Drug levels too high or too low |
| Prozac (antidepressant) | Alcohol | May increase drowsiness, dizziness, depression |
| Sinemet (levodopa) | High-protein foods (meat, fish, eggs) | Reduced effectiveness of medicine |
| Synthroid (thyroid) | High-fiber diet & soy products; large amounts of iodine such as spinach, shellfish, saltwater fish, and iodized salt | Problem with absorption or utilization. Iodine can affect thyroid hormone levels. Aim for consistent amounts of iodine in the diet. |
| Theophylline | Caffeine | Nausea, palpitations, or seizures |
| Xanax (benzodiazepine) | Grapefruit juice | Drug levels too high or too low |
| Valium | Cranberry juice | Reduced effectiveness of medicine |
| Vasotec (enalapril) | Salt substitutes containing potassium | Heart rhythm problems |
| Zocor | Grapefruit juice | Problem with absorption or utilization |
| Zoloft (antidepressant) | Alcohol | May increase drowsiness, dizziness, depression |
| Zyvox (linezolid) (antibiotic) | Tyramine-containing food | Dangerously high blood pressure |

