



# DRUG INTERACTIONS

## WHAT ARE DRUG INTERACTIONS?

Prescription drug dosages need to be high enough to fight a specific disease but low enough to avoid causing serious side effects. Taking other prescription drugs, non-prescription (over-the-counter) or recreational drugs, herbal products, or even food can cause large changes in the amount of the drug in your bloodstream. This is called a "drug interaction." It is serious because too much of the drug in your bloodstream can cause serious side effects, and too little can mean that the drug will not work.

**Everyone taking antiretroviral (ARV) drugs should be very careful about drug interactions. Make sure your doctor knows about ALL drugs and supplements you are taking.**

## HOW DOES THE BODY PROCESS DRUGS?

Our body recognizes drugs as "foreign substances." It removes them, usually in urine or in bowel movements. Many drugs are removed unchanged by the kidneys in urine. Other drugs must be processed by the liver. Enzymes in the liver change drug molecules, and then they are eliminated in urine or in bowel movements.

When you take a pill, the drug goes from the stomach to the intestine and then into the liver before circulating to the rest of the body. If the drug is easily broken down by the liver then very little of the drug reaches the body.

## HOW DO DRUGS INTERACT?

The most common drug interactions involve the liver. Several drugs can slow down or speed up the action of liver enzymes. This can cause big changes in the blood levels of other drugs that are broken down by the same enzyme.

A few drugs slow down the kidneys. This increases the blood levels of substances that are normally removed by the kidneys.

## WHY DOES FOOD MATTER?

Any pills that you take go through the stomach. Most drugs are absorbed faster if the stomach is empty. For some drugs,

this is a good thing, but it can also cause more side effects. Some drugs need to be taken with food so that they are broken down more slowly, or to reduce their side effects. Others should be taken with fatty foods because they dissolve in fat and are absorbed better.

Stomach acid breaks down some drugs, including ddl (didanosine, Videx®). Some ddl tablets include an antacid buffer that protects the drug from stomach acid. The buffer, however, interferes with the absorption of indinavir (Crixivan®), so these drugs should not be taken at the same time.

## WHAT DRUGS CAUSE THE MOST INTERACTIONS?

Protease inhibitors and non-nucleoside reverse transcriptase inhibitors are processed by the liver and cause many drug interactions.

Some other types of drugs that are likely to cause interactions include:

- Antifungal drugs with names that end in "-azole"
- Some antibiotics (names end in "mycin")
- The antacid cimetidine (Tagamet®)
- Some drugs that prevent convulsions, including Dilantin® and Tegretol®

**NOTE: This is not a complete list. Other drugs may also cause interactions.**

## WHAT OTHER DRUGS NEED SPECIAL ATTENTION?

With some drugs, just a little too much can cause a dangerous overdose, and if the amount is just a little too low, the drug might not work. This is called having a "narrow therapeutic index." If you are taking this type of drug, any interactions could be dangerous or possibly fatal.

Drugs to watch out for include:

- Some drugs used to treat depression
- Some antihistamines
- Drugs to control heart rhythm
- Some pain killers derived from opium
- Propulsid®, which increases bowel activity
- Some sedatives, including Versed® and Halcion®
- Drugs to thin the blood, including Coumadin®

- Methadone and buprenorphine
- Drugs to treat erectile dysfunction, such as Viagra
- Some drugs used to treat tuberculosis, especially rifampin

Other drugs to watch out for include **recreational drugs**. There are no careful studies of interactions, but there have been reports of overdoses and death caused by taking recreational drugs while taking ARVs. You can find more information at AIDS Community Research Initiative at [http://www.acria.org/treatment/treatment\\_edu\\_springupdate2005\\_interactions.html](http://www.acria.org/treatment/treatment_edu_springupdate2005_interactions.html)

Women taking **birth control pills** should talk to their doctor about drug interactions. Some ARVs can lower the levels of these drugs. This could result in an unwanted pregnancy.

## WHAT ABOUT HERBAL PRODUCTS?

There has been very little research on interactions between herbal products and medications. Recent treatment guidelines indicate that St. John's Wort (see fact sheet #729) should not be taken with any protease inhibitor or non-nucleoside reverse transcriptase inhibitor. Garlic supplements, or possibly large amounts of garlic in food, can reduce blood levels of ARVs. This can cause problems for someone using saquinavir as the only protease inhibitor in their regimen.

## THE BOTTOM LINE

Many ARVs can interact with other medications, drugs, or herbal products, and the list of interactions is always growing. These interactions can lead to serious or fatal overdoses of some drugs, or can drop drug levels too low to do any good. **You and your physician should carefully review the information that comes with each medication (the "package insert"). Ask for this information for each drug that you are taking. Also, be sure that a doctor reviews ALL medications, drugs, and supplements or herbs you are taking.**

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