



RITONAVIR (Norvir)

WHAT IS RITONAVIR?

Ritonavir is a drug used as part of antiretroviral therapy (ART). It is also called Norvir. It is manufactured by Abbott Laboratories. Ritonavir is a protease inhibitor. These drugs prevent the protease enzyme from working. HIV protease acts like a chemical scissors. It cuts the raw material for HIV into specific pieces needed to build a new virus. Protease inhibitors "gum up" these scissors.

WHO SHOULD TAKE IT?

Ritonavir was approved in 1996 as an antiretroviral drug (ARV) for people with HIV infection. It was studied in adults and children 1 month old and older.

There are no absolute rules about when to start ART. You and your health care provider should consider your CD4 cell count, your viral load, any symptoms you are having, and your attitude about taking ART. Fact Sheet 404 has more information about guidelines for the use of ART.

If you take ritonavir with other ARVs, you can reduce your viral load to extremely low levels, and increase your CD4 cell counts. This should mean staying healthier longer.

Ritonavir makes the liver work more slowly. This can increase the blood levels of some drugs, including other protease inhibitors. This can cause some dangerous interactions with other drugs.

Ritonavir is rarely used as a protease inhibitor any more. It is difficult for patients to tolerate. However, ritonavir is frequently used to increase (boost) blood levels of other protease inhibitors. The dose used for boosting is much smaller than the full anti-HIV dose and causes fewer side effects.

WHAT ABOUT DRUG RESISTANCE?

Many new copies of HIV are mutations. They are slightly different from the original virus. Some mutations can keep multiplying even when you are taking an ARV. When this happens, the drug will stop working. This is called "developing resistance" to the drug. See Fact Sheet 126 for more information on resistance.

Sometimes, if your virus develops resistance to one drug, it will also have

resistance to other ARVs. This is called "cross-resistance."

Resistance can develop quickly. It is very important to take ARVs according to instructions, on schedule, and not to skip or reduce doses.

HOW IS IT TAKEN?

Ritonavir is taken by mouth as a capsule or tablet. The full dose (when ritonavir is the only protease inhibitor) is 600 milligrams (mg) twice a day. However, ritonavir is almost never used this way any more. Ritonavir was approved for use by children over 1 month old at a dose of 350 to 400 mg per square meter of body area.

Ritonavir is mostly used to increase the blood levels of other protease inhibitors. Usually 100 or 200 mg are taken with each dose. Be sure you know how much ritonavir your health care provider has prescribed for you, and when and how to take each dose.

A small amount of ritonavir is included in capsules of Kaletra as a booster. Kaletra is also manufactured by Abbott.

During 1998, a liquid form of ritonavir was developed. Many people think the liquid version tastes bad. However, some people find the liquid more convenient, especially for children. The liquid version should **not** be refrigerated. Shake the bottle before taking each dose.

Your pharmacist must keep the ritonavir soft-gel capsules refrigerated. You should keep ritonavir in your refrigerator, but it can also stay out at room temperature (below 77 degrees F, or 25 degrees C) for up to 30 days. A new 100 mg tablet does not need to be refrigerated. The tablet must be taken with a meal.

If full-dose ritonavir is used for adults or children, the dose is gradually increased over the first few days to reduce side effects.

WHAT ARE THE SIDE EFFECTS?

The most serious side effects are nausea, vomiting, gas, and diarrhea. Some people also experience tingling or numbness around the mouth, or find that foods taste strange. Side effects made about one-third of people stop taking ritonavir in some clinical trials. However, there are far less

side effects with the lower "booster" doses of ritonavir.

For many people, the side effects of ritonavir lasted only 2 to 4 weeks. If they lasted beyond 4 weeks, in most cases they were permanent.

HOW DOES IT REACT WITH OTHER DRUGS?

Ritonavir can interact with other drugs or supplements that you are taking. **These interactions can change the amount of each drug in your bloodstream and cause an under- or overdose. New interactions are being identified all the time.**

There can be dangerous interactions with drugs for pulmonary arterial hypertension or erectile dysfunction such as sildenafil (Viagra) or other drugs with names ending in "-afil", drugs to treat asthma, and for heart rhythm (antiarrhythmics.) Taking ritonavir together with saquinavir can cause an irregular heartbeat.

Other drugs to watch out for include other ARVs, drugs to treat tuberculosis (see fact sheet 518), and for migraine headaches. Interactions are also possible with several antihistamines (allergy medications), sedatives, drugs to lower cholesterol and anti-fungal drugs. **Make sure that your health care provider knows about ALL drugs and supplements you are taking.**

Ritonavir lowers blood levels of **methadone**. Watch for signs of excessive sedation if you take ritonavir with **buprenorphine**.

Some **birth control pills** may not work if you are taking ritonavir. Talk to your health care provider about how to prevent an unwanted pregnancy.

The herb **St. John's Wort** (See Fact Sheet 729) lowers the blood levels of some protease inhibitors. Do not take it with ritonavir.

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