How PIs Work

OVERVIEW

HIV attacks cells within the body's immune system. To spread, the virus needs to enter these cells and make copies of itself. The copies are then released from these cells and infect other cells. Treatment with protease inhibitors (PIs) is one way to help stop the virus from replicating and control HIV infection.

The main purpose of HIV is to copy itself as many times as it can. However, HIV lacks the machinery it needs to reproduce itself. Instead, it injects its genetic material into immune cells in the body called CD4 cells. It then uses these cells as a kind of HIV virus factory.

Once HIV enters and integrates its genome with the host cell's DNA, it makes long chains of HIV proteins. At this stage the virus is immature and noninfectious to other CD4 cells. The viral DNA then releases an enzyme known as protease, which is essential in breaking up the protein chains to make new functional virus particles. PIs bind to the protease enzyme, inhibit its activity, and prevent the break-up of the protein chains. Formation of new infectious virus particles is then prevented or inhibited.

PIs are one of 6 classes of antiretroviral drugs (ARVs) used to treat HIV as part of antiretroviral therapy (ART).

AVAILABLE PIs

Currently, there are several PIs that the Food and Drug Administration (FDA) and WHO have approved for HIV treatment:

- atazanavir (Reyataz)
- darunavir (Prezista)
- lopinavir (Kaletra)

PIs are also available in several combination medications. Combination HIV medicines contain 2 or more HIV medicines from 1 or more drug classes.

USE IN COMBINATION TREATMENT

PIs need to be taken along with other medications to treat HIV effectively. To be effective, PIs need to be taken (boosted) with either ritonavir (Norvir) or cobicistat (Tybost).

In addition, 2 other HIV medications are typically prescribed along with the PI and ritonavir or cobicistat. These medications may be given individually as separate pills or together in combination medications that contain multiple drugs.

TIPS FOR USAGE

All PIs come as tablets that are taken by mouth. Your healthcare provider will select treatment based on test results that give important information about your specific condition. If you have taken ARVs before, your healthcare provider will also factor this in when deciding on treatment options.

Once HIV treatment starts, the medication needs to be taken on a daily basis exactly as instructed. This is the most important way to help control your HIV. The following tips can help ensure adherence to treatment:

- **Take the medication** at the same time each day.
- **Use a weekly pill box** that has compartments for each day of the week. These boxes are available in most pharmacies.
- **Combine taking the medication with a task** that is performed every day. This makes it part of your daily routine.
- **Use a calendar** to check off the days when medication was taken.
- **Set an alarm reminder** for taking the medication on a phone or computer.
- **Download an app** that can give reminders when it's time to take the medication. A search for reminder apps will provide many options.
- **Ask a family member or friend to give reminders** for take the medication.
- **Arrange to receive text or phone messaging reminders** from your healthcare provider.

POTENTIAL SIDE EFFECTS

PIs can cause side effects. Some side effects are more common than others. Your reaction depends in part on which drugs your

healthcare provider prescribes and what other drugs you take.

Common side effects usually go away with time. These can include:

- Changes in how foods taste
- Fat redistribution (storing body fat in different places on your body)
- Diarrhea
- Insulin resistance (when the body can't use the hormone insulin well)
- High blood sugar levels (diabetes)
- High cholesterol or triglyceride levels
- Liver problems
- Nausea
- Vomiting
- Rash
- Jaundice (yellowing of the skin or the whites of the eyes), which is most often associated with the use of atazanavir

If you are taking a PI and start to have uncomfortable side effects, don't stop taking the drug without talking to your healthcare provider first. Pausing or changing ARVs can do more harm than good. The medications may become less effective or the virus may become resistant to the drugs altogether. This means the drugs won't work anymore to treat the virus.

THE BOTTOM LINE

Protease inhibitors (PIs) are medications that have made HIV management possible. It is important that the appropriate antiretroviral drug (ARV) regimen for HIV treatment is carefully selected, depending on your medical history, other illnesses, prior HIV treatment, stage of infection, and individual preferences.

If your healthcare provider has prescribed PIs it's important to stick to your treatment plan to manage HIV. If you have side effects from antiretroviral therapy (ART), there are some tips you can try to manage them. More importantly, talk to your healthcare provider for suggestions and recommendations. Your healthcare provider may also change your treatment plan to help relieve side effects.

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