RESISTANCE: THE SILENT SIDE EFFECT

What you need to know about HIV resistance
How to help keep your HIV therapy working
**KNOWLEDGE IS POWER**

Being informed and making smart choices is the first step to getting the most from your HIV therapy. Knowledge can help you and your doctor decide if and when to start HIV therapy. Knowledge also helps you choose a combination of HIV meds that is right for you.

Whether you’ve started HIV therapy or not, learning about resistance is also important, because it’s one of the main reasons why HIV meds stop working.

**By reading this brochure, you’ll learn:**

- What resistance is
- Why resistance happens
- What you can do to reduce the risk of your HIV developing resistance

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UNDERSTANDING RESISTANCE

What is resistance?
Put simply, resistance means that the HIV in your blood changes in a way that stops one or more of your meds from working the way they should. When your HIV becomes resistant to a certain med, that med will no longer work, and you'll have to switch to a different med. However, to really understand resistance, you should know how it happens.

HIV is a virus that makes copies of itself very fast. The HIV virus does this by taking over your body's infection-fighting cells (CD4 T-cells) and turning them into "factories" that make copies of the HIV. Most of the time, the copies look exactly like the original virus. But once in a while, one of the copies comes out looking different from the original. These changes are called mutations.

Some mutations don't have any effect on the way your HIV meds work. However, certain mutations are so different that an HIV med can no longer recognize the resistant HIV virus.

RESISTANCE

To stay healthy, you want to keep the amount of HIV virus in your body low and the number of your CD4 T-cells high.

Resistance can develop when the HIV in your blood makes copies that look different from the original virus. If the changes, called mutations, are different enough, your HIV meds will no longer work the way they should.
Why does resistance stop my meds from working?

For HIV meds to work, they must be able to attach to the HIV virus. However, when a mutation is so different that an HIV med can no longer recognize it, the virus is resistant because the HIV med won’t attack it. And although the med still works on the copies that it does recognize, the resistant HIV copies “escape” and can make more and more copies of themselves.

As the resistant copies grow in number, the HIV med becomes less and less effective at keeping the amount of HIV in your blood low and the number of your CD4 T-cells high.

Why does resistance happen?

If you’re not taking your HIV meds exactly as your doctor tells you to, you may not have enough medicine in your body to keep the amount of HIV in your blood low. This gives the HIV in your blood the opportunity to make millions of copies of itself. As it makes more and more copies, it also makes more and more mutations. As we said earlier, certain mutations are so different that an HIV med can no longer recognize the resistant HIV virus, and can no longer attack it.

There are other ways HIV can become resistant. Sometimes, the meds you are taking give the HIV in your blood more opportunities to make mutations no matter how carefully you follow your doctor’s instructions. Ask your doctor which HIV meds may be better at keeping the HIV in your blood from making resistant copies of itself.
Can I feel resistance when it happens?

It’s important to understand that your body or your meds don’t develop resistance – the HIV in your blood does. When the HIV in your blood becomes resistant to your HIV meds, you may not feel any different at first. No alarm goes off in your body to warn you. You could say resistance is like a “silent side effect.” But even though you can’t feel resistance, your HIV meds can become less and less effective. And because your HIV meds aren’t working the way they should, the amount of HIV in your blood increases, which may cause you to become sick and feel worse.

HIV is either resistant, or it’s not, right?

No. The degree of resistance can vary. In addition, resistance usually develops gradually over time. As resistance develops, your meds will not work as well. Eventually, your meds won’t work at all, and you’ll have to switch to new meds.

Can I be infected with HIV that’s already resistant to certain meds?

Yes. Not all HIV is the same. You could be infected by someone with an already resistant form of HIV. If this happens, your choices of HIV meds may be limited before you even begin your HIV therapy.

It’s also possible for someone who’s already HIV positive to be “re-infected” with resistant HIV. That’s why everyone should practice safer sex — even if both partners are already HIV positive. This means using a condom or dental dam during sex. Not sharing needles for drugs, or needles and ink for tattoos, is equally important.

Resistance to HIV meds happens over time — it’s not an all-or-nothing thing.

Being infected or “re-infected” with resistant HIV can limit your choices of HIV meds that work.
What is cross-resistance?

When HIV becomes resistant to one HIV med, cross-resistance may also make HIV unrecognizable to other meds that are in the same “family.” This is because each med belonging to the same “family” fights HIV in a similar way. It is possible for cross-resistance to wipe out a lot of your future treatment options. This is why reducing the chances of your HIV making resistant copies of itself is so important.

The basic “families” of HIV meds are:

- NRTIs (nucleoside/nucleotide reverse transcriptase inhibitors, or “nukes”)
- NNRTIs (non-nucleoside reverse transcriptase inhibitors, or “non-nukes”)
- PIs (protease inhibitors)
- FIs (fusion inhibitors)

For HIV meds to work best, they should be used in combination with other HIV meds. No one med can minimize your risk of developing resistance if it is used alone. Combinations that include at least two different “families” of HIV meds may work better than combinations that don’t. Certain HIV meds may be better at minimizing the chance of your HIV developing resistance. Your healthcare team can tell you more about HIV meds that help minimize resistance.

Can I get rid of resistance once it develops?

No. Once the HIV in your blood becomes resistant to a certain HIV med, that med will no longer work the way it should.

As we said before, the goal of your HIV therapy is finding a combination of meds that will keep you healthy and feeling good for a long time. Usually, your first combination of meds is your best chance at finding a long-lasting combination. If your HIV develops resistance to your first combination, your second combination of HIV meds may not work as well or last as long as the first.

Since you can’t reverse resistance or make it go away, minimizing the risk of your HIV developing resistance in the first place is very important.
MINIMIZING RESISTANCE

Why is it important to take my meds exactly as prescribed?

HIV makes copies of itself very fast. If you miss a dose of your meds, the level of medicine in your blood goes down. If the level of medicine in your blood drops below a certain point, HIV can make more copies of itself. The more copies HIV can make of itself, the more likely the chance that it will make a mutation that is resistant to your meds.

To ensure that you always have enough medicine in your blood to fight HIV, you must always take your HIV meds exactly as prescribed by your doctor. For example, if your doctor tells you to take them twice a day at 7 am and 7 pm with food, then that’s what you must do – and keep doing every day.

If you’re not sure how to take your meds, ask your doctor, HIV counselor, or HIV-trained pharmacist for help.

How do medicine levels in my blood change?

Medicine levels in your blood are changing all day long. Right before your next dose, they are at their lowest. At this point, medicine levels may fall below what you need – especially if you miss a dose or take it late.

This is why it’s important for the lowest levels of medicine to stay well above the amount you need to keep HIV under control.

Are medicine levels the same for all meds?

No. Some HIV meds keep higher amounts of medicine in your blood than others. Some HIV meds are absorbed into your body better than others. And some medicines leave your body faster.

Because everyone’s bodies are different, the amount of HIV in the blood will also be different from person to person – even when the same amount of the same medicine is taken the same way. Again, the important thing is for medicine levels in your body to stay well above the amount needed to fight your HIV. Medications that keep a higher level of the drug in your blood between doses are more likely to reduce the chance that your HIV will become resistant.

Ask your doctor or healthcare team which medications can help keep a higher level of the drug in your blood between doses to keep fighting HIV at all times.
What else can I do to minimize the risk of my HIV developing resistance?

You play the most important role in minimizing the risk of your HIV developing resistance to your meds. Here are some tips that can help:

Take your meds correctly.

To reduce the risk of your HIV developing resistance to your meds you must always take your meds on time exactly the way your doctor prescribed. This won’t be easy, but you can do it.

Learn about the meds you’re taking.

Knowing which meds are better at minimizing the risk of your HIV developing resistance will help you make better choices when it comes to your HIV therapy.

Plan ahead.

Every day, think ahead of where you’ll be going and what you’ll be doing. Make a plan. Forgetting to take your meds is the most common reason people miss a dose, so reminders can help.

Remember, resistance can limit your future treatment options.

Work with your doctor to choose meds that help minimize the chance of your HIV developing resistance to your meds. While fewer pills, fewer doses, and milder side effects are important, reducing the chance that your HIV becomes resistant to your meds should be one of your top priorities.

How can I tell if my meds are still working?

Because HIV meds are taken in combination, it is important to know which one is no longer recognizing and fighting your HIV. Two blood tests are used to find this out.

A phenotypic test (pronounced “fee-no-tip-ick”) measures how well a medicine stops the HIV in your blood from making copies of itself. If your HIV becomes resistant, the medicine may no longer work well enough to keep your HIV under control. This test is done for all of the different meds to see which ones will or won’t work for you.

A genotypic test (pronounced “gee-no-tip-ick”) identifies which mutations your HIV has developed. Knowing which meds work against which mutations allows your doctor to predict which meds will work for you.

Ask your doctor if you should have one of these tests.
The more you know, the better you’ll feel.

Test what you know about resistance. Answer and return this page to your doctor and talk about your therapy together.

Q 1 What is resistance?
❍ A. When you don’t like taking your meds
❍ B. When your body “resists” your medication
❍ C. When the HIV in your blood changes in a way that stops your medication from working the way that it should
❍ D. When your medications change in a way that stops them from keeping your HIV under control

Q 2 What can cause resistance?
❍ A. When you forget to take your HIV meds too many times
❍ B. When the amount of medicine in your body is too low
❍ C. When HIV makes copies that are different from the original
❍ D. All of the above

Q 3 With careful management, you can get rid of resistance.
❍ A. True
❍ B. False

Q 4 HIV is either totally resistant or it’s not resistant at all.
❍ A. True
❍ B. False

Q 5 You can be “re-infected” with HIV that is already resistant.
❍ A. True
❍ B. False

Build a support team.

Having a few friends or family members that you can count on to help remind you to take your meds can be a big help. In addition, talk openly and honestly with your healthcare team; they can help you solve problems.

It’s all about attitude.

Keeping a positive attitude and reducing stress can help you take your meds the right way. If you do miss a dose – and everyone does sooner or later – don’t beat yourself up! Just try to learn from your mistake and do better.

With some of the meds available today, long-term success is possible. New meds are being developed, too. You and your doctor will want to make choices that will help your HIV meds last a long time.

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Continued on other side
Q 6 What is cross-resistance?
❍ A. When HIV is resistant to a med only when you are angry or stressed
❍ B. When HIV is no longer resistant to your HIV meds
❍ C. When you are only partially resistant to your HIV meds
❍ D. When HIV is resistant to one med and also develops resistance to other meds in the same “family”

Q 7 What can help you minimize the development of resistance?
❍ A. Getting plenty of exercise
❍ B. Taking your HIV meds exactly as prescribed by your doctor
❍ C. Drinking 2 cups of orange juice every day
❍ D. Keeping a positive attitude

Q 8 Resistance to one or more HIV meds can limit your future treatment options
❍ A. True
❍ B. False

Q 9 A blood test to help you determine if the HIV in your blood is resistant to one or more of your meds is called:
❍ A. Phenotypic test
❍ B. Genotypic test
❍ C. Both
❍ D. Neither

Q 10 Which of the following becomes resistant?
❍ A. You
❍ B. Your meds
❍ C. Your HIV
❍ D. Your CD4 T-cells

For more information about resistance, ask your doctor. Or visit AbbottVirology.com.