AIDS InfoNet www.aidsinfonet.org **Fact Sheet Number 419**

TENOFOVIR (Viread)

WHAT IS TENOFOVIR?

Tenofovir (Viread®), also called bis-POC PMPA, is a drug used for antiviral therapy. It is manufactured by Gilead Sciences. The FDA approved tenofovir for use against HIV in October 2001.

Tenofovir is a nucleotide analog reverse transcriptase inhibitor, or nuke. These drugs stop HIV from multiplying by preventing the reverse transcriptase enzyme from working. This enzyme changes HIV's genetic material (RNA) into the form of DNA. This has to occur before HIV's genetic code gets inserted into an infected cell's genetic codes.

WHO SHOULD TAKE TENOFOVIR?

Tenofovir was approved in 2001 as an antiviral drug for people with HIV infection. It has not been carefully studied in people younger than 18 or older than age 65.

There are no absolute rules about when to start antiviral drugs. You and your doctor should consider your T-cell count, your viral load, any symptoms you are having, and your attitude about taking HIV medications. Fact Sheet 404 has more information about guidelines for the use of antiviral medications.

Be sure to let your doctor know if you have any kidney problems. People with kidney damage may need to take a reduced dose of tenofovir.

If you take tenofovir with other antiviral drugs, you can reduce your viral load to extremely low levels, and increase your T-cell counts. This should mean staying healthier longer.

Tenofovir may also help control Hepatitis B (see fact sheet 506). However, Hep B got much worse in some people who were taking tenofovir and then stopped taking it. Get tested for hepatitis B before you start taking tenofovir to treat HIV. If you have hepatitis B and stop taking tenofovir, your doctor should carefully monitor your liver function for several months.

Tenofovir is also being studied for the prevention of HIV infection. Gilead hopes that just one pill a day will be effective.

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 antiviral drug. 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 antiviral drugs. This is called "cross-resistance". However, tenofovir seems to have very little cross resistance with other antiviral drugs.

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

A benefit of tenofovir is that it works against several strains of HIV that are already resistant to AZT, ddC, or ddI.

HOW IS TENOFOVIR TAKEN?

The normal adult dose of tenofovir is 300 milligrams (mg) taken as one pill, once a day, with or without a meal. People who are taking both tenofovir and ddI (didanosine, Videx) should take tenofovir 2 hours before, or one hour after didanosine.

Tenofovir is also available in Truvada, a combination of tenofovir and emtricitabine (see fact sheet 421).

WHAT ARE THE SIDE EFFECTS?

With the start of any antiviral treatment there may be temporary side effects such as headaches, high blood pressure, or a general sense of feeling ill. These side effects are likely to get better or even disappear over time.

The most common side effects of tenofovir are nausea, vomiting and loss of appetite. In some people, tenofovir can increase creatinine and transaminases. These are enzymes related to the kidneys and liver. High levels can indicate damage to these organs.

Tenofovir can reduce bone mineral density (see fact sheet 557). Calcium or vitamin D supplements may be helpful. This is especially true for people with osteopenia or osteoporosis.

HOW DOES TENOFOVIR REACT WITH OTHER DRUGS?

Tenofovir and didanosine (Videx) A recent study showed that taking 250 mg of the "enteric coated" version of ddI (Videx EC) with tenofovir results in blood levels as high as taking 400 mg of Videx EC by itself. ddI and tenofovir should not be used together, especially in patients with a high viral load and a low CD4 count. Some patients have had serious side effects related to high levels of ddI.

Tenofovir blood levels increase if it is taken with the protease inhibitors **atazanavir (Reyataz)** and **lopinavir/ritonavir (Kaletra).** This can increase the risk of tenofovir side effects. Tenofovir decreases blood levels of atazanavir. Ritonavir should be taken when atazanavir is taken with tenofovir.

Tenofovir does not affect blood levels of **methadone, ribavirin** or **adefovir.**

Three regimens containing tenofovir should normally not be used without careful analysis of risks and benefits, or additional anti-HIV drugs:

- **Tenofovir + abacavir + lamivudine** (Viread + Ziagen + Epivir)
- **Tenofovir + didanosine + lamivudine** (Viread + Videx + Epivir)
- **Tenofovir + Videx EC + either efavirenz or nevirapine** in patients new to anti-HIV therapy with high viral loads.

Tenofovir is eliminated by the kidneys. It is not metabolized in the liver, so it is not expected to interact with many other drugs. However, antiviral drugs with names that end in "-ovir," such as acyclovir and ganciclovir, may interact with tenofovir. Be sure your doctor knows about all medications you are taking.

Tenofovir should be used as part of combination antiviral therapy against HIV. It is normally used along with a nucleoside analog reverse transcriptase inhibitor (nuke) plus a non-nucleoside reverse transcriptase inhibitor (NNRTI) or a protease inhibitor.

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