TENOFOVIR DF (Viread)

WHAT IS TENOFOVIR?

Tenofovir dispoxil fumarate (TDF, Viread) is a drug widley used as part of antiretroviral therapy (ART). It is manufactured by Gilead Sciences. The FDA approved tenofovir for use against HIV in October 2001. Generic versions are approved under PEPFAR (see fact sheet 925.)

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 is inserted into an infected cell's genetic codes.

WHO SHOULD TAKE TENOFOVIR?

Tenofovir DF was approved in 2001 as an antiretroviral drug (ARV) for people with HIV infection. In US treatment guidelines (see fact sheet 404), tenofovir is listed as a preferred drug for people just starting ART.

While antiretroviral therapy (ART) is recommended for all people living with HIV, independent of your symptoms or CD4 count, 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 ARVs. Fact Sheet 404 has more information about guidelines for the use of ARVs.

Be sure to let your health care provider 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 ARVs, you can reduce your viral load to extremely low levels, and increase your CD4 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 health care provider should carefully monitor your liver function for several months.

Tenofovir is also approved as part of Truvada for the pre-exposure prevention of HIV infection (called PrEP, see fact sheet 160), and used for post-exposure prevention of HIV (called PEP, fact sheet 156).

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." However, tenofovir seems to have very little cross-resistance with other ARVs.

Resistance can develop quickly. It is very important to take ARVs 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 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.

A new version tenofovir called tenofovir alafenamide (TAF; previously known as GS7340), has been developed. In studies TAF causes fewer effects on the kidneys and bone. TAF is available in certain combination pills, including Descovy (fact sheet 428), Odefsey (fact sheet 476) and Genvoya (fact sheet 475).

People who are taking both tenofovir and ddI (didanosine, Videx) should take tenofovir 2 hours before, or one hour after didanosine.

Children ages 2 to 5 will use a powder formulation. For children ages 6 to 12, there are pills of 150 mg, 200 mg, 250 mg. Dosing is based on age and weight.

Tenofovir is also available in Truvada, a combination of tenofovir and emtricitabine (fact sheet 421), and other combination drugs, including Complera (fact sheet 471) and Stribild (474).

WHAT ARE THE SIDE EFFECTS?

With the start of any ART 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. TDF can cause kidney damage. Creatinine levels should be monitored in people taking tenofovir. Tenofovir can also damage the liver. People taking tenofovir should have their liver health monitored.

TDF 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. This is important for young people because bone density normally increases during this period. A newer version of tenofovir, called TAF has less effect on kidney and bones.

HOW DOES TENOFOVIR REACT WITH OTHER DRUGS?

Tenofovir can interact with other drugs or supplements you are taking. **These interactions can change the amount of each drug in your bloodstream and cause an under- or overdose. New interactions are constantly being identified. Make sure that your health care provider knows about ALL drugs and supplements you are taking.**

TDF results in higher blood levels of **didanosine (Videx).** ddI and tenofovir should not be used together, especially in patients with a high viral load and a low CD4 count. Serious ddI side effects may result.

TDF 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.** There is no known interaction between tenofovir and **buprenorphine.**

TDF is removed from the body by the kidneys. It is not metabolized in the liver, so it is not expected to interact with many other drugs. However, medications with names that end in "-ovir," such as acyclovir and ganciclovir, may interact with tenofovir.

Tenofovir should be used as part of combination antiretroviral therapy (ART) 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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