



FACT SHEET

Diethylenetriamine pentaacetate (DTPA)

What is DTPA?

DTPA is a kind of medicine called a *chelating agent*. Chelating agents work by binding and holding on to radioactive materials or poisons that get into the body. Once bound to a radioactive material or poison, the chelating agent is then passed from the body in the urine. Chelating agents help decrease the amount of time it takes to get a poison out of the body. This fact sheet from the Centers for Disease Control and Prevention (CDC) gives you some basic information about DTPA.

What does DTPA do?

When radioactive materials get into the body through breathing, eating, drinking, or through open wounds, we say that "internal contamination" has occurred (<http://www.bt.cdc.gov/radiation/contamination.asp>). Over the past 50 years, almost all cases of internal contamination have happened in people who use radioactive materials in their work. Since the 1960s, doctors have used DTPA as a chelating agent to treat internal contamination from radioactive materials such as americium (<http://www.bt.cdc.gov/radiation/isotopes/americium/index.asp>), plutonium (<http://www.bt.cdc.gov/radiation/isotopes/plutonium/index.asp>), californium, curium, and berkelium. Currently, DTPA is approved by the U.S. Food and Drug Administration (FDA) for chelation of only three radioactive materials: plutonium, americium, and curium.

What DTPA cannot do

Knowing what DTPA cannot do is also important. DTPA cannot bind all of the radioactive materials that might get into a person's body after a radiological or nuclear event, such as a terrorist attack with a "dirty bomb." This medicine cannot prevent radioactive materials from entering the body. DTPA cannot reverse the health effects caused by radioactive materials once these materials have entered the body.

How does DTPA work?

DTPA comes in two forms: calcium (Ca-DTPA) and zinc (Zn-DTPA). Both forms work by tightly chelating (holding on to) plutonium, americium, and curium. These radioactive materials (bound to DTPA) are then passed from the body in the urine. When given within the first day after internal contamination has occurred, Ca-DTPA is about 10 times more effective than Zn-DTPA at chelating plutonium, americium, and curium. After 24 hours have passed, Ca-DTPA and Zn-DTPA are equally effective in chelating these radioactive materials.

How well does DTPA work?

Chelating agents work best when given shortly after radioactive materials or poisons have entered the body. The more quickly a radioactive material or poison is removed from the body, the fewer and less serious the health effects will be. After 24 hours, plutonium, americium, and curium are harder to chelate. However, DTPA can still work to remove these radioactive materials from the body several days or even weeks after a person has been internally contaminated.

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Who should get DTPA?

Many people could be internally contaminated after a radiological or nuclear terrorist event. People contaminated with small amounts of radioactive materials might not need treatment with DTPA. Doctors and public health authorities will work together to decide who will likely benefit from DTPA treatment.

- **Infants (including breastfed infants) and children <12 years of age**

Either Ca-DTPA or Zn-DTPA may be given to infants and children. The dosage of DTPA to be given should be based on the child's size and weight.

- **Young adults and adults**

Young adults and adults internally contaminated with plutonium, americium, or curium should receive Ca-DTPA if treated within the first 24 hours after contamination. After 24 hours, if additional treatment is needed, adults should receive Zn-DTPA. If Zn-DTPA is not available, patients may receive Ca-DTPA together with a vitamin and mineral supplement that contains zinc.

- **Pregnant women**

Unless a pregnant woman has very high levels of internal contamination with plutonium, americium, or curium, treatment should begin and continue with Zn-DTPA. Ca-DTPA should be used in pregnant women only to treat very high levels of internal radioactive contamination. In this case, doctors and public health authorities may prescribe a single dose of Ca-DTPA, together with a vitamin and mineral supplement that contains zinc, as the first treatment. However, after the first dose of Ca-DTPA, treatment should continue 24 hours later with a daily dose of Zn-DTPA, as needed.

- **Breastfeeding women**

Radioactive materials can—and do—get into breast milk. For this reason, CDC recommends that women with internal contamination stop breastfeeding and feed the child baby formula or other food if it is available. If breast milk is the only food available for an infant, nursing should continue. Breastfeeding women who are internally contaminated with plutonium, americium, or curium should be treated with DTPA.

How should DTPA be given?

Currently, DTPA is only available by injection and is not available in an oral (by mouth) form. DTPA may be injected directly into a vein in the arm or dripped into a vein from a bag (intravenously [IV]). Injection and IV drip are good ways of treating people a) who might have been internally contaminated by eating, drinking, or inhaling radioactive materials or b) who have contaminated wounds.

Adults who have inhaled plutonium, americium, or curium can be treated with DTPA mist or spray that is breathed into the lungs. Inhaling DTPA might cause some people, especially those with asthma, to cough or wheeze. The safety and effectiveness of inhaled DTPA has not been shown in children.

How often will I need to get DTPA?

DTPA should be taken only as long as your doctor has determined you need it. In the past, most people who have needed treatment with DTPA have only needed one dose. However, internal contamination with very high levels of plutonium, americium, or curium may require treatment with DTPA every day for weeks or months. The length of treatment with DTPA will depend on a) the amount of radioactive material in your body and b) how well your body gets rid of the radioactive material. Doctors might collect samples of blood, urine, and feces during your treatment with DTPA. These samples can tell the doctors how much radioactivity you are passing and how much remains in your body.

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Medical conditions that might make it harmful to receive DTPA

There are no medical reasons why a person who is internally contaminated with plutonium, americium, or curium should not be treated with Ca-DTPA or Zn-DTPA. However, keep the following guidelines in mind:

- Because radioactive materials chelated to DTPA are passed out of the body in the urine, DTPA must be used carefully in people whose kidneys do not function properly.
- Ca-DTPA should be used carefully in people who have a disease called "hemochromatosis." (Hemochromatosis is a genetic disease that causes the body to absorb too much iron from foods and other sources, such as vitamins containing iron.)
- Breathing treatments using DTPA may not be safe for some people with asthma. If a person with asthma requires treatment with DTPA, the drug should be injected.
- DTPA should not be used to treat people who are internally contaminated with the radioactive materials uranium (<http://www.bt.cdc.gov/radiation/isotopes/uranium/index.asp>) or neptunium.

What are the possible risks and side effects of DTPA?

DTPA does not build up in the body or cause long-term health effects. People who are given repeat doses of Ca-DTPA within a short period of time may have nausea, vomiting, diarrhea, chills, fever, itching, and muscle cramps. Other side effects may include headache, lightheadedness, chest pain, and a metallic taste in the mouth.

Ca-DTPA (and Zn-DTPA) can chelate certain important minerals that the body needs (zinc, magnesium, and manganese). For example, the body needs zinc to make red blood cells, white blood cells, and platelets. Therefore, DTPA treatment may interfere with the normal production of blood cells. As a precaution, patients receiving long-term treatment with DTPA should be given a vitamin and mineral supplement that contains zinc.

Where can I get DTPA?

CDC has included both Ca-DTPA and Zn-DTPA in the Strategic National Stockpile, a collection of medicines and medical supplies that CDC maintains for emergencies. During an emergency, these medicines and medical supplies are given to doctors and hospitals for treatment of patients.

Other information sources

More detailed information on DTPA can be found at the FDA Web site at <http://www.fda.gov/cder/drug/infopage/dtpa/>.

For more information, visit www.bt.cdc.gov/radiation,
or call CDC at 800-CDC-INFO (English and Spanish) or 888-232-6348 (TTY).