Targeted Cancer Therapy

Targeted therapy is a newer type of cancer treatment that uses drugs or other substances to more precisely identify and attack cancer cells. Targeted therapy is a growing part of the treatment for many types of cancer.

- **What Is Targeted Cancer Therapy?**
- **Things to Know Before Getting Targeted Cancer Therapy**
- **Side Effects of Targeted Cancer Therapy Drugs**

**What Is Targeted Cancer Therapy?**

Researchers have learned about some of the differences in cancer cells (or other cells near them) that help them grow and thrive. This has led to the development of drugs that “target” these differences. Treatment with these drugs is called *targeted therapy*.

Targeted therapy drugs, like other drugs used to treat cancer, technically are considered chemotherapy. But targeted therapy drugs don’t work the same way as standard chemotherapy (chemo) drugs. For example, many targeted drugs go after the cancer cells’ inner workings – the programming that makes them different from normal, healthy cells, while leaving most healthy cells alone. These drugs tend to have side effects different from standard chemo drugs.

- Targeted therapy is a special type of chemotherapy that takes advantage of differences between normal cells and cancer cells. It’s sometimes used alone, but most often other cancer treatments are used with targeted therapy.

Targeted drugs can be used as the main treatment for some cancers, but in most cases they’re used with other treatments such as chemo, surgery, and/or radiation therapy.
How does targeted cancer therapy work?

Most standard chemo drugs work by killing cells in the body that grow and divide quickly. Cancer cells divide quickly, which is why these drugs often work against them. But chemo drugs can also affect other cells in the body that divide quickly, which can sometimes lead to serious side effects.

Targeted therapy drugs don’t work like chemo drugs. These drugs target certain parts of cancer cells that make them different from other cells. (Or they may target other cells that help cancer cells grow.)

Cancer cells typically have many changes in their genes (DNA) that make them different from normal cells. For instance, these gene changes might allow the cell to stop working the way it should and/or grow and divide very quickly. These types of changes are what make it a cancer cell.

But there are many different types of cancer, and not all cancer cells are the same. For example, colon cancer and breast cancer cells often have different gene changes that help them grow and/or spread. Even among people with colon cancer, the cancer cells can have different gene changes.

Targeted drugs zero in on some of the changes that make cancer cells different. They target specific areas of the cancer cell that allow the cell to grow faster and abnormally. There are many different targets on cancer cells and many drugs that have been developed to attack them.

Targeted drugs can work to:

- **Block or turn off chemical signals** that tell the cancer cell to grow and divide
- **Change proteins** within the cancer cells so the cells die
- **Stop making new blood vessels** to feed the cancer cells
- **Trigger your immune system** to kill the cancer cells
- **Carry toxins to the cancer cells** to kill them, but not normal cells

Some targeted drugs are more “targeted” than others. Some might target only a single change in cancer cells, while others can affect several different changes. Others boost the way your body fights the cancer cells. This can affect where these drugs work and what side effects they cause.

Things to Know Before Getting Targeted
Cancer Therapy

Here are some questions you might want answered before you start your treatment. For treatment-related questions, see the targeted therapy page under a specific cancer type.

Can I drink alcohol while getting targeted therapy?

Small amounts of alcohol can help you relax and increase your appetite. But alcohol can interact with some drugs so that they don’t work as well, or it may make some side effects worse. Be sure to ask your doctor if you can drink beer, wine, or any other alcoholic beverages while you’re getting targeted therapy.

Can I take vitamin, mineral, or herbal supplements while getting targeted therapy?

There’s no single answer to this question. Some herbal supplements can interact with some targeted drugs, which might make the drugs less effective or increase their side effects. Some other supplements are probably safe to take, but there hasn’t been a lot of research to prove this. It’s not clear if any type of supplement can actually be helpful if taken along with a targeted drug. This is an area that hasn’t been well studied.

It’s important not to take any supplement without talking to your doctor first.

Do I need to protect others from exposure to my targeted drug?

Although there are guidelines for protecting those close to you while on standard chemo, little has been written about what’s needed while on targeted therapy. Even though these drugs tend to have less severe side effects, anyone taking a targeted drug should avoid exposing their loved ones to the drug unnecessarily. This doesn’t mean that you need to avoid close contact with others while you’re getting treatment. It means that you should be careful about exposure to the drug itself or any body fluids that could contain the drug (such as urine or vomit).

If you’re taking the drug at home, you should keep your pills away from children and pets. Ask your cancer care team about precautions you and your family should take.
Will targeted therapy affect my memory and thinking?

Research has shown that cancer and some of its treatments, such as chemotherapy and radiation, can sometimes affect thinking, memory, or concentration, even many years after treatment. Although this is commonly called *chemo brain* or *chemo fog*, it even can occur in people who don’t get drug treatment for their cancer. But it isn’t clear if targeted drugs by themselves can cause chemo brain. You can learn more in Chemo Brain.

Will targeted therapy affect my sex life?

Some people being treated for cancer notice little or no change in their levels of sexual desire and energy. Others find that their sexual interest declines.

Some of the possible ways targeted drugs might affect your desire for sex or make it harder to enjoy include:

- Worries about changes in how you look (skin rashes, weight changes, hair changes)
- Side effects such as nausea, diarrhea, or sensitive skin

Learn more in Sexuality for the Woman With Cancer and Sexuality for the Man With Cancer.

Is it safe to get pregnant during targeted therapy treatment?

It might be possible to get pregnant during treatment, but doctors recommend that it be avoided because some targeted therapy drugs could cause birth defects. Doctors typically advise women of childbearing age – from the teens through the end of menopause – to use birth control throughout treatment and often for some time afterward. Ask your doctor what forms of birth control are safe to use.

If a woman is pregnant when her cancer is first found, it might be possible to delay treatment until after the baby is born. For a woman who needs treatment sooner, the doctor may suggest starting treatment after the 12th week of pregnancy, when the fetus is beyond the stage of greatest risk. Sometimes, terminating the pregnancy might be considered.
Most targeted therapies aren’t known to have long-term effects on a woman’s ability to become pregnant after treatment, but this issue hasn’t been well studied. Before you start treatment, talk to your doctor if you are considering pregnancy in the future.

Little is known about male fertility and whether it’s safe to father a child while you are getting targeted therapy. Again, talk to your doctor if this is a concern.

**How do I pay for targeted therapy treatment?**

The cost of targeted therapy depends on the drug used, how it’s given, how long and how often it’s given, and whether you get treatment at home, in a clinic, office, or hospital.

- Insurance plans often cover very expensive targeted drugs that are taken by mouth under their prescription drug benefit, so you end up paying more out of pocket than you would for IV drugs given in a clinic, hospital, or office.

Targeted drugs tend to be very expensive and can cost thousands of dollars per month. Drugs that are given into a vein (IV) are covered differently by insurance plans than are drugs taken by mouth, which can affect how much you have to pay.

Drugs that are taken by mouth may be covered under your prescription drug benefit rather than your cancer chemo benefit, this means you may end up paying more out of pocket. Because these drugs are expensive, having a set prescription co-pay can often be much cheaper than if you have to pay a percentage of the prescription cost.

Most health insurance policies, including Medicare (Part B and D), cover at least part of the cost of most kinds of targeted therapy and chemo drugs. But to reduce their costs, companies often don’t pay for every drug. Before you start treatment, find out whether your health insurance will pay for your medicines, and how much they will pay for any targeted drug you take. If it’s too costly for you, ask your doctor about getting help from the drug company. To learn more about getting this kind of help, see Prescription Drug Assistance Programs.

**Side Effects of Targeted Cancer Therapy Drugs**
Although targeted therapy drugs don’t affect you the same way that standard chemo drugs do, they can still cause side effects. There are many different types of targeted drugs, and the side effects from these drugs depend largely on what each drug targets.

**What should I know about side effects?**

- Not every person gets every side effect, and some people get few, if any.
- The severity of side effects can vary greatly from drug to drug and from person to person. Be sure to talk to your cancer care team about which side effects are most common with your treatment, how long they might last, how bad they might be, and when you should call the doctor’s office about them. Your doctor may give you instructions to follow or medicines to help prevent some side effects before they happen.
- Rare and unusual side effects can happen with some of these drugs, and some can be serious. Report all changes and side effects as soon as possible to your cancer care team.
- Although side effects can be unpleasant, the less serious ones must be measured against the need to fight the cancer.

**How long do side effects last?**

Most side effects go away over time after treatment ends and the healthy cells recover. The time it takes to get over some side effects varies from person to person. It depends on many factors, including your overall health and the drugs you were given.

Because many targeted drugs are still quite new, it’s hard to say how long you can expect side effects to last. We do know that some of the side effects from standard chemo drugs can last a lifetime, such as when the drug causes long-term damage to the heart, lungs, kidneys, or reproductive organs. In many cases we still don’t know if targeted therapy drugs cause these kinds of long-term changes.

**Skin problems from targeted cancer therapy drugs**

Many targeted therapy drugs cause a rash or other skin changes. These skin problems usually develop slowly over days to weeks. They are not signs of a drug allergy.

In contrast, allergic reactions to drugs tend to start suddenly, usually within minutes to hours after taking the drug. They may include hives (raised skin welts that often go
away in a day or so) and intense itching. An allergic reaction often includes other serious symptoms such as trouble breathing, dizziness, tightness in the throat or chest, or swelling of the lips or tongue. If you have these kinds of symptoms, get emergency help and call your doctor right away.

- Skin problems are common with targeted drugs, and can range from mild to severe. They can be debilitating and can affect your quality of life. There are some things you can do to try to prevent them, but you'll need your doctor’s help to keep an eye on them and/or treat them.

**Why do skin changes occur?**

Skin changes are caused by the way some targeted therapy drugs work. For instance, some targeted drugs attack the epidermal growth factor receptor (EGFR) protein, which tells the cancer cells to grow and divide. These are called **EGFR inhibitors**, and examples are cetuximab (Erbitux®), panitumumab (Vectibix®), and erlotinib (Tarceva®). The problem is that normal skin cells also have a lot of EGFR, so drugs that target or block EGFR can affect skin cells, too. They turn off the signal for skin cells to grow normally and make it harder for them to retain moisture.

Drugs called angiogenesis inhibitors often target vascular endothelial growth factor (VEGF) proteins. Bevacizumab (Avastin®) is one of these drugs. The VEGF proteins help tumors build and keep a blood supply, but they also seem to be important to the very small blood vessels in the hands and feet. Blocking these proteins leads to damage in these tiny blood vessels which can cause hand-foot syndrome (described later).

**What kinds of skin changes should I watch for?**

**Changes in how your skin feels:** Your skin may start to feel like it’s sunburned, before any redness or rash shows up. Even though it doesn’t look different, the sensation can be disturbing. You may notice this change on your face as early as the first week of treatment.

**Photosensitivity:** Your skin will likely become much more sensitive to light and more easily damaged by UV rays during treatment. It may very easily be burned and blister, even after very little sun exposure or exposure to sun coming through windows.

**Rash:** This is the most common skin change from targeted drugs. The risk of getting a rash and how bad it gets depends on the type and dose of the targeted drug. In most
people, the rash is mild. It often looks like acne and shows up on the scalp, face, neck, chest, and upper back. In severe cases it can affect other parts of the body.

The rash most often starts as skin redness and swelling. It’s often worst within the first few weeks of treatment. By about a month into treatment, the skin usually crusts and gets very dry and red. In the weeks after that, round, flat or raised red spots and pimples with pus in the center often appear. In some people this can lead to skin infections. The rash can itch, burn, or sting, and may be painful. It may get better on its own or stay about the same during the rest of treatment, but it should go away completely about a month after treatment is stopped.

The rash can be very distressing and make a person feel self-conscious around others. Prevention and treatment of rashes are discussed later.

**Dry skin**: This is very common for many targeted therapy drugs. It can start within the first few weeks, but nearly everyone getting targeted therapy has dry skin after 6 months of treatment. The skin can become very dry, brittle, itchy, and scaly and may even crack open – especially on the hands and feet. Cracking can happen by itself, but it tends to be worse when there’s also a rash.

**Itching**: Many skin changes, like rash or dryness, can cause itching.

**Red, sore cuticles (the areas around the nails)**: Some targeted drugs can cause swollen, red, and painful sores around the fingernails and toenails. (This can look a lot like an infection or an ingrown nail.) This most often happens to the big toes and thumbs. These sores may become infected. Nails may also become brittle and grow more slowly.

**Hand-foot syndrome**: Hand-foot syndrome (HFS) has been linked to many cancer treatment drugs, including some targeted therapies. The cause of this syndrome isn’t known for sure. It may have to do with damage to the tiny blood vessels in the hands and feet, or with the drugs themselves leaking out of the blood vessels and causing damage.

Painful sensitivity, tingling, or numbness in the hands and feet are the earliest symptoms of HFS. Then, the palms of the hands and the soles of the feet become red and swollen. The redness looks a lot like sunburn and may blister. In severe cases, the blisters can open up and become sores. The affected skin also can become dry, peel, and crack.

HFS can be painful and can affect your ability to walk and do your normal activities. If it becomes severe, pain medicines may be needed. Let your doctor know if you’re having
HFS symptoms – even if they’re mild. Treating HFS early can help keep it from getting worse. Like the other skin changes, it can be treated, and there are things you can do to try to prevent it.

**Changes in hair growth:** Some targeted drugs can cause the hair on your head to become thin, dry and brittle, or even curly. Long-term use may lead to bald patches or complete loss of scalp hair. Facial hair for both men and women may grow faster than usual, including longer, thicker, curly eyebrows and eyelashes that may need to be trimmed. But in some men, facial hair growth slows down. Eyebrows may thin out as well. These changes usually don’t happen right away, but you may notice them later as treatment goes on.

Some people notice sores on their scalp and on other hairy areas. Scars caused by these sores may keep your hair from growing back after treatment.

**Changes in hair or skin color:** Some targeted drugs can turn the skin or hair a yellowish color during treatment. In a few people, hair and/or skin gets darker. This tends to go away once treatment ends.

**Changes in and around the eyes:** The eyes may burn, and become dry or red. In some people, the eyelids get red, tender, and swollen, and the lashes may become crusty. Sometimes the eyelids may turn inward or outward. Distorted eyelids or prolonged dryness can damage the outer part of the eye (the cornea). Talk with your doctor or nurse about managing these changes to avoid injury, pain, or infection.

**Can skin changes be prevented?**

There are things you can do to help prevent skin changes or at least try to keep them under control. Your doctor may ask you to start doing these things as soon as targeted treatment starts – before you have skin problems.

Starting good skin care before you have side effects may help to minimize the problems. You may be asked to:

- Use very mild soaps, body washes, and shampoos that do not contain alcohol, perfume, or dye.
- Take baths instead of showers, and try oatmeal bath products to soothe your skin.
- Bathe with cool or lukewarm (instead of hot) water. And avoid hot, humid places.
- Moisturize your skin at least twice a day with a thick emollient cream that has no alcohol, perfumes, or dyes. The best time to do this is right after you bathe, while your skin is still damp.
• Wear loose, soft clothing.
• Keep nails short.
• Use laundry detergents or fabric softeners without strong perfumes.
• Stay out of the sun as much as possible, because sunlight seems to trigger and/or worsen rashes in some people. If you’ll be outside during the day, wear a hat and clothes with long sleeves. Use a broad-spectrum sunscreen with SPF of at least 30 and zinc oxide or titanium dioxide at least 1 hour before going out. Be careful near windows too.
• Not use acne medicines. Though the rash may look like acne, acne medicines don’t work. They can even dry it out and make it worse.
• Try gel shoe inserts if the soles of your feet are tender.
• Wear shoes that fit well and aren’t too tight. Thick, soft socks may help if you have shoes that are big enough for the extra bulk.
• Use certain kinds of makeup. Some makeup brands can cover rashes without making them worse.

Ask your doctor or nurse if there are other things you can do to help lower your chance of skin problems.

**What should I do if I have skin changes?**

It’s very important to tell your cancer care team right away if you notice any rashes or skin changes. Left untreated, rashes can get worse and lead to infections, which might then lead to delaying or even stopping treatment.

Don’t treat your skin with over-the-counter medicines or stop taking your targeted drug without talking to your doctor first. Your doctor may give you a skin cream or a medicine to take by mouth to treat the skin.

Be sure to let your doctor or nurse know if:

• You notice a burning feeling, redness, or rash. There are creams you can use to try to keep it from getting worse.
• Your skin is dry, flaking, or cracked. Moisturizing cream may help with this.
• Your skin is itchy. There are creams and gels you can use to ease itching. There are also some medicines you can take by mouth to try to stop the itching.
• The area around your fingernails or toenails becomes sore or red. Creams and soaks can help with this. But you and your cancer care team will need to watch for changes that could be signs of infection, which need to be treated quickly.
• You have very dry, red, or tender eyes, or if you notice eyelashes growing inward
toward the eyeball.

- You get sores on your scalp or other areas with hair. You'll want to get them treated to help prevent scars that may keep hair from growing later.

Your doctor may tell you to avoid direct exposure to sunlight when possible. Even after treatment is over, you may find that you're more sensitive to sunlight than before.

**Can skin changes be treated?**

If you have skin changes, your doctor will need to check your skin fairly often to figure out the problem, the best course of action, and whether treatment is helping. You'll probably need extra doctor visits while the problem is being brought under control.

**Mild changes:** Patients with mild skin changes may not need treatment. These changes include rashes that are only in a limited area, that are not causing any distress, and are not infected. Heavy skin creams or ointments that contain no alcohol, perfume, or dye can sometimes help with dryness. Be sure to talk with your cancer care team before using anything on your skin.

The doctor may prescribe a mild corticosteroid cream or antibiotic gel to put on the rash.

If your eyelids are crusty or swollen, careful cleansing and clean, warm, wet cloths laid over your closed eyes may help.

For mild skin problems, the dose of the targeted drug usually does not need to be changed. You'll be watched closely to see if the rash gets better or worse.

**Moderate changes:** These include a rash over a larger area of the body or skin changes causing mild distress from itching or soreness, but with no signs of infection. The skin may be treated with a prescription cream or gel. The doctor may also prescribe an antibiotic you take by mouth. Drops or ointments may be prescribed to help with eye problems.

The dose of the targeted therapy drug usually does not need to be changed for moderate skin problems. Still, you will be watched closely to see if the rash gets better or worse.

**Severe changes:** These are bad rashes that cover a lot of skin, cause itching and soreness that affect your quality of life (such as sleep problems or pain), and are likely to get infected. Treatment is much like that used for moderate changes, including creams or gels, as well as an antibiotic that's taken by mouth. Along with this, a course of corticosteroid pills is often given.
The targeted therapy drug dose often needs to be reduced when a person has severe skin changes. Expect to see your doctor often during this time. If the rash doesn’t get better within about 2 weeks, the targeted drug is often stopped until the skin changes improve. It may then be re-started with continued skin care.

A note about steroid skin creams and gels

Steroids that are spread on the skin in the form of creams, ointments, or gels can help many skin problems. But it’s important to know that using steroid creams for too long can actually cause other skin problems, and can make you more likely to get a skin infection. For this reason, only use steroid creams (even those that don’t require a prescription) as directed by your doctor.

Common and serious side effects of targeted drugs

Some of the other common and serious side effects caused by targeted therapy drugs are listed here. This is not a complete list, as each targeted drug can have different side effects.

High blood pressure

Some targeted drugs, especially those called angiogenesis inhibitors can raise your blood pressure. There isn’t really anything you can do to prevent this, but your doctor will watch your blood pressure closely if you’re getting a drug that can cause this side effect. Some people need medicine to bring their blood pressure down to safe levels during treatment. They should stay on this medicine until their doctor tells them it can be stopped.

Bleeding or blood clotting problems

Some targeted therapy drugs interfere with new blood vessel growth. This can lead to problems with bruising and bleeding. Bleeding, such as from the stomach and intestines, can be severe and even life threatening. Tell your doctor if you throw up blood or material that looks like coffee grounds, or if you notice dark or black stools or bright red blood in your stool. These can be signs of bleeding in the stomach or intestines.

Some drugs can also cause blood clots in the lungs and legs, as well as heart attacks and strokes. Let your doctor know if you have problems with sudden swelling, pain, or tenderness in the arm or leg. If you have chest pain, sudden shortness of breath, vision
problems, weakness, seizures, or trouble speaking, get emergency help. These can be symptoms of serious problems caused by blood clots.

These problems are not common, and there’s no known way to prevent them.

**Slow wound healing**

By blocking new blood vessel growth, some of these drugs interfere with wound healing. This can lead to old wounds (cuts) opening up again and new wounds not closing. It can also lead to holes opening up in the stomach or intestine (called *perforations*). Tell your doctor right away if you have pain in your belly or vomiting.

Because some of these drugs can affect wound healing, they usually need to be stopped before any planned surgery, including dental procedures. Talk to your cancer doctor as soon as you know about a planned surgery or other procedure so you can find out what to do.

**Heart damage**

Some drugs can damage the heart, especially if used with certain chemotherapy drugs. Your doctor may test your heart function before starting treatment. Possible symptoms of heart damage might include chest pain, increased coughing, trouble breathing (especially at night), rapid weight gain, dizziness, fainting, or swelling in the ankles or legs.

**Autoimmune reactions**

Certain targeted therapy drugs work by basically taking the brakes off the body’s immune system. This can lead to serious side effects if the immune system starts to attack healthy parts of the body. In some people this can cause serious reactions in the lungs, intestines, liver, skin, eyes, nerves, hormone-making glands, or other organs. This isn’t common but in some people it might be serious enough to be life threatening.

**Swelling**

Some targeted therapies cause facial swelling, especially around the eyes. They can also cause swelling in the feet and legs, as well as the hands. This usually doesn’t need to be treated, but a diuretic (water pill) may be used in severe cases.

**Other side effects**
Other side effects have also been linked to treatment with some targeted therapy drugs. Many of these side effects are the same as those seen with standard chemo drugs, and include:

- Nausea and vomiting
- Diarrhea or constipation
- Mouth sores
- Shortness of breath or trouble breathing
- Cough
- Feeling tired all the time (fatigue)
- Headache
- Hair loss
- Damage to organs such as the thyroid gland, liver, or kidneys
- Allergic reactions (while getting an IV drug)
- Increased risks of certain infections
- Second cancers

Your cancer care team will watch you closely during treatment and will check you often. Side effects can and should be treated as early as possible. It’s important that you tell your cancer care team about any changes in how you feel or anything you notice that’s new or unusual. Tell them right away so they can treat any problems and try to keep them from getting worse.

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1-800-227-2345 or www.cancer.org