# Breast Cancer: Targeted Therapy

## What is targeted therapy?

Targeted therapy is the use of medicines that target parts of cancer cells that make them unlike normal cells. Targeting cancer cells like this allows these medicines to kill them without affecting most normal, healthy cells. The medicines are different from standard chemotherapy medicines. They may work when chemotherapy medicines don't. And they often have less severe side effects.

## How targeted therapy works

Targeted medicines for breast cancer include monoclonal antibodies and tyrosine kinase inhibitors. They work by stopping or slowing the growth of some breast cancers. They do this by blocking certain proteins in or on the cancer cells. For breast cancer, the protein most commonly targeted is a growth factor protein called HER-2. Breast cancers that have a lot of the HER-2 protein are called HER-2 positive. About 1 in 5 people with breast cancer have tumors that make too much of the HER-2 protein. These tumors tend to grow and spread faster than tumors that don't make too much HER-2 protein. These tumors are also more likely to come back after treatment.

## When might targeted therapy be used for breast cancer?

Breast cancer cells are tested for HER-2 in the lab. Your healthcare provider may advise targeted therapy if your breast cancer is found to be HER-2 positive.

## Types of targeted therapy medicines for breast cancer

The medicines most commonly used include:

- **Trastuzumab.** This is the most common targeted therapy used to treat HER-2 positive breast cancer. Treatment with trastuzumab can stop or slow the growth of these cancer cells. In some cases, it can help shrink tumors.
- **Fam-trastuzumab deruxtecan.** In this medicine, the monoclonal antibody is attached to a chemotherapy medicine. It is approved for use in advanced breast cancer after a HER2 targeted therapy has been used first.
- **Ado-trastuzumab emtansine.** In this medicine, the monoclonal antibody is attached to a chemotherapy medicine. It may be used in people with advanced breast cancer who have already used trastuzumab.
- **Pertuzumab.** This is a monoclonal antibody that attaches to the HER-2 protein. It seems to target a different part of the protein than trastuzumab. It's given along with trastuzumab and chemotherapy to treat advanced breast cancer. This combination of medicines may also be used to treat early breast cancer before surgery is done.
- **Lapatinib.** This is a tyrosine kinase inhibitor. It blocks the effects of the HER-2 protein and other proteins inside cancer cells. It may be used to treat people with HER-2 positive breast cancer that is not responding to treatment with chemotherapy and trastuzumab.
- **Neratinib.** This kinase inhibitor may be used to treat early breast cancer. It's usually given for 1 year and started after completing 1 year of trastuzumab.

## How is targeted therapy given for breast cancer?

These medicines may be given alone. Or they may be given along with chemotherapy. Trastuzumab, ado-trastuzumab emtansine, fam-trastuzumab deruxtecan, and pertuzumab are given as an IV (intravenous)

infusion into a vein. Some types of targeted therapy may also be given as an injection under the skin (subcutaneously). This is often done as an outpatient procedure. You don't need to stay overnight in the hospital. Lapatinib and neratinib are given as a pill. You take them at home in 2- or 3-week cycles.

## What are common side effects of targeted therapy?

Targeted therapy medicines work differently from standard chemotherapy. They target only certain cells, so they tend to cause less harm to healthy cells. They also often have less severe side effects. Possible side effects include:

- Chills
- Diarrhea
- Fever
- Headaches
- Nausea
- Rashes
- Sore, red, and peeling hands or feet
- Trouble breathing
- Vomiting

You may find that some side effects occur only during the actual treatment. They may become less severe after your first treatment. Most side effects go away or get better within a few weeks after your treatment ends. If you're having trouble with side effects, tell your healthcare provider or nurse so that they can help you manage them.

## When to call your healthcare provider

Some targeted therapy treatments can cause serious lung, heart, or liver problems. Call your healthcare provider right away if you have signs of lung, heart, or liver problems, such as:

- Trouble breathing, wheezing, or coughing
- Leg swelling
- Extreme tiredness
- Fast heartbeat
- Dark urine, yellowing whites of eyes, itchy skin, and pain in the upper right belly

Some of these medicines can cause long-term heart damage. Your healthcare provider will use tests to closely watch you for signs of heart problems. For many people, heart damage is a short-term problem that gets better when the medicine is stopped. The risks for heart problems are higher when certain chemotherapy medicines are given with targeted therapy. Ask your healthcare provider if you're taking doxorubicin or epirubicin if you are risk for heart problems.

Fam-trastuzumab deruxtecan can cause lung problems. Lapatinib and neratinib can cause liver problems. Your healthcare provider will use blood tests to check your liver function.

You need to know what to watch for so you can tell your healthcare provider about problems right away.

## Working with your healthcare provider

It's important to know which medicines you're taking. Write your medicines down. Ask your healthcare team how they work and what side effects they might have.

Talk with your healthcare providers about what side effects to watch out for and when to call them. Make sure you know what number to call with questions, even on evenings, holidays, and weekends.

It may be helpful to keep a diary of your side effects. Write down physical and emotional changes, and changes in thinking. A written list will make it easier for you to remember your questions when you go to your appointments. It will also make it easier for you to work with your healthcare team to make a plan to manage your side effects.

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