FACTS FOR LIFE

# Targeted Therapies

## Different views of targeted therapy

A basic definition of "targeted therapy" is any breast cancer treatment that acts in a certain way to kill specific cancer cells. In this sense, chemotherapy and hormone therapy are both targeted therapies. Most researchers consider targeted therapy to be a new approach to treating breast cancer that targets the inner workings of cancer cells.

There are two types of breast cancer treatments:

- **Local therapy** affects only a single (limited) area in the body. Surgery and radiation are local therapies.
- **Systemic therapy** affects cancer that may be present anywhere in the entire body. It may be one or more drugs that are taken in pill form or infused.
  - **Chemotherapy** — kills both cancer cells and some healthy cells.
  - **Hormone therapy** — blocks the production of hormones in the body or blocks the hormone receptors on the tumors to stop tumors from getting the hormones they need to grow.
  - **Targeted therapy** — targets the genes and proteins inside cancer cells with little impact on healthy cells.

## A new way to treat cancer

Targeted therapies work by going straight to the genes and proteins in cancer cells to stop their growth and spread. As a result, cancer cells are affected by the treatment more than healthy cells. They are one of the newest treatments for breast and other types of cancer.

Researchers are working to find new ways to target cancer cells as part of treatment. Once targets are found, therapies can then be developed to kill cancer cells. For example, after finding that some breast cancers over-express the HER2 protein, trastuzumab (Herceptin®) was developed to target cancers with this protein. Other targeted therapies are being studied in clinical trials to see how well they work in treating breast cancer. Most new targeted therapies are given first to women with metastatic breast cancer. As more targets are identified and therapies are developed, doctors will be able to offer patients teatment that works best for their type of breast cancer.

## How do targeted therapies work?

Every cell in the body contains almost 30,000 genes. Each of these genes makes a different protein. Each protein performs a different task for the cell. Targeted therapies stop specific proteins from helping cancer survive. When certain proteins are blocked or stop working the cancer cells can't grow and they die.

## Types of targeted therapies

Epidermal growth factor receptors (EGFRs) are proteins on the surface of cancer cells that accept messages telling the cells to grow and divide. Inhibitors of epidermal growth factor receptors work by blocking the receptors for EGFRs.

- **Monoclonal antibodies** — Antibodies fight infection in the body. For some reason, the body doesn't see cancer as an infection and antibodies are not produced. Monoclonal antibodies are made in a laboratory. They seek out specific targets in cancer cells, and keep the cancer from growing.

  The drug trastuzumab (Herceptin®) is a monoclonal antibody. Some breast cancer cells over-express or make too much of a protein called human epidermal growth factor receptor 2 (HER2). Trastuzumab binds to the HER2 on the surface of the cancer cells. It blocks the HER2 protein and the cancer cells cannot grow. It is FDA approved to treat HER2-positive early stage breast cancer after surgery and metastatic HER2-positive breast cancer. Other uses of trastuzumab are under study in clinical trials.

- **Enzyme inhibitors** — Enzymes are proteins that cause certain chemical reactions in the body to start. These drugs stop some enzymes from working, and in doing so, block the activity of cancer cells.

  Tyrosine-kinase inhibitors, such as lapatinib (Tykerb®), belong to a class of drugs that targets enzymes important for cell functions. The drug is currently used for treatment of metastatic HER2-positive breast cancer that has stopped responding to Herceptin.

## Questions to ask your doctor

- What are my treatment options?
- Is a targeted therapy right for me?
- What are the side effects and risks of the therapy you recommend for me?
- Is the cost covered by my health insurance?
- What clinical trials could I join?

## Resources

Susan G. Komen for the Cure®
1-877-GO KOMEN (1-877-465-6636)
www.komen.org

National Cancer Institute
1-800-4-CANCER
www.cancer.gov/cancertopics/factsheet/Therapy/targeted

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