



Immunotherapy uses the body's natural defenses (immune system) to treat cancer. Starting in 2015, a number of immunotherapy drugs have been approved to treat both non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC).

These drugs have changed the treatment landscape for many people with lung cancer. Yet, they do not work for everyone. There is still a lot to learn. Researchers continue to study immunotherapy to

understand which drugs are safest and most effective, how to tell who will benefit from them, and when to use them. This booklet lists the immunotherapy drugs that are approved to treat lung cancer today. It also lists some of the immunotherapies being studied.

## What is Immunotherapy?

Immunotherapy is a type of cancer treatment that uses the body's natural defenses (immune system) to identify, attack, and kill cancer cells. The immune system is designed to attack any cell it sees as unhealthy or abnormal.

Today, there are multiple kinds of immunotherapy treatments. They help fight cancer by:

- Boosting the immune system. A “revved up” immune system can be better at fighting the cancer.
- “Marking” cancer cells so that your immune system can see them better to find and destroy them. This keeps the cancer from being able to hide from the immune system.
- Helping the immune system find cancer cells and delivering treatment (like chemotherapy, radiation, or even T cells) directly to the cancer cells.

## How is Immunotherapy Given?

The use of immunotherapy is rapidly increasing as more immunotherapies are approved to treat people with more types of cancer. Most immunotherapy is given using an IV infusion (through a vein). You may receive immunotherapy in a doctor's office, in a clinic, or as a day patient in a hospital. Different immunotherapies are given on different schedules. Some may be given in combination with other therapies or with a different immunotherapy.

### TALKING ABOUT IMMUNOTHERAPY

**Immune System:** A network of cells, tissues, and organs that work together to protect the body from bacteria, viruses, parasites, fungi, and abnormal cells like cancer cells.

**T Cells:** A type of white blood cell. T cells are the immune system's “soldiers.” They help protect the body from infection and can help fight cancer. They are also called T lymphocytes.

**Antibody:** A protein made by your body's immune cells to attach to a specific foreign invader, such as bacteria, viruses, and potentially cancerous cells.

**Tumor Antigen:** A substance produced by a tumor cell that can cause the body to create a specific immune response.

**Biomarker:** A molecule in your body that your doctors can measure. Biomarkers give your doctor specific information about your cancer. Biomarkers can let doctors know if your tumor has a good chance of responding to a certain treatment.

# HOW IMMUNOTHERAPY COMPARES

Some of the most common cancer treatments include:



## IMMUNOTHERAPY

Immunotherapy works by making the immune system stronger so it can fight cancer better. The immune system helps your body fight infections and other diseases, like cancer. But sometimes cancers learn how to escape from the immune system and grow anyway. Immunotherapy helps your own immune system fight cancer better. Common side effects include fatigue, skin problems, fever, and shortness of breath. Most side effects are mild, but some can be severe.



## SURGERY

Surgery is an operation to remove the cancer (or part of it) from your body. It is not always possible or helpful. Surgery is often used as a treatment option for early-stage cancers that have not spread to other parts of the body. When it is thought that cancer can be removed completely, it is often the first treatment. The most common side effects of surgery are pain, fatigue, bleeding, swelling around the surgical site, and infection.



## CHEMOTHERAPY

Chemotherapy (also called chemo) uses drugs to kill cancer cells. These very strong drugs attack fast-growing cells like cancer. Chemo can cause side effects like hair loss, nausea, mouth sores, and low white blood cell counts.



## RADIATION THERAPY

Radiation therapy uses energy beams, such as very strong x-rays, electrons, or protons, to kill cancer cells and shrink tumors. Radiation can also damage normal tissue or organs, so it is carefully focused to reduce that damage. You may experience redness, burns, or hair loss in the area being treated. Other possible side effects include fatigue, loss of appetite, and nausea.



## TARGETED THERAPY

Targeted therapies are drugs that “target” changes in cells that cause cancers to grow, divide, or spread. Doctors test tumors for these changes (biomarkers) to find out if targeted therapy should work. Diarrhea and skin problems, including rashes, are the most common side effects.

## KEY THINGS TO KNOW

- It is **very important** that anyone receiving immunotherapy let their health care team know right away if they develop any side effects.
- Although there are promising results, immunotherapy does not work for every patient who tries it.
- There is still a lot that researchers don't know about immunotherapy.

Here are some questions researchers are trying to answer about immunotherapy treatments:

- Why do they work so well in some people and not at all in others?
- How can they be combined with other treatments?
- When is the best time to use them?
- What are the long-term side effects?

## Is Immunotherapy Right for Me?

Most people who get immunotherapy today have cancers that are advanced or metastatic. Their cancers have either returned and spread after initial treatment or were diagnosed in an advanced stage. Some immunotherapy drugs are now approved to treat certain early stage cancers. Researchers are testing immunotherapy in new cancer types and at earlier stages. Some people cannot receive immunotherapy because of serious health problems (like autoimmune disorders) that make it unsafe to take these drugs. Ask your health care team if immunotherapy is right for you.

## What Does it Cost?

Many new treatments, including immunotherapy, are very expensive. Patients who are being treated through a clinical trial may have those costs covered. Talk to your health care team upfront about the financial issues involved in your treatment. Many treatment centers have resources to help patients obtain insurance coverage or access programs designed to help cover costs of treatment.

“Keep pushing until you get the answers you are looking for, because they are out there.”

— Steve, immunotherapy clinical trial patient



# Immunotherapy Drugs Approved for Lung Cancer

These are the immunotherapy drugs that are FDA-approved to treat lung cancer as of November 2020. They are all a type of immunotherapy known as checkpoint inhibitors. They are given into a vein through an intravenous (IV) line. You may receive them at your doctor's office, at an infusion clinic, or as a day patient at a hospital. Which drug you receive will depend on

biomarker testing results, overall health status, what you prefer, and your insurance. Ask your health care team if these drugs are an option for you.

This list changes often. For the latest list of approved immunotherapy drugs for lung cancer, go to [www.CancerSupportCommunity.org/lung-cancer](http://www.CancerSupportCommunity.org/lung-cancer). Refer to Cancer Support Community's Immunotherapy booklet or [www.CancerSupportCommunity.org/Immunotherapy](http://www.CancerSupportCommunity.org/Immunotherapy) for more information on immunotherapy and how it works.

DRUG	WHEN IT IS USED
<b>atezolizumab (Tecentriq®)</b>	<ul style="list-style-type: none"> <li>For <b>advanced non-squamous non-small cell lung cancer (NSCLC)</b> that is EGFR- or ALK-</li> <li>For <b>advanced NSCLC</b> that is PD-L1+ and EGFR- and ALK-</li> <li>For <b>advanced NSCLC</b> for which platinum chemotherapy* did not work or stopped working <ul style="list-style-type: none"> <li>And, if EGFR+ or ALK+, the targeted therapy did not work or stopped working</li> </ul> </li> <li>For <b>advanced small cell lung cancer (SCLC)</b></li> <li>Often given at the same time as the chemotherapy drugs carboplatin, paclitaxel, or etoposide. May be given with bevacizumab, a targeted therapy drug.</li> </ul>
<b>durvalumab (Imfinzi®)</b>	<ul style="list-style-type: none"> <li>For <b>Stage III NSCLC</b> that cannot be removed by surgery, and that has not progressed after treatment with chemoradiation that included a platinum chemotherapy* drug.</li> <li>For <b>advanced SCLC</b> with etoposide and a platinum chemotherapy* drug.</li> </ul>
<b>nivolumab (Opdivo®)</b>	<ul style="list-style-type: none"> <li>For <b>advanced NSCLC</b> that is PD-L1+ and EGFR- and ALK- <ul style="list-style-type: none"> <li>Given with ipilimumab (Yervoy®)</li> </ul> </li> <li>For <b>advanced NSCLC</b> for which platinum chemotherapy* did not work or stopped working <ul style="list-style-type: none"> <li>And, if EGFR+ or ALK+, targeted therapy did not work or stopped working</li> </ul> </li> <li>For <b>advanced SCLC</b> after at least two different types of chemotherapy (including one platinum chemotherapy*) that did not work or are no longer working</li> </ul>
<b>pembrolizumab (Keytruda®)</b>	<ul style="list-style-type: none"> <li>When given as initial therapy, often given at the same time as chemotherapy</li> <li>For <b>advanced non-squamous NSCLC</b> that is EGFR- or ALK-</li> <li>For <b>advanced squamous NSCLC</b></li> <li>For <b>Stage III NSCLC</b> that <b>cannot</b> be treated with surgery or chemoradiation</li> <li>For <b>advanced NSCLC</b> that is PD-L1+ <b>and</b> EGFR- or ALK-</li> <li>For <b>advanced NSCLC</b> <ul style="list-style-type: none"> <li>If PD-L1+, platinum chemotherapy* either did not work or stopped working, <b>and</b></li> <li>If EGFR+ or ALK+, targeted therapy did not work or stopped working</li> </ul> </li> <li>For <b>advanced SCLC</b> for which platinum chemotherapy* either did not work or stopped working, and at least one other prior line of therapy</li> <li>For any type of lung cancer that tests positive for MSI-High/dMMR or TMB-High when prior treatment did not work or stopped working</li> </ul>

\* Platinum chemotherapy for lung cancer includes cisplatin (Platinol®, Platinol®-AQ, CDDP) or carboplatin (Paraplatin®).

# THE 5 MAJOR KINDS OF CANCER IMMUNOTHERAPY

New treatments become available all the time so this may not be a complete list. This list does not include clinical trials. **These are the immunotherapies that are available as of November 2020.** For the latest information go to **CancerSupportCommunity.org** and search for your tumor type to find out if new immunotherapy drugs have been approved.

CANCER IMMUNOTHERAPY	DESCRIPTION	GIVEN BY	APPROVED TO TREAT
<b>CHECKPOINT INHIBITORS</b>	Prevents tumor from turning off cancer-fighting cells	IV	Melanoma, Hodgkin lymphoma, Merkel cell and cutaneous squamous cell carcinoma, head and neck cancer, triple negative breast cancer, and lung, colorectal, kidney, bladder, cervical, endometrial, liver, and stomach cancers as well as any non-blood cancers that test positive for the biomarkers MSI-high/dMMR
<b>CELL THERAPY</b>	Modifies the body's own immune cells to become a cancer treatment drug	IV	CAR T therapy for leukemia and lymphoma
<b>CYTOKINES</b>	Boosts the body's immune system generally	IV	Advanced melanomas and kidney cancers
<b>TREATMENT VACCINES</b>	Teaches the body's immune cells to find cancer cells	IV	Prostate cancer
<b>ONCOLYTIC VIRUS THERAPY</b>	Uses viruses to fight cancer cells	IV	Advanced melanoma

## Types of Immunotherapy

### CHECKPOINT INHIBITORS

The immune system has safeguards in place to prevent it from attacking healthy cells. These safeguards are called checkpoints. They slow down or stop the immune system from attacking healthy tissue. Some cancers have learned how to activate these checkpoints to avoid being found and killed by the immune system. They trick the body into turning its own defenses off. Checkpoint inhibitors block these checkpoints, helping the body fight cancer.

Most patients who receive immunotherapy today are on one of two kinds of checkpoint inhibitors: PD1/PDL-1 or CTLA-4 inhibitors. However, not all cancers can be treated with these drugs. Currently, checkpoint inhibitors only work for up to a third of patients who are given them. But that number depends on your cancer type. These drugs may be given in combination with other therapies, such as chemotherapy or other immunotherapy drugs. Researchers are also studying giving checkpoint inhibitors in combination with radiation therapy.

## CHECKPOINT INHIBITOR SIDE EFFECTS

We tend to think of immunotherapy as “natural”—as our body’s own defense system. However, immunotherapy can still have side effects. These effects are generally different from those caused by chemotherapy or radiation therapy. In many cases, they are not severe and may be short-lived or easy to manage. Less often, side effects can be very severe and even life-threatening.

### Common Side Effects

- Flu-like symptoms (fever, chills, headache, nausea, cough, loss of appetite)
- Fatigue (some people get extreme fatigue)
- Rashes, redness, or itching
- Pain or soreness
- Muscle or joint pain
- Infections

### Less Common Side Effects

- Colitis or other gastrointestinal problems (stomach pain, diarrhea)
- Problems with the thyroid, liver, kidneys, heart, or other glands or organs
- Lung problems (cough, shortness of breath)
- Other serious autoimmune conditions (such as pituitary disorders or diabetes)

Sometimes the side effects do not occur right after treatment is given. They may show up several months later. Little is known at this time about whether there are any long-term side effects. **If you are on immunotherapy, it is important to let your health care team know immediately if you notice any change in side effects or symptoms. Most side effects can be managed if they are treated early.**

There are several checkpoint inhibitors approved to treat cancer. Your doctor may test your PD-1/PD-L1 levels before using these drugs. In some cases, the drugs are only used on cancers with certain levels of PD-1/PD-L1. In others, the results may predict how well your cancer will respond to this treatment.

These drugs have been shown to successfully treat a growing number of cancers. In addition, at least one PD-1 inhibitor is approved to treat any solid tumor (non-blood cancer) that tests positive for the biomarkers MSI-high (microsatellite instability-high) or dMMR (mismatch repair deficient).



“It is important to call your health care team even with the slightest change of the person’s symptoms, because symptoms can escalate very quickly. No question or call is wrong, so always call.”

— Heather DiFilippo, Nurse Practitioner  
(Abramson Cancer Center,  
Hospital of the University of Pennsylvania)

## OTHER MONOCLONAL ANTIBODIES

Checkpoint inhibitors are one type of monoclonal antibody (mAb). Other types let the immune system find and destroy cancer cells using targets that aren't checkpoints. Still others take radiation or chemotherapy drugs directly to cancer cells. Each mAb is made to find and attach to a specific protein that occurs in cancer cells. Not all mAbs are immunotherapies, some are targeted therapies. Most mAb treatments that aren't checkpoint inhibitors are used in blood cancers. To learn more, see our Immunotherapy and Blood Cancers page at [www.CancerSupportCommunity.org/IOBlood](http://www.CancerSupportCommunity.org/IOBlood).

## CELL THERAPY

In cell therapy, the body's own cells are removed from a person with cancer, taken to a lab, and modified. Once returned to the person, these modified cells find and destroy cancer cells.

The most common form of this treatment is CAR T cell therapy. It is now approved in certain leukemias and lymphomas and being tested in several other cancer types. For more information on CAR T cell therapy, visit: [www.CancerSupportCommunity.org/CART](http://www.CancerSupportCommunity.org/CART).

Researchers are also studying cell therapies called TIL, TCR-T, and CAR NK for other cancers including melanoma, cervical cancer, and blood cancers.

## CYTOKINES

Cytokines have been used for years. They do not target cancer cells like some newer treatment methods. Rather, they work by speeding up the growth of T cells and activating other immune cells, boosting

the immune system generally. They do not provide a targeted response like some newer treatment methods. Interleukins and interferon are examples of cytokines that have shown some success in treating advanced melanomas and kidney cancers.

## TREATMENT VACCINES

Treatment vaccines are designed to "teach" T cells to find and attack cancer cells that have specific proteins. There are different ways to do this. Currently, there is only one approved cancer vaccine which treats advanced prostate cancer. It is made from the patient's own white blood cells. These cells are sent to a lab where their ability to recognize and fight prostate cancer cells is boosted. They are then re-infused into the patient. Researchers are studying possible vaccines for other cancers including brain, breast, cervical, colon, kidney, lung, melanoma, ovarian, pancreas, and blood cancers, among others.

## ONCOLYTIC VIRUS THERAPY

Oncolytic virus therapy uses viruses to fight cancer cells. The one oncolytic virus therapy currently approved in the U.S. is used to treat specific types of melanoma. Several other viruses are being tested in clinical trials for cancers such as brain, breast, colon, and pancreas.

To see if we have more information on immunotherapies in your cancer type, visit [orders.cancersupportcommunity.org](http://orders.cancersupportcommunity.org) or call our Cancer Support Helpline at 888-793-9355.



## Immunotherapy Being Studied for Lung Cancer

Immunotherapy is a major area of lung cancer research. Doctors and scientists study the immune system, lung cancer, and their relationship. The overall goal of this research is to extend and improve the lives of people affected by lung cancer. Scientists aim to make better and safer drugs. They look for new ways to strengthen the immune system to fight lung cancer. Research also focuses on better knowing which people with cancer might benefit from immunotherapy.

Examples of areas of current research for lung cancer include:

- Checkpoint inhibitors and other therapies to treat earlier-stage lung cancers
- Combining immunotherapy with other forms of treatment
- Drugs that target dendritic cells, a type of immune cell
- Personalized cancer vaccines
- New biomarkers to indicate whether immunotherapy is likely to work
- Early phase trials of gene-mediated cytotoxic immunotherapy
- Adoptive cell therapies

Ask your health care team if clinical trials might be right for you. Refer to [www.CancerSupportCommunity.org/finding-clinical-trial](http://www.CancerSupportCommunity.org/finding-clinical-trial) for more information on clinical trials and how to find them.

## Is a Clinical Trial Right for Me?

Be sure to ask your health care team about clinical trials. Clinical trials are research studies to test new treatments or learn how to use existing treatments better.

- A clinical trial may be the only way to get some of the newest, most promising treatments. Talk with your health care team about clinical trial options.
- The U.S. FDA and local review boards oversee all U.S. clinical trials to keep patients safe. Participating in a clinical trial means that you will receive the best available standard of care for your cancer or a new approach that may offer improved outcomes.
- Almost no one receives a placebo or “sugar pill,” and you will be specifically told if this is a possibility.
- If you join a clinical trial, you can leave the trial at any time and continue to get standard treatment by your doctor.
- Every doctor does not offer the same trials. Even if another doctor is in charge of the trial, your doctor may still help with your care.
- Most often, the trial pays the costs of the drug being studied, and your health insurance only has to pay for “standard” treatment costs. However, your health insurance may not pay for everything. Be sure to ask your health care team.



## QUESTIONS TO ASK YOUR HEALTH CARE TEAM

- Do you recommend immunotherapy for me? If so, what type?
- Has my tumor been sent for biomarker testing? If so, have you gotten all the results back yet? And what do the results mean for me?
- Was my tumor tested for the PD-L1, MSI-High, or dMMR biomarkers? If so, does that give me more treatment options?
- Are there any clinical trials for immunotherapy that would be right for me? How do I find out more about them?

### **For each treatment or clinical trial that is recommended:**

- Why are you recommending this type of therapy for me?
- What is the goal of this treatment? What are the risks?
- How will I receive this treatment?
- How often will I receive this treatment? How long will each session take?
- Where will I go to receive treatment?
- What side effects should I expect (short and long term)?
- What can I do to prepare for immunotherapy treatment?
- Will I need someone to drive me home after treatment?
- Can/should I eat before or after treatment?
- How long will I need to be on this treatment?
- How will we know if this therapy is working?
- How much will this therapy cost?
- Will I need other cancer treatments at the same time?
- How will this treatment impact my daily routine? Will I be able to do my usual daily activities?
- Whom should I call if I have questions or problems during office hours?

Name: \_\_\_\_\_ Phone Number: \_\_\_\_\_

- After hours and weekends?

Name: \_\_\_\_\_ Phone Number: \_\_\_\_\_



## **Mary's Story**

### **Getting A Second Opinion**

Mary was initially diagnosed with lung cancer in 1983, when her children were ages 9 and 11. Thirty years later, following a bout with pneumonia, she learned that she had stage IV lung cancer and was told there were no treatment options. When she told her older brother the news, he suggested she get a second opinion. The second doctor also told her there were no standard treatments.

The conversation might have ended there, but Mary asked about clinical trials. Two weeks later, in December 2013, she entered a phase II trial of an experimental immunotherapy drug. In October 2016, the drug she was using, an anti-PD-L1 immunotherapy, was approved to treat metastatic non-small cell lung cancer. After three-and-a-half years on immunotherapy, Mary stopped receiving treatment due to developing colitis as a side effect. After a round of steroids, the colitis went away, though Mary still gets colitis every once in a while. Two-and-a-half years later, she still has no evidence of disease.

# Lung Cancer Information, Survivorship, and Support

**Cancer Support Community** • 888-793-9355 • [www.CancerSupportCommunity.org](http://www.CancerSupportCommunity.org)

**American Cancer Society** • 800-227-2345 • [www.cancer.org](http://www.cancer.org)

**American Lung Association** • 800-586-4872 • [www.lung.org](http://www.lung.org)

**CancerCare** • 800-813-4673 • [www.cancercare.org](http://www.cancercare.org)

**Cancer.net** • 888-651-3038 • [www.cancer.net](http://www.cancer.net)

**GO<sub>2</sub> Foundation for Lung Cancer** • 800-298-2436 • [www.go2foundation.org](http://www.go2foundation.org)

**Lung Cancer Research Foundation** • 844-835-4325 • [www.lcrf.org](http://www.lcrf.org)

**LUNGEvity Foundation** • 321-407-6100 • [www.LUNGEvity.org](http://www.LUNGEvity.org)

**National Cancer Institute (NCI)** • 800-422-6237 • [www.cancer.gov](http://www.cancer.gov)

**NCI Clinical Trial Information** • 800-422-6237 • [www.cancer.gov/ClinicalTrials](http://www.cancer.gov/ClinicalTrials)

**Patient Advocate Foundation** • 800-532-5274 • [www.patientadvocate.org](http://www.patientadvocate.org)

## Cancer Support Community Resources

**Cancer Support Helpline®** — Have questions, concerns or looking for resources? Call CSC's toll-free Cancer Support Helpline (888-793-9355), available in 200 languages Mon - Fri 9am - 9pm ET.

**Open to Options®** — Need help making a cancer treatment decision? Our trained specialists can help you create a list of questions to share with your doctor. Make an appointment by calling 888-793-9355 or by contacting your local CSC or Gilda's Club.

**Frankly Speaking About Cancer®** — Trusted information for cancer patients and their loved ones is available through publications, online, and in-person programs at [www.CancerSupportCommunity.org/FranklySpeakingAboutCancer](http://www.CancerSupportCommunity.org/FranklySpeakingAboutCancer).

**Services at Local CSCs and Gilda's Clubs** — With the help of 170 locations, CSC and Gilda's Club affiliates provide services free of charge to people touched by cancer. Attend support groups, educational sessions, wellness programs, and more at a location near you.  
[www.CancerSupportCommunity.org/FindLocation](http://www.CancerSupportCommunity.org/FindLocation)

**Cancer Experience Registry®** — Help others by sharing your cancer patient or cancer caregiver experience via survey at [www.CancerExperienceRegistry.org](http://www.CancerExperienceRegistry.org).

**MyLifeLine** — CSC's private, online community allows patients and caregivers to easily connect with friends and family to receive social, emotional, and practical support throughout the cancer journey and beyond. Sign up at [www.MyLifeLine.org](http://www.MyLifeLine.org).

**Grassroots Network** — Make sure your voice is heard by federal and state policy makers on issues affecting cancer patients and survivors by joining our Network at [www.CancerSupportCommunity.org/become-advocate](http://www.CancerSupportCommunity.org/become-advocate).

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