PATIENT RESOURCE

Fourth Edition

UNDERSTANDING CANCER IMMUNOTHERAPY

Engaging the Immune System Against Cancer

CONTENT REVIEWED BY A DISTINGUISHED MEDICAL ADVISORY BOARD

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Published in partnership with

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UNDERSTANDING CANCER IMMUNOTHERAPY

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IMMUNE SYSTEM vs CANCER

Your immune system can fight cancer with the help of an intuitive type of treatment called immunotherapy. This treatment is sometimes referred to as biologic therapy or biotherapy. Immunotherapy is currently in the spotlight as new variations become available that harness the strength of the immune system as a weapon against cancer.

The concept of using the immune system to fight cancer is not new. For centuries, doctors and researchers have understood how well-equipped the immune system is at fighting off millions of threats to our bodies from bacteria, viruses, parasites and other microorganisms on a daily basis (see *Explaining the Immune System,* page 2). In fact, the immune system is so powerful that the body has to suppress the full strength of the immune system most of the time so that it does not get out of control. As a result, doctors and researchers have worked hard to use the potential of the immune system to be an effective treatment for cancer. Today, medications – oral and intravenous – are available that boost the immune system so it can recognize and attack cancer.

In 1990, the U.S. Food and Drug Administration (FDA) approved the first commercial immunotherapy to treat bladder cancer. Since then, multiple immunotherapy drugs that work in a variety of ways for other cancer types have been introduced, and the immunotherapy options for treatment continue to increase as new medications and procedures are tested and approved (see *Types of Cancer Immunotherapies,* page 4).

When it was first introduced, immunotherapy was considered a second-line treatment, which means it was given after another option, such as surgery, chemotherapy or radiation therapy, was used. As research has progressed, many immunotherapies approved for second-line treatment are now gaining approval as a first-line treatment for many different cancers. First-line treatment is considered the standard of treatment and the best treatment for that particular type of cancer.

In addition to being given as a first-line or second-line treatment, research is showing that immunotherapy may be effective as a combination treatment with chemotherapy or radiation therapy. Research, in the form of clinical trials, is helping to determine the most effective combinations for different cancers.

None of the advancements in immunotherapy would have been possible without the use of clinical trials. Clinical trials are ongoing as researchers look for new ways to stimulate the immune system and personalize treatment for each individual. Researchers are also exploring why some immunotherapies work for certain people but not for others.

As you consider treatment options, talk with your doctor about immunotherapy and ask if you are eligible to participate in a clinical trial (see *About Clinical Trials,* page 16). ■

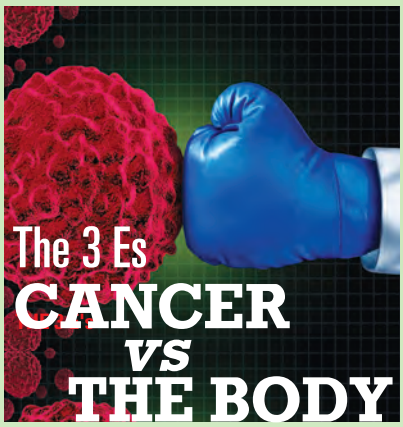
ADDITIONAL RESOURCES

- **Cancer Research Institute:** www.cancerresearch.org
  Immunotherapy and Chemotherapy: What's the Difference?
- **National Cancer Institute:** www.cancer.gov
  Immunotherapy: Using the Immune System to Treat Cancer
- **Society for Immunotherapy of Cancer:** www.sitcancer.org

A LONG HISTORY

More than a century ago, Dr. William B. Coley worked with other doctors and people with cancer to study how cancer tumors reacted to bacterial infections. His treatments for people with inoperable tumors consisted of injecting a combination of bacteria directly into the tumors. Dr. Coley believed the body's increased response to the bacteria helped fight off the cancer. The treatment shrank the tumors and sometimes even led to a cure. More recently, in the 1960s, Dr. Donald Morton experimented with a vaccine that was intended not to prevent cancer but to stimulate the body's immune system to attack cancer cells once they had developed. Dr. Morton was at the forefront of global cancer research and treatment, with a focus on melanoma. He was an early proponent of immunotherapy, particularly cancer vaccines. His work with bacillus Calmette-Guerin (BCG) for treating melanoma led to the approval of BCG for bladder cancer, the first successful immunotherapy against a human tumor.

William B. Coley



In the 1950s, some researchers thought that in addition to protecting the body against bacteria and viruses, the immune system looked for abnormal cells and killed them before they could become tumors. This theory, called cancer immunosurveillance, was initially rejected. In the last ten years, however, studies have confirmed this is possible. Although tumors may develop in a functioning immune system, the way a tumor grows and develops is influenced by the body's immune response. Based on this new evidence, and confirmed by studies conducted by cancer researcher Dr. Robert Schreiber, the theory has been renamed "cancer immunoediting."

The three Es of Dr. Schreiber's theory of cancer immunoediting are elimination, equilibrium (balance) and escape.

1 ELIMINATION. The immune system sees and destroys cancer cells. In this phase, our bodies may be regularly introduced to cancerous changes, and our immune systems are capable of handling and eliminating them.

2 EQUILIBRIUM. If the cancer cells are not destroyed right away, they may exist in a delicate balance between growth and control by the immune system. During equilibrium, the body's immune system is able to keep the cancer cells in check but unable to kill them completely. In this phase, a tumor may remain dormant for an unknown length of time and evade medical testing. According to the theory, however, the constant interactions between the tumor cells and the cells of the immune system may lead to tumors that can adapt to the immune response. This means the immune system may no longer be able to find tumors and attack them. Tumors that avoid the immune response can no longer be controlled and move on to the third phase.

3 ESCAPE. The escape phase refers to the disruption of equilibrium, which allows tumors to escape and begin growing in an environment of immune "tolerance." It's at this point that the symptoms of cancer begin to appear. Tumors in the escape phase use a number of methods to alter the body's immune response in a way that allows them to grow.

EXPLAINING THE IMMUNE SYSTEM

Every day our bodies encounter various organisms that could negatively affect our health. To fight against them, we all have an immune system working to identify these attackers and eliminate them, keeping us healthy.

Even though you may be unaware that your immune system is functioning, it is always working. You may notice it when an infection or irritation you can see or feel occurs. An example is when a bug bites your skin. You may develop an itchy, red bump. The bump is a physical sign that your immune system is working. Over a period of days, your immune system counteracts the reaction to the bite and heals it.

Another example is when you develop a cold. Germs can occasionally get past the defenses of the immune system through our nostrils, skin, saliva and mucus coating the inner linings of organs, eyes and mouth. When this occurs, you may experience a cold. Your immune system works to destroy the virus or bacteria that caused your illness. A working immune system helps you recover from the illness.

UNDERSTANDING THE IMMUNE SYSTEM

The immune system is a complex network of cells, molecules, organs and lymph tissues working together to defend the body against germs, cancer cells and other microscopic invaders. The first job of the immune system is to distinguish between what is part of the body ("self") and what is not part of the body ("non-self"). Once the immune system determines that a cell is foreign to the body, it begins a series of reactions to identify, target and eliminate the foreign cell.

The key driver of the immune system is the lymphatic system because it circulates clear fluid called lymph through the body to accomplish several jobs:

- Defend the body against harmful substances, such as germs
- Fight infections
- Drain fluids from the body's tissues from the bloodstream to help the body maintain proper fluid levels
- Filter lymph through the lymph nodes
- Filter blood through the spleen
- Identify and eliminate cancer cells

Lymph nodes, located throughout the body (with larger concentrations near the chest, abdomen, groin, pelvis, underarms and neck), circulate lymph. Although lymph and lymph nodes make up a large part of the lymphatic system, it also includes other organs, such as the skin, thymus, spleen, appendix, tonsils and adenoids. These organs collect, filter and circulate lymph. The lymph is able to contain and filter bacteria, viruses, toxins and chemicals, known as antigens, which are circulating in the lymphatic system and the bloodstream. These bacteria, viruses, toxins and chemicals are considered non-self antigens, meaning they originate outside of the body.

As the lymph passes through a lymph node, white blood cells (lymphocytes) within the node intercept the non-self antigens. Once the body recognizes these types of antigens, it produces antibodies to attack them or activates T-cells to destroy cells with these non-self antigens. When these levels increase in the body, due to an infection, more antibodies are made to fight the specific non-self antigen causing the infection.

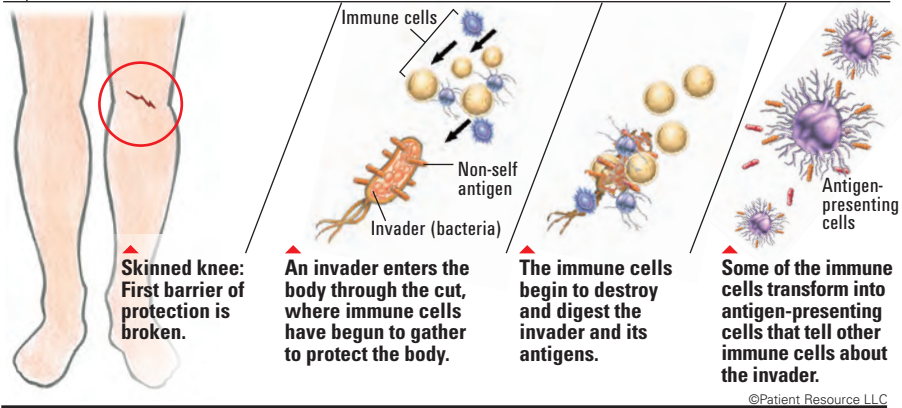
Lymphocytes are a major part of the immune system. They begin in the bone marrow and develop from lymphoblasts (immature cells found in bone marrow). Lymphoblasts mature into infection-fighting cells. The two main types of lymphocytes are B-lymphocytes (B-cells) and T-lymphocytes (T-cells).

■ **B-cells** develop in the bone marrow and mature into either plasma cells or memory cells. Plasma cells make antibodies to fight germs and infection. The function of B-cells is to produce protein antibodies that attach to infectious organisms, such as bacteria and some viruses, marking them for destruction. However, they can only identify them, not destroy them. Memory cells help the body remember which antigens attacked the body so it can recognize them if they return.

■ **T-cells** also develop in the bone marrow but travel to the thymus to mature into helper T-cells, killer T-cells, regulatory T-cells or memory T-cells. Each type of T-cell plays a part in the immune system. Helper T-cells identify non-self antigens and tell other immune system cells to coordinate with the B-cells for an attack. Killer T-cells directly attack and destroy these cells by inserting a protein that causes them to enlarge and burst. One type of killer T-cell is cytotoxic, which means it specifically targets cancer cells. Regulatory T-cells slow down the immune system after an immune response is finished, and they inhibit T-cells that attack normal, healthy cells that did not get eliminated before leaving the thymus. Memory T-cells can stay alive for years, continuing to fight off the same invading cells. Memory is the basis of immune protection against disease in general and explains why we don't become infected with some diseases, such as measles or chicken pox, more than once. T-cells are especially effective at eliminating viruses and cancer cells.

Another key part of the immune system is skin. Skin is the immune system's first barrier of protection. When you skin your knee, for example, the barrier is broken and harmful substances can easily enter the body (see Figure 1). As soon as the injury occurs, immune cells in the injured tissue begin to respond and call other immune cells that have been circulating in your body to gather at the site and release messenger proteins, called cytokines, to call other immune cells to help defend the body. This process is called an immune response. The immune cells can recognize any bacteria or foreign substances as dangerous, non-self antigens and begin to destroy them with a general attack. Although this attack can kill some of the dangerous cells, it may not be able to destroy all of them or prevent them from multiplying.

FIGURE 1
NORMAL IMMUNE RESPONSE



HOW THE IMMUNE SYSTEM ATTACKS CANCER

Our immune system basically attacks cancer the same way it attacks dangerous, non-self antigens, but the process is more complicated because cancer cells are created by the body (or "self"). If the immune system sees cancer cells as a normal part of the body, the tumor cells can effectively "hide" from the immune system.

Cancer develops when one or several abnormal cells divide and multiply to become a mass of abnormal cells (tumor). Mutations in DNA may cause normal cells to become abnormal or different enough from the body that the immune system may recognize the cancer cells as non-self, which may stimulate an immune response. But, because the cells started as normal cells, the immune system may still see the cancer cells as self antigens and not coordinate an attack.

To understand how cells in the body interact, it is important to know that the surface of a cell is not completely round and smooth. Instead, it contains various proteins, sugars, fats and other molecules that stick out of the cell's surface. These components contain information that is shared between cells through chemical signals and their receptors. One of the key cells needed to stimulate an immune response is the antigen-presenting cell (APC). APCs are able to find and pick up dangerous antigens, "eat" them and prepare them to be presented to other cells by sharing the antigens on their surface to be recognized by T-cells. In this manner, the APC sounds an alarm that there is an intruder in the body, and T-cells respond to this alarm. When a T-cell encounters an APC, it changes into either a killer T-cell to fight the intruder or a helper T-cell to begin assisting or "helping" the immune response.

Cancer cells are smart. Over time, not only can they change, they can use multiple methods to escape or confuse the immune system. Cancer cells produce proteins on their surface that they use to hide from the immune system, like camouflage. In addition, cancer cells can create their own messengers (cytokines), which means that the cancer cells can communicate and confuse other immune cells, allowing the cancer to take control of certain parts of the process that the body uses to regulate the immune response. This means that even if the immune system recognizes the cancer, it may not be able to successfully start or maintain an attack long enough to kill the cancer cells.

INSIDE THE IMMUNE SYSTEM

The immune system faces a variety of challenges as it attempts to protect the body from cancer.

HOW CANCER HIDES FROM THE IMMUNE SYSTEM

► Imagine a police officer (a T-cell) who encounters a suspicious person (a cancer cell). He asks the suspicious person for identification to determine if the suspect should be let go or arrested. If the police officer thinks the person does not pose a threat (a healthy cell), he will let him go. If he thinks he is dangerous (a cancer cell), he will call for backup (activate the immune system). However, the suspicious person may use fake identification to appear friendly with the hope that the police officer will think he is a normal, law-abiding citizen and send him on his way.

Cancer cells are clever and do the same thing by disguising themselves. The cancer cell produces proteins on its surface to alter its appearance, making it look like a normal, healthy cell to the T-cell. If the cancer cell is successful, the T-cell will be fooled and will let the cancer cell continue to attack the body.

HOW THE IMMUNE SYSTEM REMEMBERS

► Although cancer cells can be sneaky, the immune system has a long memory when it comes to battling dangerous cells. When your immune system encounters a virus like chicken pox, the memory T-cells automatically remember if it's exposed to it again and offers you immunity from that virus. Memory T-cells stay alive for a long time and store information about the cells the immune system attacked. When a memory T-cell interacts with a dangerous cell, it checks to see if it has any characteristics that match any of the cells it previously attacked. If it does, the memory T-cell alerts the rest of the immune system that a virus, for example, is back and to make more immune cells to attack it and keep you from getting the disease again. It offers the ability to be effective long after the treatment has ended.

With immunotherapy, one of the main goals is for the immune system to recognize cancer cells when they try to return. If the body can remember cancer and prevent it from recurring, this can lead to long-term, cancer-free remission and increased overall survival, in a way that no other therapies used to treat cancer can do.

The longer the cancer cells face a weakened immune response, the more they are able to adapt, and the easier it is for them to manipulate immune cells inside the tumor's location (sometimes called the microenvironment). The microenvironment typically contains cancer cells, normal connective tissues that form the structure of the tumor and provide access to blood vessels that drive tumor growth, and several cell types that contribute to tumor development. Immune cells found in this area are often referred to as tumor-infiltrating lymphocytes (TILs). Because the tumor can control the cells in the area, the tumor can trick TILs into becoming useless or even helping the tumor grow.

For example, APCs in the tumor area may be confused by signals from tumor cells, preventing them from functioning properly and making them incapable of sounding the alarm about a threat. In some cases, tumors can increase the activity of regulatory T-cells inside the area. In addition, this naturally slows down the immune system after an attack is completed. By increasing the activity of regulatory T-cells, the tumor is recruiting the body's own immune cells to fight off the attack, using the very processes that normally protect the body to help the cancer cells multiply undetected. Tumors often contain more than one type of cell and, when a tumor changes the composition of its cells, this can confuse the immune system. The longer the immune system is exposed to the tumor, the weaker the immune response becomes. Immunotherapy treatments and research focus on identifying different ways tumors manipulate the immune system and how to reverse those processes. ■

ADDITIONAL RESOURCES

- **American Cancer Society:** www.cancer.org
  Cancer Immunotherapy
- **American Society of Clinical Oncology:** www.cancer.net
  Understanding Immunotherapy
- **Society for Immunotherapy of Cancer:** www.sitcancer.org

TYPES OF CANCER IMMUNOTHERAPIES

Immunotherapy is a strategy doctors use to treat many different types of cancer using the body's own immune system. Immunotherapy helps the immune system recognize and attack cancer cells that have been hiding and target them for destruction, which is very different from the following types of cancer treatments.

- **Chemotherapy** uses drugs to kill rapidly multiplying cells, including cancer cells and sometimes healthy cells.
- **Radiation therapy** targets a specific region of the body with high-energy X-rays to destroy cancer cells.
- **Targeted therapy** drugs target specific genes or proteins in cancer cells or in cells related to cancer growth, such as the blood vessels that supply oxygen and nutrients to the cancer cell.
- **Surgery** to remove a tumor can be invasive and may leave behind cancer cells that have the potential to develop into new tumors.

Treating cancer with immunotherapy offers multiple benefits. It is less likely to affect healthy tissues and cells, which may reduce the likelihood and severity of side effects. Although side effects to immunotherapies may be more tolerable, in general, serious reactions called adverse events are possible. Your doctor will let you know what to watch for. If you begin to have any adverse effects or side effects, call your doctor at once (see *Side Effects,* page 15).

Immunotherapy offers the ability to be effective long after the treatment has ended. This is a feature of the immune system called "memory." When your immune system encounters a virus like chicken pox, it automatically remembers it if it is exposed to it again and offers you immunity from that virus. With immunotherapy, your immune system may be able to recognize a specific type of cancer cell easier, which can lead to long-term, cancer-free remission of that type and increased overall survival.

To be a candidate for immunotherapy, you must have a functioning immune system, not have an autoimmune disorder and not be taking immunosuppressive medications. Biomarker testing may also be needed. Some immunotherapies are approved to treat cancers in people with specific biomarkers present. If immunotherapy is an option for you, monitoring your health and any possible side effects are key once treatment begins.

ADOPTIVE CELLULAR THERAPY

Adoptive cellular therapy is a treatment that enhances or changes the body's own immune cells to be able to fight cancer. There are two main strategies. In one strategy, the doctor isolates T-cells that have attached to a patient's tumor (tumor-infiltrating lymphocytes, or TILs), helps them multiply, and then administers them back to the patient. In the second strategy, a patient's own T-cells are collected and new receptors are added that enable the T-cells to recognize specific antigens (foreign substances such as bacteria, viruses or parasites) on the surface of cancer cells. These engineered T-cells are called chimeric antigen receptor T-cells, or CAR-T. They are then infused back into the patient. In both cases, the goal is for the T-cells to multiply, seek and destroy the cancer cells that carry those specific antigens. Although this strategy is approved by the FDA for limited use, research focused on expanding its availability continues through clinical trials.

IMMUNE CHECKPOINT INHIBITORS

The body's immune system is so strong that it has the potential to attack normal, healthy cells along with foreign cells. To avoid doing so, the immune system regulates itself so that it only produces enough white blood cells to fight the non-self antigens (foreign cells) that are present in the body. When the white blood cells have completed their attack, the immune system slows down. It does this by using checkpoints.

Checkpoints keep the immune system "in check," preventing an attack on normal cells through the use of regulatory T-cells (see *Explaining the Immune System,* page 2). A series of signals that occur when the correct proteins and receptors on cell surfaces connect and tell the regulatory T-cells to slow down the immune system after an immune response is finished.

To better understand how this happens, think of the proteins on the cell surface and their receptors on a different cell's surface as puzzle pieces. Proteins have "tabs" that protrude (stick out), and receptors have "spaces" that curve inward. When the puzzle pieces fit together, chemicals and information are exchanged between them, triggering signals to the immune system to slow down. Three pieces of the puzzle work together to slow the immune system.

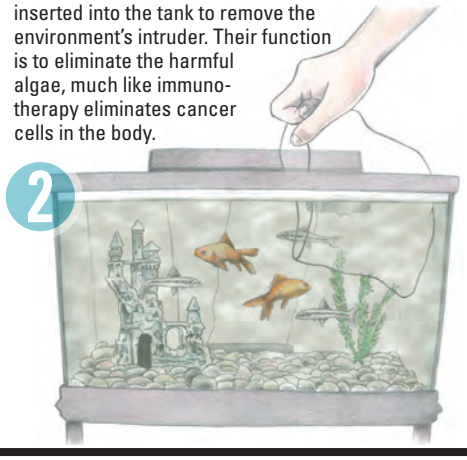
IMMUNOTHERAPY 101

Immunotherapy can be a difficult concept to understand. ***The science of it essentially changes a body's immune system so that it will recognize an illness that it may not have been able to fight before. Once the body can recognize the illness, it will fight it. Imagine how a fish tank's environment works.***

1

Algae-filled Tank ▶ The algae in the fish tank represent cancer cells that overwhelm the environment and "crowd out" the healthy cells in the body.

Introducing the Cure ▶ When algae occur, algae-eating fish can be inserted into the tank to remove the environment's intruder. Their function is to eliminate the harmful algae, much like immunotherapy eliminates cancer cells in the body.



2

3

Healthy Environment ▶ After the tank is algae-free, the algae-eating fish remain in the environment, continuing to provide support. Similarly, immunotherapy arms your immune system to provide ongoing protection against a specific cancer type.

1. CTLA-4 (cytotoxic T-lymphocyte-associated protein 4) is a receptor that binds with certain molecules to tell the immune system to slow down.

2. PD-1 (programmed cell death protein 1) is a receptor involved with telling T-cells to die and to reduce the death of regulatory T-cells (suppressor T-cells). Both have an effect to slow down an immune response. PD-1 can only tell the immune system to slow down if it connects with PD-L1.

3. PD-L1 (programmed death-ligand 1) is a protein that, when combined with PD-1, sends a signal to reduce the production of T-cells and enable more T-cells to die.

When PD-1 (the receptor) and PD-L1 (the protein) combine, the reaction signals the immune system that it is time to slow down. CTLA-4, however, can connect with more than one protein, which is a more complex reaction than the PD-1 and PD-L1 interaction. When CTLA-4 combines with any of the various proteins, it also tells the immune system to slow down.

One of the ways cancer can outsmart the immune system is by producing PD-L1 (the protein) on the surface of its cells and using it to camouflage its appearance so that T-cells will think they are normal cells. T-cells only expect normal cells to produce PD-L1, so when a T-cell encounters PD-L1 on a cancer cell, it is tricked into sending the signal for the immune system to slow down. This is how cancer can hide from the immune system.

Immune checkpoint inhibitors are drugs that prevent the proteins and receptors (puzzle pieces) from fitting together and triggering the slowdown of the immune system.

When an immune checkpoint inhibitor is given, the immune system is not so easily fooled by the cancer's disguise. By not slowing down, it's like the immune system develops X-ray vision and can see through the camouflage the cancer cell is wearing. This keeps the immune response on and also helps the immune system recognize cancer cells as foreign cells.

The following immune checkpoint inhibitors currently approved for use in immunotherapy block connections between specific proteins.

- **Anti-CTLA-4 antibodies** allow the T-cells to continue fighting cancer cells instead of shutting down.
- **Anti-PD-1 drugs** allow for the continued or increased production of T-cells and enable them to continue fighting cancer.
- **Anti-PD-L1 molecules** allow the T-cells to see through the disguises of some tumor cells, recognize them as the enemy and attack them.

MONOCLONAL ANTIBODIES

Antibodies (a type of protein) are the body's way of tagging an antigen (foreign substance). They are produced from plasma cells, which are mature forms of B-cells. Antibodies are produced for specific antigens. They bind to the antigen and allow the rest of the immune system to recognize the antigen as foreign and target it for destruction.

Monoclonal antibodies (mAbs) are antibodies made in a laboratory that are designed to target specific tumor antigens. They can work in different ways, such as flagging targeted cancer cells for destruction, blocking growth signals and receptors, and delivering other therapeutic agents directly to targeted cancer cells. They can also be created to carry cancer drugs, radiation particles or laboratory-made cytokines (proteins that enable cells to send messages to each other) directly to cancer cells. When a mAb is combined with a toxin, such as a chemotherapy drug, it travels through the system until it reaches the targeted cancer cell, where it attaches to the surface, gets swallowed by the tumor cell and breaks down inside the cell, releasing the toxin and causing cell death. Combining mAbs with radiation particles, a treatment known as radioimmunotherapy, allows for radiation to be delivered in lower doses over a longer period of time directly to specific cancer cells. This direct form of radiation delivery typically damages only the targeted cells.

Three different types of mAbs are used in cancer treatment.

1. Naked mAbs work by themselves. No drugs or radioactive particles are attached to them.

2. Conjugated mAbs have a chemotherapy drug or a radioactive particle attached to them. They are used to deliver treatment to the cancer cells. These also are referred to as tagged, labeled or loaded antibodies.

3. Bispecific mAbs are made up of two different mAbs and can attach to two different proteins at the same time.

NONSPECIFIC IMMUNE STIMULATION

The goal of this strategy is to boost the whole immune system instead of just specific parts. It can be used alone or in combination with other treatments to produce increased and longer-lasting immune responses. Different types of nonspecific immune stimulation include the following.

- **Cytokine immunotherapy** aids in communication among immune cells and plays a big role in the full activation of an immune response. This type of immunotherapy works by introducing large amounts of the following laboratory-made cytokines to the immune system to promote specific immune responses:
  - **Interleukins** are cytokines that help regulate the activation of certain immune cells.
  - **Interferons** are cytokines that boost the ability of certain immune cells to attack cancer cells.
  - **Granulocyte-macrophage colony stimulating factors** (GM-CSFs) are cytokines that stimulate the bone marrow, promoting the growth of immune and blood cells and the development of dendritic cells, which become antigen-presenting cells (cells that show the antigens to T-cells).
- **Modified bacteria** are used to treat certain cancers. Some bacteria have been changed to ensure they will not cause the disease to spread while stimulating an immune response.
- **Toll-like receptor agonists** recognize patterns in bacteria or viruses and produce a signal that activates the immune cell to attack. The immune system often detects germs through a series of receptors (called toll-like receptors) found on the surface of most immune cells. Several of these specialized receptors have been evaluated for use in cancer treatment.

ONCOLYTIC VIRUS IMMUNOTHERAPY

An oncolytic virus only attacks and kills cancer cells. Oncolytic virus immunotherapy uses viruses that directly infect tumor cells and induce an immune response against the infected cells. One of the most-studied approaches uses a weakened version of the herpes simplex virus that has been changed from the original and contains the cytokine GM-CSF. The virus targets specific cancer cells, infects them and duplicates itself continuously within the cell until it ruptures. This rupture kills the cell and releases the GM-CSF cytokine produced by the virus to promote an overall immune boost against the cancer. This process increases the chance that the attack can also begin killing cancer cells that have not been infected with the virus.

VACCINATIONS

Two types of vaccines are used against cancer: preventive vaccines and treatment vaccines. Preventive vaccines are given before a person develops cancer with the goal of stopping it from forming. Currently, preventive vaccinations are available for human papillomavirus

(HPV), the cause of many cervical, anal, and head and neck cancers, and for hepatitis B virus (HBV), a known risk factor for liver cancer.

Treatment vaccines may be given to treat existing cancers. These vaccines are created from either viruses or tumor cells that have been changed in a laboratory. Their goal is to direct immune cells to the cancer cells. Some of these vaccines are custom-made for the patient's specific tumor type while others are "off-the-shelf" vaccines that contain one to more than 100 antigens that are common to the patient's type of cancer.

Available types of treatment cancer vaccinations include the following.

- **Tumor cell vaccines** are made from tumor cells that are similar to a patient's cancer type. (In rare cases, these vaccines are made from a patient's own tumor.) In some cases, the tumor cells are changed in the laboratory to express a new property or are treated with drugs that make the tumor cells or their components easier for the immune system to recognize. The vaccines are treated with radiation to prevent spreading and are then injected back into the body to help the immune system recognize remaining cancer cells.
- **Antigen vaccines** are typically made from one to five of the antigens that are either unique to or overexpressed (more than needed) by tumor cells. They may be specific to a certain type of cancer but are not patient-specific.
- **Dendritic cell vaccines** (or antigen-presenting cell [APC] vaccines) are made from white blood cells removed from the patient. The cells are sent to a lab, changed into dendritic cells, and then exposed to tumor antigens so that they'll transform into mature APCs. When they're injected back into the patient, they share the antigen information with the T-cells so the cells releasing that specific antigen are targeted and destroyed.
- **Vector-based vaccines** are made from altered viruses, bacteria, yeast or other structures that can be used to get antigens into the body. Often, these germs have been altered so that they no longer cause disease. Some vaccines can be used to deliver more than one cancer antigen at a time. Vector-based vaccines are injected into the body to create an immune response, both specific and overall. Tumor-specific vectors are changed to train the immune system to recognize, target and destroy cancer cells. One vector-based vaccine currently being studied to treat leukemia is an HIV virus (modified to no longer cause disease) that targets B-cells, the cells primarily affected by leukemia. ■

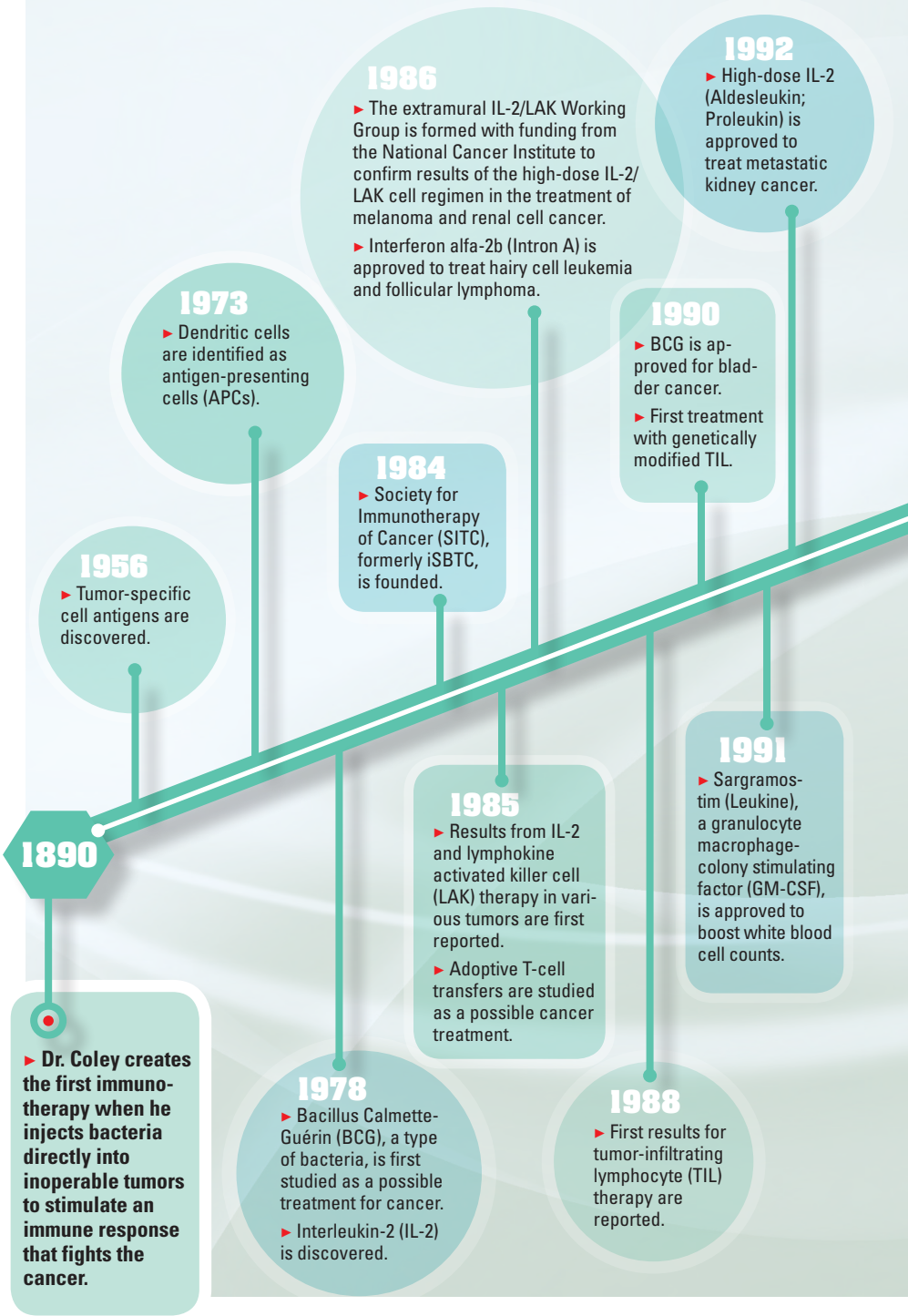
CANCER IMMUNOTHERAPY DEVELOPMENT

Researchers are having great success with immunotherapy.

More immunotherapy strategies and indications have been approved for more types of cancer in the last few years than in the past few decades. These groundbreaking developments are significantly improving and extending the lives of people with cancer, offering hope for a cure and a better quality of life.

This timeline highlights progress in the development of immunotherapy agents. Immunotherapy works by altering the immune system, either by stimulating the production of T-cells (a type of white blood cell) or antibodies (special proteins) or by overcoming the ability of cancer cells to "hide" from the immune system and not be recognized as dangerous.

Some immunotherapies are monoclonal antibodies, but they should not be confused with monoclonal antibodies that directly attack certain components in or on cancer cells, a type of treatment known as targeted therapy.



MILESTONES

1998

- IL-2 (Aldesleukin; Proleukin) is approved to treat metastatic melanoma.

1996

- Interferon alfa-2b (Intron A) is approved for the adjuvant treatment of high-risk melanoma.

1999

- Denileukin diftitox (Ontak), a fusion of IL-2 and diphtheria toxin, is approved to treat certain lymphomas.

2010

- The first therapeutic cancer vaccine, sipuleucel-T (PROVENGE), is approved for advanced prostate cancer.

2011

- Ipilimumab (Yervoy) is approved to treat advanced melanoma. Peginterferon alfa-2b (Sylatron) is approved for adjuvant therapy of selected patients with melanoma.

2012

- Several clinical studies of T-cell checkpoint inhibitors targeting PD-1 and PD-L1 demonstrate therapeutic activity in many types of cancers.

2013

- The first Phase III trial of oncolytic virus immunotherapy shows improvement in the long-term response rate in patients with melanoma.
- The combination of agents targeting CTLA-4 and PD-1 checkpoints shows activity against melanoma.

2014

- Pembrolizumab (Keytruda) is the first PD-1 inhibitor approved for advanced melanoma.
- Nivolumab (Opdivo), a PD-1 inhibitor, is approved for advanced melanoma.

2015

- Elotuzumab (Empliciti), a SLAMF7-directed immunostimulatory antibody, is approved for multiple myeloma.
- The first biosimilar product, filgrastim-sndz (Zarxio), is approved to treat severe chronic neutropenia.
- Nivolumab (Opdivo) is the first checkpoint inhibitor approved for non-small cell lung cancer and advanced renal cell carcinoma.
- Pembrolizumab (Keytruda) is approved to treat metastatic non-small cell lung cancer that has progressed after other treatments and with tumors that express a protein called PD-L1.
- Talimogene laherparepvec (Imlygic), a genetically modified oncolytic viral therapy, is approved for the local treatment of unresectable cutaneous, subcutaneous and nodal lesions in patients with melanoma.

2016

- Atezolizumab (Tecentriq) is the first PD-L1 inhibitor approved for previously treated locally advanced or metastatic urothelial carcinoma (a type of bladder cancer) and for the treatment of patients with metastatic non-small cell lung cancer.
- Nivolumab (Opdivo), a PD-1 inhibitor, is approved for classical Hodgkin lymphoma.
- Nivolumab (Opdivo) is approved for recurrent or metastatic squamous cell carcinoma of the head and neck with disease progression.
- Pembrolizumab (Keytruda) is the first checkpoint inhibitor approved as a first-line treatment for metastatic non-small cell lung cancer.
- Pembrolizumab (Keytruda) is approved for recurrent or metastatic head and neck squamous cell cancer with disease progression.

2017

- Nivolumab (Opdivo) is approved to treat bladder cancer.
- Pembrolizumab (Keytruda) is approved to treat classical Hodgkin lymphoma.
- Avelumab (Bavencio) is approved to treat metastatic Merkel cell carcinoma.
- Darvalumab (Imfinzi) is a PD-L1 blocking antibody approved to treat bladder cancer.
- Avelumab (Bavencio) is approved to treat locally advanced or metastatic bladder cancer.
- Pembrolizumab (Keytruda) is approved to treat locally advanced or metastatic bladder cancer.
- Pembrolizumab (Keytruda) is approved to treat unresectable or metastatic microsatellite instability-high and mismatch repair deficient cancers.
- Blinatumomab (Blincyto) is approved for the treatment of Philadelphia chromosome-negative relapsed or refractory B-cell precursor acute lymphoblastic leukemia (ALL).
- Nivolumab (Opdivo) is approved to treat selected patients with colorectal cancer.
- Tisagenlecleucel (Kymriah) is the first CAR T-cell therapy approved to treat cancer. It is indicated for patients up to 25 years old who have relapsed or refractory acute lymphoblastic leukemia (ALL).
- Pembrolizumab (Keytruda) is approved for patients with recurrent locally advanced or metastatic gastric or gastroesophageal junction adenocarcinoma whose tumors express PD-L1 as determined by an FDA-approved test.
- Bevacizumab-awwb (Mvasi), a biosimilar to bevacizumab (Avastin), is the first biosimilar approved in the U.S. for the treatment of cancer.
- Nivolumab (Opdivo) is approved for the treatment of hepatocellular carcinoma (HCC) in patients who have been previously treated with sorafenib.
- Axicabtagene ciloleucel (Yescarta), a CAR T-cell therapy, is approved for the treatment of adult patients with select types of relapsed or refractory large B-cell lymphoma after two or more lines of systemic therapy.

Current as of December 5, 2017

CANCER TYPES

Immunotherapy as a cancer treatment is a fast-growing area of research. As scientists and doctors learn more about how the immune system can be trained to find and fight cancer cells, new drugs are being approved, widening the circle of cancer types that can be treated with immunotherapy. Following are some of the cancer types being treated with immunotherapy strategies (see *Types of Cancer Immunotherapies*, page 4).

BLADDER CANCER

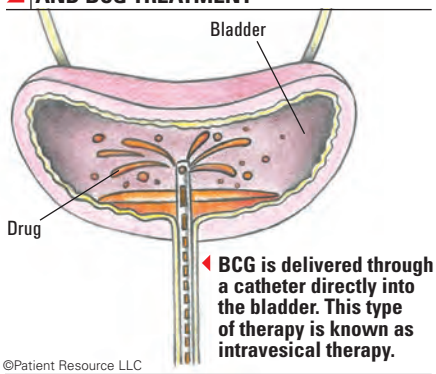
Bladder cancer begins when the cells found in the lining of the bladder mutate and grow uncontrollably. These cells accumulate and form a mass known as a primary tumor. Several options are available to treat bladder cancer and include surgery, chemotherapy, immunotherapy and radiation therapy. Your doctor may recommend one or a combination of these therapies.

Bladder cancer was the first cancer type to receive an approved immunotherapy agent, which was a monumental achievement for medicine. This agent, bacillus Calmette-Guérin (BCG), was approved by the U.S. Food and Drug Administration (FDA) in 1990 and is used to treat and to reduce the risk of recurrence in early-stage bladder cancer. BCG is a weakened version of the bacterium that causes tuberculosis, and it is delivered directly into the bladder through a catheter. This is called intravesicle therapy (see Figure 1). BCG attaches to the lining of the bladder and causes inflammation, which triggers an immune response. This stimulates the immune system to attack the cancer cells in the bladder.

Immune checkpoint inhibitors are another immunotherapy strategy used to treat bladder cancer. Checkpoint inhibitors are drugs that block specific proteins and receptors from triggering a slowdown of the immune system.

Additional immunotherapy drugs are available to treat bladder cancer, but not all immunotherapies are approved to treat all types and stages. Research in clinical trials is ongoing to develop more immunotherapies that offer new hope to people who have bladder cancer. Ask your doctor about the best treatment options for you.

FIGURE 1
ANATOMY OF BLADDER AND BCG TREATMENT



BCG is delivered through a catheter directly into the bladder. This type of therapy is known as intravesical therapy.

COLORECTAL CANCER

Colorectal cancer begins when healthy cells in the inner lining of the colon or rectum mutate and grow uncontrollably. These cells accumulate and form a mass, known as a primary tumor. Cancer that begins in the colon is called colon cancer, and cancer that begins in the rectum is called rectal cancer.

The main treatment options for colorectal cancer have included surgery, chemotherapy, targeted therapy and radiation therapy. In 2017, the U.S. Food and Drug Administration (FDA) approved the first immunotherapy to treat colorectal cancer in children and adults with metastatic disease that is microsatellite high (MSI-H). This strategy uses immune checkpoint inhibitors to target and block the PD-1 receptor on certain immune cells (T-cells) to block specific proteins and receptors from triggering a slowdown of the immune system.

Research is continuing in clinical trials to learn more about colorectal cancer, including ways to prevent, detect and treat it. The use of checkpoint inhibitors in combination with other therapies is also being evaluated.

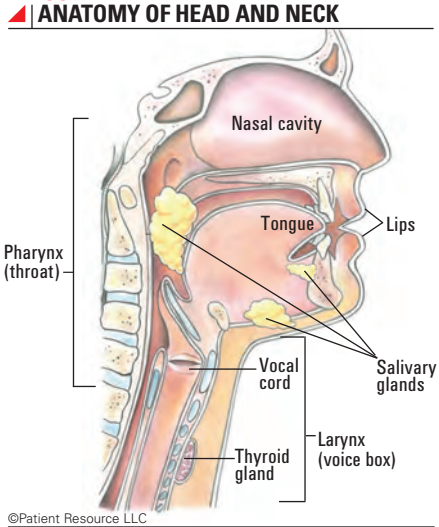
Clinical trials offer people the opportunity to try new therapies that are not widely available. Ask your doctor if a clinical trial may be an option for you.

HEAD AND NECK CANCER

Head and neck cancer describes a variety of malignant (cancerous) tumors that affect the mouth, pharynx (throat), larynx (voice box), sinuses, nose, thyroid and salivary glands (see Figure 2). Most of these cancers begin in the squamous cells that make up the moist tissues lining the nose, mouth and throat; others form in the cells of the thyroid and salivary glands.

The areas affected by head and neck cancer treatment control vital functions, including breathing, swallowing, chewing and speaking. As a result, treating head and neck cancer is more than removing a tumor and killing cancer cells. It also includes repairing the body so that patients can still perform those vital functions. The main treatment options for head and neck cancers include surgery, radiation therapy, chemotherapy, targeted therapy and immunotherapy, or a combination of these treatments.

FIGURE 2
ANATOMY OF HEAD AND NECK



In 2016, the U.S. Food and Drug Administration (FDA) approved the first immunotherapy drugs for head and neck cancer, specifically for recurrent or metastatic head and neck squamous cell carcinoma that progressed during or after chemotherapy that contained a platinum drug. These immunotherapy drugs are called immune checkpoint inhibitors. They block the PD-1 receptor on certain immune cells (T-cells) to block specific proteins and receptors from triggering a slowdown of the immune system.

Immunotherapy offers people with this type of head and neck cancer an alternative treatment option that is less invasive and disfiguring than some surgeries, bringing new hope to people with cancers in the head and neck region.

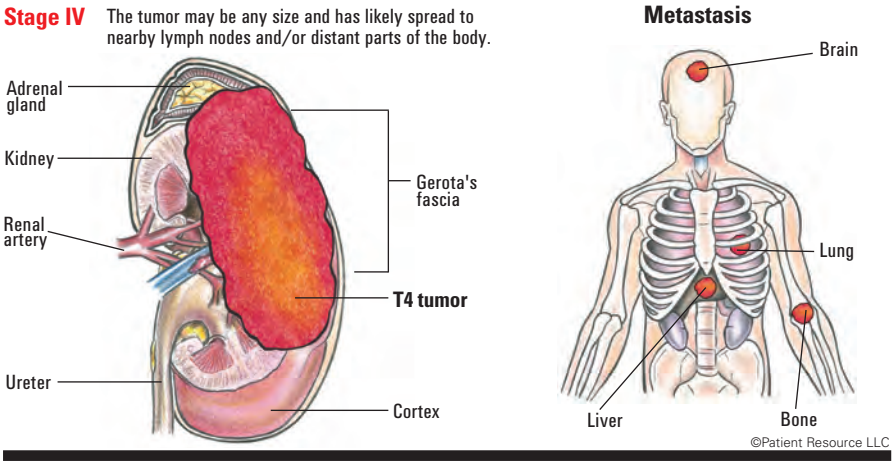
Research continues to expand the development of new treatment options for early-stage head and neck cancers and to find other types of immunotherapies that boost the immune system in different ways. In addition, immunotherapies approved for other types of cancers are being evaluated in clinical trials for head and neck cancers. Talk with your doctor to determine if a clinical trial is right for you.

KIDNEY (RENAL) CANCER

Cancer that develops in the kidneys is often referred to as renal cancer. The kidneys are

FIGURE 3

ANATOMY OF THE KIDNEY AND POSSIBLE METASTASIS



a pair of bean-shaped organs located in the back of the abdomen. There is one on each side of the spine, and they're protected by the lower rib cage. Each kidney is about the size of a fist. The most common type of kidney cancer affects the lining of the tubules (very small tubes) inside the kidneys. This type of cancer is called renal cell carcinoma (RCC) (see Figure 3). RCC begins when abnormal cells in the kidneys grow out of control and form one or more masses – or tumors – in the kidney.

Treatment options for kidney cancer include surgery, targeted therapy and immunotherapy, used alone or together. Surgery is often the primary treatment for most kidney cancers. Because kidney cancer is usually resistant to chemotherapy and radiation therapy, targeted therapy is typically the first line of treatment for advanced kidney cancer; however, radiation therapy and chemotherapy are occasionally used. This means the development of additional targeted therapies and immunotherapies is extremely important in the fight against this disease.

Different types of immunotherapies are available to treat kidney cancer. One type is a laboratory-made cytokine that can be used to shrink tumors and reduce the risk of recurrence. Cytokines are proteins made naturally in the body or made in a laboratory that act primarily by helping the various cells of the body's immune system communicate. They are capable of stimulating the immune system or slowing it down to help it fight cancer. Another type of immunotherapy used to treat kidney cancer is called an immune checkpoint inhibitor, which is a drug that blocks specific proteins and receptors from triggering a slowdown of the immune system.

Immunotherapy offers hope for people with kidney cancer, but the currently approved immunotherapy drugs are not approved for treating all stages of the disease. Researchers are working to learn more about kidney cancer, the best ways to treat it and which patients can benefit the most from these treatments. Personalized vaccines are also being evaluated in clinical trials. Talk with your doctor to determine if a clinical trial is right for you.

LEUKEMIA

Leukemia starts in the blood and bone marrow and occurs when white blood cells, leukocytes, in the body mutate (change) and grow uncontrollably. Chemotherapy, targeted therapy, immunotherapy and stem cell transplantation, used alone or in combination, are treatment options for leukemia. Following are some of the most common forms of leukemia treated with immunotherapy. Additional strategies for these and other types of leukemia are being researched in clinical trials.

■ **Acute lymphocytic leukemia (ALL),** also referred to as acute lymphoblastic leukemia, is a fast-growing cancer of the blood and bone marrow. It starts in the cells that become lymphocytes, a type of white blood cell. To treat ALL, different treatments or a combination of treatments may be given in three phases of treatment: induction, consolidation and maintenance.

In 2014, the U.S. Food and Drug Administration (FDA) approved the first immunotherapy strategy to treat ALL, indicated specifically for the treatment of Philadelphia chromosome-negative relapsed (cancer that has come back after treatment) or refractory (cancer that is not responding to treatment) B-cell precursor ALL. Since then, the FDA has expanded the drug's use to include Philadelphia chromosome-positive relapsed and refractory B-cell precursor ALL.

FDA-APPROVED CANCER IMMUNOTHERAPIES* *(As of 12/5/17)*

ACUTE LYMPHOCYTIC LEUKEMIA
- blinatumomab (Blincyto)

ACUTE PRECURSOR B-CELL (PRE-B-CELL) LYMPHOBLASTIC LEUKEMIA
- blinatumomab (Blincyto)
- tisagenlecleucel (Kymriah)

ACUTE T-CELL (LYMPHOBLASTIC) LEUKEMIA
- interferon alfa

ADULT T-CELL LYMPHOMA
- interferon alfa

ANAPLASTIC LARGE CELL LYMPHOMA
- brentuximab vedotin (Adcetris)

B-CELL CHRONIC LYMPHOCYTIC LEUKEMIA
- alemtuzumab (Campath)
- rituximab (Rituxan)

BLADDER CANCER
- atezolizumab (Tecentriq)
- avelumab (Bavencio)
- bacillus Calmette-Guérin (BCG)
- durvalumab (Imfinzi)
- nivolumab (Opdivo)
- pembrolizumab (Keytruda)

CHRONIC MYELOID LEUKEMIA
- interferon alfa

COLORECTAL CANCER
- nivolumab (Opdivo)
- pembrolizumab (Keytruda)

DIFFUSE LARGE B-CELL LYMPHOMA
- axicabtagene ciloleucel (Yescarta)
- rituximab (Rituxan)
- rituximab and hyaluronase human (Rituxan Hycela)

FOLLICULAR LYMPHOMA
- ibritumomab tiuxetan (Zevalin)
- interferon alfa-2b (Intron A)
- obinutuzumab (Gazyva)
- rituximab (Rituxan)
- rituximab and hyaluronase human (Rituxan Hycela)

HAIRY CELL LEUKEMIA
- interferon alfa-2b (Intron-A)
- rituximab (Rituxan)

HEAD AND NECK CANCER
- nivolumab (Opdivo)
- pembrolizumab (Keytruda)

HODGKIN LYMPHOMA
- brentuximab vedotin (Adcetris)
- nivolumab (Opdivo)
- pembrolizumab (Keytruda)
- rituximab (Rituxan)

INTRAVASCULAR LARGE B-CELL LYMPHOMA
- rituximab (Rituxan)

KIDNEY (RENAL) CANCER
- interferon alpha
- interleukin-2 (Aldesleukin, Proleukin)
- nivolumab (Opdivo)

LIVER CANCER
- nivolumab (Opdivo)

LUNG CANCER
- atezolizumab (Tecentriq)
- nivolumab (Opdivo)
- pembrolizumab (Keytruda)

LYMPHOPLASMACYTIC LYMPHOMA
- rituximab (Rituxan)

MANTLE CELL LYMPHOMA
- lenalidomide (Revlimid)
- rituximab (Rituxan)

MARGINAL ZONE B-CELL LYMPHOMA
- rituximab (Rituxan)

MELANOMA
- high-dose interleukin-2 (IL-2)
- interferon alfa-2b (Intron A)
- interleukin-2 (Aldesleukin, Proleukin)
- ipilimumab (Yervoy)
- nivolumab (Opdivo)
- peginterferon alfa-2b (Sylatron)
- pegylated interferon alfa-2b (PEG-Intron)
- pembrolizumab (Keytruda)
- talimogene laherparepvec (Imlygic)

MERKEL CELL CARCINOMA
- avelumab (Bavencio)

MULTIPLE MYELOMA
- daratumumab (Darzalex)
- elotuzumab (Empliciti)
- lenalidomide (Revlimid)
- pomalidomide (Pomalyst)
- thalidomide (Thalomid)

NON-HODGKIN LYMPHOMA
- rituximab (Rituxan)

PRIMARY CENTRAL NERVOUS SYSTEM LYMPHOMA
- rituximab (Rituxan)

PRIMARY MEDIASTINAL B-CELL LYMPHOMA
- rituximab (Rituxan)

PROLYMPHOCYTIC LEUKEMIA
- alemtuzumab (Campath)

PROSTATE CANCER
- sipuleucel-T (Provenge)

STOMACH (GASTRIC) CANCER
- pembrolizumab (Keytruda)

**Each therapy is prescribed based on specific criteria. Discuss your options with your doctor.*

In 2017, the FDA approved the first gene therapy in the United States. This breakthrough drug is known as a chimeric antigen receptor (CAR) T-cell therapy and is approved to treat certain children and young adults with B-cell ALL. CAR T-cell therapy is the use of a patient's own immune cells, or T-cells, that are redesigned to recognize and kill ALL cells.

Additional immunotherapy strategies are being studied in clinical trials. Ask your doctor if you are a candidate for a clinical trial.

■ **Chronic myeloid leukemia (CML)** is a cancer of the bone marrow and blood. It is a slow-growing leukemia that develops when a genetic change mutates or damages immature myeloid cells, which are the cells that become white blood cells (other than lymphocytes), red blood cells or cells that make platelets.

The type of immunotherapy used to treat CML is called an interferon, which is a cytokine. Cytokines are proteins made naturally in the body or made in a laboratory, and they act primarily by helping the various cells of the body's immune system communicate. They are capable of stimulating the immune system or slowing it down in order to help it fight cancer. Interferons can reduce the number of white blood cells and the number of cells that contain the Philadelphia chromosome.

Researchers conducting clinical trials are exploring how to prevent, diagnose and treat CML. Cancer treatment vaccines may be used to stimulate the immune system to recognize cancer cells as a threat to the body, and to destroy them. Currently, clinical trials are assessing how this type of treatment may be used against the Philadelphia chromosome in patients with CML. Talk with your doctor about clinical trials, and whether one may be right for you.

■ **Hairy cell leukemia** is a rare type of cancer of the blood and bone marrow, which is the soft tissue in the center of most bones. It gets its name from the "hairy" appearance its cells have when viewed under a microscope. In hairy cell leukemia, too many blood stem cells become lymphocytes, which are white blood cells that help fight infections. However, these lymphocytes are abnormal and do not become healthy white blood cells. They become leukemia cells that can build up in the blood and bone marrow so there is less room for healthy white blood cells, red blood cells and platelets.

One type of immunotherapy approved for hairy cell leukemia is a cytokine. Cytokines are proteins made naturally in the body or made in a laboratory, and act primarily by helping the various cells of the body's immune system communicate. They are capable of stimulating the immune system or slowing it down in order to help it fight cancer. Typically, the cytokines used for hairy cell leukemia are interferons.

Alpha interferon was approved in 1986 and represented a new and exciting advance in the treatment of hairy cell leukemia. Until that time, splenectomy (the removal of the spleen) was the only known effective therapy for this disease. Interferon benefited people with active hairy cell leukemia, regardless of whether they had a splenectomy. At this time, interferon has a relatively limited role in the treatment of hairy cell leukemia, so discuss with your doctor if it is appropriate for you.

Other types of treatment are being tested in clinical trials. Talk to your doctor about all of your treatment options, and ask if a clinical trial may be an option for you.

LIVER CANCER

The liver is the largest internal organ in the body and is located behind the rib cage below the right lung. It's shaped like a pyramid and has two lobes, which are further subdivided into segments. An essential part of the digestive system, the liver has several important functions, including processing and storing several nutrients that are later used for energy or to build and repair tissues, collecting and filtering blood, making clotting factors to help stop bleeding, secreting bile into the intestines to assist in nutrient absorption, breaking down and removing toxic waste from the blood and maintaining proper blood sugar levels.

Several options exist for treating liver cancer. Your doctor will consider many factors, such as the stage of the cancer and your personal preferences, before recommending treatment.

The most common type of primary liver cancer is hepatocellular carcinoma. Immune checkpoint inhibitors, drugs that block specific proteins and receptors from triggering a slowdown of the immune system, are currently approved to treat hepatocellular carcinoma in certain situations.

LUNG CANCER

Lung cancer starts in the epithelial cells in the lungs, which are the cells that line the airways. Healthy epithelial cells create mucus, which lubricates and provides protection to the lungs. When healthy epithelial cells mutate and grow uncontrollably, they become cancerous cells that accumulate and form a mass known as a primary tumor. Cancerous cells may accumulate so rapidly that they replace normal, healthy cells, affecting the way that your lungs function, which may make breathing difficult.

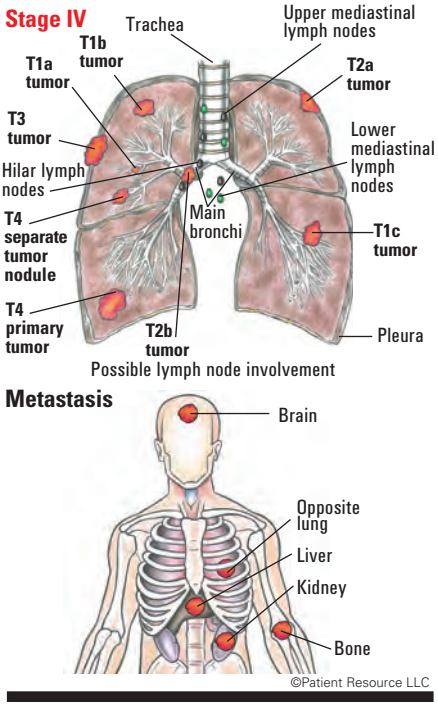
Sometimes cancer cells break off from the primary tumor and form secondary tumors in nearby sites, such as another lobe of the lung, or distant sites, such as the brain. This spread of cancer is called metastasis. When metastasis occurs, the cancer found in the new region is still considered lung cancer and is treated as such. For example, lung cancer that has spread to the liver is still considered lung cancer, not liver cancer (see Figure 4).

Several options are available to treat lung cancer, including surgery, chemotherapy, radiation therapy, targeted therapy, molecular therapy and immunotherapy. When possible, surgery is the primary treatment to remove tumors that are caught early. Factors that will guide your treatment include the type and stage of your lung cancer, the location of the tumor, biomarker testing results, your overall lung function and your general health.

A type of immunotherapy known as immune checkpoint inhibitors is a relatively new, but effective, strategy for treating metastatic lung cancer. Immune checkpoint inhibitors are drugs that block specific proteins and receptors from triggering a slowdown of

FIGURE 4

ANATOMY OF LUNGS AND POSSIBLE METASTASIS



the immune system. This promising treatment is changing the course of lung cancer treatment. Some people with metastatic lung cancer are living longer with a better quality of life, due in part to fewer and more manageable side effects.

When discussing treatment options with your doctor, make sure you know the type of lung cancer you have, including any information about biomarkers specific to your tumor. Understanding as much as you can about your cancer will help you make more informed treatment decisions. Research through clinical trials continues to expand the role of immunotherapy as a treatment option for lung cancer. Talk with your doctor to determine if a clinical trial is right for you.

LYMPHOMA

Lymphoma occurs when cells of the immune system called lymphocytes, a type of white blood cell, grow and multiply uncontrollably. These cancerous lymphocytes can travel to many parts of the body and form a mass called a tumor. Two main types of lymphocytes develop into lymphomas: B-lymphocytes (B-cells) and T-lymphocytes (T-cells).

- **Non-Hodgkin lymphoma (NHL)** is the most common cancer of the lymphatic system. NHL occurs when T-cells, B-cells and natural killer (NK) cells grow uncontrollably, sometimes forming a tumor. It may be found in any of the lymphoid tissues, and it spreads in a less orderly way than Hodgkin lymphoma. More than 60 subtypes of NHL exist. These subtypes vary in microscopic appearance, molecular features, how they grow and spread, how they affect the body and how they are treated. Slow-growing types are called indolent lymphomas, and fast-growing types are called aggressive lymphomas.

Treatment options for NHL include chemotherapy, immunotherapy, targeted therapy, radiation therapy and stem cell transplantation. Factors that will guide your treatment include the stage of the disease as well as your age, overall health and symptoms. The first successful immunotherapy introduced for lymphoma is a monoclonal antibody that is available for all B-cell lymphomas. Monoclonal antibodies are laboratory-made versions of immune system proteins designed to attack cancer cells. NHL is usually treated with an immunotherapy drug combined with chemotherapy.

Many clinical trials are evaluating possible immunotherapy drugs or combinations. Researchers have been focused on checkpoint inhibitors, such as anti-PD-1, anti-PD-L1 and anti-CTLA-4 antibodies, alone and in combination. Cancer treatment vaccines and chimeric antigen receptor (CAR) T-cell therapy are also being researched in clinical trials. Ask your doctor if a clinical trial is right for you.

- **B-cell lymphoma** is the most common type of NHL. T-cell lymphoma is less common, and NK-cell lymphoma is relatively rare. NHL can start nearly anywhere and can spread to almost any organ. It most often begins in the lymph nodes, liver, spleen or bone marrow, but it can also involve the stomach, intestines, skin, thyroid, brain or any other part of the body where lymphatic tissue is found. In 2017, the FDA approved a chimeric antigen receptor (CAR) T-cell therapy to treat certain types of large B-cell lymphoma. This CAR T-cell therapy involves using a patient's genetically engineered immune cells, or T-cells, that are redesigned to recognize and kill lymphoma cells.
- **Follicular lymphoma** is a B-cell lymphoma and is the most common slow-growing form of NHL. It usually begins in the lymph nodes and can spread into the blood and bone marrow (soft, spongy tissue in the center of some bones) or other organs. Common treatment options for follicular lymphoma include chemotherapy, immunotherapy, targeted therapy and radiation therapy. The main type of immunotherapy used to treat follicular lymphoma involves monoclonal antibodies, which are laboratory-made versions of immune system proteins designed to attack cancer cells. One type of monoclonal antibody attaches to a specific protein found on B-cells (the type of cell that follicular lymphoma is made of) that makes the B-cells more visible to the immune system and helps it attack cancer cells more efficiently.

A somewhat similar treatment option involves the use of a radioactive monoclonal antibody. This is an immunotherapy drug that combines a radioactive particle with a monoclonal antibody, allowing it to deliver radiation directly to the cancer cells. This approach, known as radioimmunotherapy, leaves most of the surrounding healthy cells undamaged.

Follicular lymphoma commonly comes back after treatment. When this occurs, it is called relapsed disease. Relapse can happen weeks, months or even years after initial treatment has ended. Treatment options for relapsed follicular lymphoma include chemotherapy, immunotherapy, targeted therapy or a combination of treatments. Radioimmunotherapy may also be used alone or in combination with chemotherapy to treat this condition.

Immunotherapy combined with chemotherapy is the most common treatment for more advanced Stage II, Stage III and Stage IV disease. One of the first immunotherapies approved for follicular lymphoma was a type of interferon, which is a cytokine. Cytokines are proteins made naturally in the body or made in a laboratory, and act primarily by helping the various cells of the body's immune system communicate. They are capable of stimulating the immune system or slowing it down to help it fight cancer.

Follicular lymphoma clinical trials are designed to investigate treatment strategies to increase the remission rate or cure the disease. The use of personalized vaccines is one strategy being evaluated. Personalized vaccines may be used to treat cancer by stimulating the immune system to recognize cancer cells as a threat to the body and destroy them. Ask your doctor if you are a candidate for clinical trials.

- **Mantle cell lymphoma (MCL)** forms when B-lymphocytes (B-cells) in the outer edge of a lymph node mutate and grow uncontrollably. The uncontrollable growth of mutated B-cells causes them to accumulate in the lymph nodes, and the lymph nodes become enlarged. The MCL cells can enter the lymphatic channels and the blood and can spread to other lymph nodes or tissues, such as the bone marrow, liver and gastrointestinal tract.

Treatment options for MCL include chemotherapy, targeted therapy, stem cell transplantation and immunotherapy. Although chemotherapy is the most commonly used treatment for MCL, immunotherapy may be combined with a chemotherapy drug to treat MCL in people who have disease that relapsed or progressed after two prior therapies. For this group of people, the use of immunotherapy with chemotherapy has led to better results than the use of immunotherapy alone. As a result, this is offering hope as an additional treatment option.

New drugs and treatment types are also being evaluated in clinical trials, including immunomodulators, which are substances that regulate the function of the immune system and can slow the rate at which cancer cells grow and multiply. Another type, radioimmunotherapy, combines the cancer-killing ability of radiation therapy with the targeting capability of immunotherapy to deliver lethal doses of radiation directly to cancer cells.

Researchers are exploring ways to extend the length of remission between relapse, and the use of vaccines to treat MCL is also being assessed. Cancer-treating vaccines work by

stimulating the immune system to recognize cancer cells as a threat to the body, and to destroy them. This type of immunotherapy treatment may be customized to work against your specific cancer by using the genetic makeup of your tumor cells to create the vaccine.

Participating in a clinical trial may offer you the best chance of receiving the most leading-edge treatments available.

■ **Hodgkin lymphoma (HL)**, formerly known as Hodgkin disease, is a cancer that starts in the part of the body's immune system known as the lymphatic system. The lymphatic system is made up of lymphoid tissue, lymph and lymphatic vessels. Lymphoid tissue is found in many parts of the body, including the lymph nodes, spleen, bone marrow, thymus, adenoids and tonsils, and digestive tract (see *Explaining the Immune System*, page 2). These tissues are primarily made of white blood cells called lymphocytes. HL typically starts in the lymph nodes in the chest, neck or underarm and may spread to other lymph nodes or to other organs, such as the liver or lungs.

Treatment options for HL include chemotherapy, radiation therapy and immunotherapy, and advances in the diagnosis and treatment of this disease have contributed to a cure rate that is generally high. Until recently, if the disease progressed, returned after treatment or stopped responding to treatment, the primary option was high doses of chemotherapy followed by stem cell transplantation and additional drug therapy. Today, people with hard-to-treat HL have a new treatment option in immunotherapy.

In 2016, the U.S. Food and Drug Administration (FDA) approved an immunotherapy drug for classical HL that has returned or progressed after a specific type of stem cell transplantation and post-transplantation drug therapy. This type of immunotherapy is referred to as an immune checkpoint inhibitor, a drug that blocks specific proteins and receptors from triggering a slowdown of the immune system.

In 2017, the FDA approved another immune checkpoint inhibitor for children and adults with classical HL that has stopped responding to treatment or that has returned after three or more therapies.

Immunotherapy brings new hope for people with relapsed HL and HL that was previously difficult to manage. Researchers are exploring the use of immunotherapy in combination with other therapies to treat all stages of HL in clinical trials. Before making any treatment decisions, ask your doctor if immunotherapy is right for you or if you may be a candidate for a clinical trial.

MELANOMA

Melanoma begins when melanocytes, which are cells that produce melanin (the substance that colors the skin, hair and eyes), mutate and grow uncontrollably. Although melanoma is primarily a cancer of the skin, it can affect other parts of the body, including the eyes, mouth, genitals and anal area.

The standard therapies for melanoma include surgery, chemotherapy, radiation therapy and immunotherapy. Surgery remains the primary treatment for the disease. Of all the cancers immunotherapies have been tested on, melanoma is one of the most responsive cancers to the treatment, which is bringing new hope to people with the disease. For many people with melanoma, immunotherapy is successful in terms of shrinking tumors, reducing the risk of the cancer coming back and leading to longer life.

Multiple immunotherapies have been approved by the U.S. Food and Drug Administration for melanoma. The first was a cytokine that was approved for treatment after surgery for patients at high risk of the cancer recurring. Cytokines are proteins made naturally in the body or made in a laboratory, and they act primarily by helping the various cells of the body's immune system communicate. They are capable of stimulating the immune system or slowing it down to help it fight cancer.

Immunotherapy is also used to treat some metastatic melanomas (those that have spread to other parts of the body), either alone or in combination with other treatments. Additional immunotherapies, such as immune checkpoint inhibitors, have been approved over the years, making melanoma one of the few cancer types for which a variety of immunotherapies have been approved. Immune checkpoint inhibitors are drugs that block specific proteins and receptors from triggering a slowdown of the immune system.

Currently, immunotherapy to treat melanoma is a significant focus in cancer research and drug development. Multiple clinical trials are taking place to investigate new immunotherapies and combinations of currently approved immunotherapies, such as checkpoint inhibitors and personalized vaccines. Because melanoma has been so responsive to new immunotherapies, researchers are investigating whether some that are already approved for advanced or metastatic melanomas could be used for earlier stage melanomas.

As newer cancer treatments are discovered, they first become available in clinical trials for those who are eligible. Talk to your doctor to see whether a clinical trial is right for you and to discuss all of the treatment options available for your type and stage of melanoma.

MULTIPLE MYELOMA

Multiple myeloma is a blood cancer that develops when healthy plasma cells in the bone marrow mutate and multiply uncontrollably. Myeloma cells overcrowd the bone marrow and suppress the growth of healthy cells that produce blood. Although few patients with multiple myeloma are cured, many treatments are available to manage the disease. Advances made in the development of treatments have made it possible for people with multiple myeloma to live healthy and active lives.

Treatments for multiple myeloma differ from person to person. Factors that will guide your treatment include the stage of the disease, as well as your age, overall health and symptoms. Common treatment options for multiple myeloma include chemotherapy, targeted therapy, immunotherapy and stem cell transplantation, used alone or in combination. Because myeloma cells are developed from mutated healthy cells in the body, the immune system may have difficulty recognizing myeloma cells as foreign. Training the immune system to respond to cancer has the potential for a more lasting response that can extend beyond the end of treatment.

Immunomodulating agents are a type of immunotherapy drug used to treat multiple myeloma. Immunomodulators are substances that regulate the function of the immune system and can slow the rate at which cancer cells grow and multiply. These drugs can be effective in treating newly diagnosed multiple myeloma and relapsed or refractory disease. Monoclonal antibodies are also a treatment option. They are laboratory-made versions of immune system proteins designed to attack specific targets called antigens (protein molecules that begin an immune response) that are found on myeloma cells.

Immune checkpoint inhibitors are currently approved to treat multiple myeloma and continue to be studied in clinical trials. Immune checkpoint inhibitors are drugs that block specific proteins and receptors from triggering a slowdown of the immune system.

Talk to your doctor to see whether a clinical trial is right for you and to discuss all of

the treatment options available for your type and stage of multiple myeloma.

PROSTATE CANCER

The prostate is a walnut-sized gland located below the bladder, in front of the rectum and at the base of the bladder and the penis. It is found only in males and makes the seminal fluid, which is the liquid in semen that carries and protects the sperm. Prostate cancer begins when healthy cells in prostate tissue mutate and begin to grow uncontrollably. They become cancerous cells that accumulate and form a mass known as a primary tumor. Prostate cancer often grows very slowly, usually causing no to few symptoms in its early stages.

Treatment options for prostate cancer include surgery, radiation therapy, hormone therapy, chemotherapy and immunotherapy. The first immunotherapy approved by the U.S. Food and Drug Administration (FDA) for metastatic castration-resistant prostate cancer is a personalized cancer vaccine, meaning that the treatment is custom-made to fight against your own cancer cells. This strategy involves collecting your own white blood cells, modifying them in a lab with a vaccine to recognize the prostate cancer cells and then injecting the white blood cells and vaccine back into your body. Your cells are then able to find and destroy the cancer.

Clinical trials are a valuable treatment option to consider. Many of the advances in cancer treatment are helping save lives today because of the research conducted through clinical trials. By participating in a trial, you may have access to cutting-edge treatments that are not yet widely available. Ask your doctor if a trial might be right for you.

SKIN CANCER

Nonmelanoma skin cancer (NMSC) is a slow-growing disease that makes up the majority of all newly diagnosed skin cancer cases.

Many options to treat NMSC exist, including surgery, radiation therapy, photodynamic therapy and drug therapies. One type of NMSC, Merkel cell carcinoma (MCC), can be treated with an immunotherapy strategy known as a checkpoint inhibitor. MCC is a fast-growing cancer located on the top layer of the skin near nerve endings. Checkpoint inhibitors are drugs that block specific proteins and receptors from triggering a slowdown of the immune system.

STOMACH (GASTRIC) CANCER

The stomach is an integral part of the digestive system and is located in the upper abdomen. It is attached to the esophagus at the top and the small intestine at the bottom. After you chew and swallow your food, food travels down the esophagus and enters the stomach, where it starts to digest due to the secretion of gastric juices. The partially digested food and gastric juices then empty into the small intestine for further digestion.

Stomach cancer, also referred to as gastric cancer, can start in any of the five parts of the stomach. Treatment of stomach cancer depends on the size and location of the tumor, as well as whether it has metastasized (spread) to other parts of the body. The lungs, bones and liver are common sites of metastasis. Your doctor will also consider other factors, such as your age and general health, before recommending one or a combination of treatments.

Treatment options include surgery, chemotherapy, targeted therapy, radiation therapy and immunotherapy.

Immune checkpoint inhibitors are drugs that block specific proteins and receptors from triggering a slowdown of the immune system. An immune checkpoint inhibitor targeting PD-1, a protein found on T-cells, may be used to treat certain types of stomach cancers. ■

ADDITIONAL RESOURCES

Society for Immunotherapy of Cancer: www.sitc.org
Glossary available at sitcancer.org/patient/glossary

ACUTE LYMPHOCYTIC LEUKEMIA

American Cancer Society: www.cancer.org
Acute Lymphocytic Leukemia

Leukemia & Lymphoma Society: www.lls.org
ALL

BLADDER CANCER

American Bladder Cancer Society: www.bladdercancersupport.org

Bladder Cancer Advocacy Network: www.bcan.org

CHRONIC LYMPHOCYTIC LEUKEMIA

Cancer Research Institute: www.cancerresearch.org

Leukemia & Lymphoma Society: www.lls.org
CLL

COLORECTAL CANCER

Colon Cancer Alliance: www.ccalliance.org

Fight Colorectal Cancer: www.fightcolorectalcancer.org

FOLLICULAR LYMPHOMA

Focus on Follicular Lymphoma: www.focusonfl.org

Leukemia & Lymphoma Society: www.lls.org
Follicular Lymphoma

Lymphoma Information Network: www.lymphomainfo.net
Follicular Lymphoma

HAIRY CELL LEUKEMIA

Hairy Cell Leukemia Foundation: www.hairycellleukemia.org

Leukemia & Lymphoma Society: www.lls.org
Hairy Cell Leukemia

HEAD AND NECK CANCER

American Cancer Society: www.cancer.org
If You Have Head or Neck Cancer

HNC Living Foundation: www.hncliving.org
Resources

National Cancer Institute: www.cancer.gov
Head and Neck Cancers

HODGKIN LYMPHOMA

American Cancer Society: www.cancer.org
What Is Hodgkin Lymphoma?

National Cancer Institute: www.cancer.gov
Adult Hodgkin Lymphoma Treatment—Patient Version

KIDNEY (RENAL) CANCER

Action to Cure Kidney Cancer: www.ackc.org

Kidney Cancer Association: www.kidneycancer.org

National Kidney Foundation: www.kidney.org

LIVER CANCER

American Liver Foundation: www.liverfoundation.org
Support Services

American Society of Clinical Oncology: www.cancer.net
Liver Cancer

LUNG CANCER

American Society of Clinical Oncology: www.cancer.net
Lung Cancer – Non-Small Cell: Diagnosis

International Association for the Study of Lung Cancer: www.iaslc.org

LUNGevity: www.lungevity.org
Lung Cancer 101

MANTLE CELL LYMPHOMA

Leukemia & Lymphoma Society: www.lls.org
Non-Hodgkin Lymphoma

Lymphoma Research Foundation: www.lymphoma.org

MELANOMA

American Melanoma Foundation: www.melanomafoundation.org

Melanoma International Foundation: www.melanomainternational.org

Melanoma Research Foundation: www.melanoma.org

MULTIPLE MYELOMA

International Myeloma Foundation: www.myeloma.org

Myeloma Central: www.myelomacentral.com

The Multiple Myeloma Research Foundation: www.themmrf.org

NON-HODGKIN LYMPHOMA

American Society of Clinical Oncology: www.cancer.net
Lymphoma – non-Hodgkin: Subtypes

Leukemia & Lymphoma Society: www.lls.org
Non-Hodgkin Lymphoma

PROSTATE CANCER

American Cancer Society: www.cancer.org
What is Prostate Cancer?

American Society of Clinical Oncology: www.cancer.net
Prostate Cancer: Introduction

Prostate Cancer Foundation: www.pcf.org
About the Prostate

SKIN CANCER

Skin Cancer Foundation: www.skincancer.org
Merkel Cell Carcinoma

STOMACH (GASTRIC) CANCER

American Cancer Society: www.cancer.org
Stomach Cancer

American Society of Clinical Oncology: www.cancer.net
Stomach Cancer

There is hope

Todd Seals was diagnosed with Stage IV prostate cancer at just 42 years old. After deciding not to let cancer rule his life, he has committed to living an active lifestyle and being an inspiration to others. He encourages others to advocate for themselves, and, most importantly, to live life every day with gusto.

During a doctor's visit for pneumonia, an X-ray of my lungs showed a mass. I was told, "It's probably a pulmonary nodule. You should probably get that checked out." I should have gotten it checked, but I didn't.

I went to my primary care doctor when symptoms became serious. I developed pain and began to urinate blood. A urine sample was taken, and I was told that it tested positive for blood. "Well, duh," I thought. I told him about the chest X-ray. He took a look and discovered that my lung was covered in tumors. He said, "I'm very scared for you." I was scared, too.

The following weeks were a blur of blood work, bone scans, CTs and drinking contrast fluids while my symptoms worsened. I was in extreme pain and couldn't sleep at night. My PSA was more than 3,200. A biopsy was taken of my prostate. It was the worst thing that I experienced in my life. The local anesthetic did nothing to ease the pain, and the two young, female students who were present for observation made it nearly unbearable. I was diagnosed with Stage IV prostate cancer that had spread to my lungs. I had a Gleason score of 7 and a prognosis of one year.

Discovering that I had cancer was a low point for me. I had made many mistakes in my life that led to a strained relationship with family, drug addiction and homelessness. At the time of my diagnosis, I had been repairing those relationships with loved ones, been clean for nine months and had met the love of my life. I was getting my life back in order and felt ripped off. I blamed God.

I opened my Bible and read the first page that it opened to. The verses were Psalm 103:2-3. It said that "my soul will praise the Lord and not forget that He forgives all sins and heals all diseases." It became my mantra and comforted me during those painful, sleepless nights.

I was referred to an oncologist who was hopeful that he could treat the disease. This made me feel hopeful as well. Within a year of being diagnosed, I married my wife, and that night I promised her 30 years of marriage.

I started a hormone therapy drug that worked well for five years. My PSA rose around the same time my oncologist retired. He was a fantastic doctor. I was nervous about transitioning to a new oncologist, so he referred me to someone he trusted.

The new oncologist gave me a three-month prognosis, so I promptly fired him. He didn't inspire the same hope that my last oncologist did, and I didn't feel like he understood the gravity of the 30-year promise I'd made to my wife.

I refused to let his negativity get to me. I became my own advocate and educated myself. I spent hours poring over information about clinical trials at the National Cancer Institute in Washington and learned that a clinical trial recently ended with an FDA approval for an immunotherapy treatment for prostate cancer. It worked as a cancer vaccine and used your own cells to create a vaccine to kill your cancer cells. I knew that I wanted to try the new treatment, but my biggest hurdle was obtaining a prescription.

I went back to the oncologist I'd fired and requested the treatment but was denied because of my lung metastases. The oncologist read in an article from a medical journal that this particular immunotherapy treatment should not be given to patients with lung metastases. He offered other treatment options, which I declined. I fought back, and it got heated. (On one phone call, there might have even been some screaming.) It ended, however, in an appeal process with the insurance company.

During the months that it took for the appeal to process, my PSA rose and I began to feel sick. My wife and I decided to go directly to an expert in Las Vegas who worked for the pharmaceutical company that made the immunotherapy drug. Just before the trip, we were told that I'd won the appeal. Our trip to Vegas became a celebration. As part of the ruling, the oncologist who denied my request for a prescription had to follow a treatment plan as ordered by the doctor in Las Vegas. I finally received immunotherapy.

The only side effect that I experienced with immunotherapy was that I slept for 24 hours after my first infusion. It was much needed sleep, so I thought it was phenomenal. Immunotherapy gave me 14 side effect-free, progression-free months. After that time, I switched back to hormone therapy.

Hormone therapy resulted in a lot of side effects, including erectile dysfunction. As newlyweds, this was the most difficult one. Prescription medications helped, and I am happy to report that they are now rarely needed. I learned to focus on the love that I have for my wife and the emotional side of intimacy, and the physical part has responded. It isn't the same as it once was, but I have adjusted to a new normal and am happy.

Overall, this has been a fantastic ride. I wasted my life prior to diagnosis. I never even took a vacation. I have since become a better husband, father, friend and kid to my mom. I have traveled all over the country, spoken at events and have become a beacon of hope to others. My story is one of hope, and if I can inspire hope in other patients, I have done my job.

The best advice I received was from another patient: "Life is going to end, and cancer is scary. There is hope, there is hope, there is hope." Just because someone says you have cancer doesn't mean that you are going to die. I have written a blog called *Living with Prostate Cancer* that is about living life. Cancer is just part of the story. Start living your life, and treasure today. ■

SIDE EFFECTS

Immunotherapy boosts the body's immune system, and it typically results in fewer side effects that can be less severe than those associated with other forms of cancer treatment. However, not everyone experiences the same side effects, and, for some people, they may become more severe. Side effects of any cancer treatment can be physical as well as emotional, and some can be prevented while others may be managed. Knowing what to expect, and what to do if side effects do occur, will make your treatment experience more manageable. If you feel better, you are more likely to finish your treatment as planned by your treatment team. Ask your medical team about the side effects you can expect with immunotherapy, and when they are likely to occur.

Following are some side effects associated with immunotherapy.

■ **Immune-mediated adverse reactions** are not common but can occur and tend to be the most serious of the possible side effects. This type of reaction occurs when the immune system is overstimulated by the treatment and may cause inflammation, swelling or redness, which may be painful. Following are some of the systems affected by immune-mediated adverse reactions and common symptoms:

- **Endocrine (endocrinopathies):** hyperthyroidism, hypothyroidism, extreme fatigue, persistent or unusual headaches
- **Gastrointestinal (colitis):** diarrhea with or without bleeding, abdominal pain, bowel perforation
- **Neurologic (neuropathies):** numbness or tingling, sensory overload or sensory deprivation
- **Pulmonary (pneumonitis):** chest pain, shortness of breath
- **Renal (kidneys) (nephritis):** Decrease in urine output, blood in urine, swelling in ankles, loss of appetite
- **Skin (dermatitis):** Rash, skin changes

Since immunotherapy works differently than other cancer treatments, partnering with your doctor to monitor for complications is vital. To determine what is normal for you, your doctor likely will perform baseline assessments for monitoring purposes throughout treatment. You will play a key role in noticing what is abnormal for you and communicating that to your doctor immediately. It is important to understand how to recognize an immune-mediated adverse reaction, as some may not produce obvious symptoms.

Having the appropriate contact information handy is important. Before beginning immunotherapy, ask your health care team whom to call, day or night, if you think you may be having an immune-mediated adverse reaction. It is necessary to call that person immediately to avoid any life-threatening complications. Without treatment, an autoimmune response can be irreversible or even deadly. For the majority of reactions, early intervention can be reversed with steroids and by temporarily stopping immunotherapy.

These types of side effects can happen, sometimes occurring weeks or even months after treatment stops. Work with your doctor to determine a plan for how long to be vigilant about potential side effect symptoms.

■ **Fatigue** is the most common side effect reported in multiple immunotherapies, including checkpoint inhibitors, cytokines and oncolytic virus therapy. Fatigue associated with cancer is different than simply feeling tired and may cause you to feel physically, emotionally or mentally exhausted.

■ **Flu-like symptoms,** such as fever, chills, aches, headache, drowsiness, nausea, vomiting, loss of appetite and low or high blood pressure, can occur with cytokines or oncolytic virus therapy.

■ **Diarrhea** is common with checkpoint inhibitors and can vary in severity and duration. Diarrhea can lead to severe dehydration and electrolyte imbalance, but also could be a symptom that your immune system is going into overdrive. Call your health care team if you experience symptoms that interfere with your daily activities, such as severe abdominal cramping or episodes that make you fearful of leaving your home.

■ **Mild skin reactions**, such as bumpy or itchy red rashes, can occur. These reactions can be common with checkpoint inhibitors. Other skin problems include yellowing or changes in skin color, inflammation, blistering, hives, pale patches, dryness, cracking of the fingertips, sun sensitivity, and flushing or redness. Although rarely severe, these symptoms can be uncomfortable. Your doctor may recommend a corticosteroid or numbing medicine, antihistamine, medicated creams or antibiotics.

■ **Depression** can affect your mood, behavior and ability to think and concentrate, as well as be associated with fatigue, appetite loss, difficulty falling asleep or extreme tiredness. Depression can include suicidal thoughts or other psychiatric disorders. Call your doctor's office if you notice these types of mood changes.

■ **Mouth sores** are small cuts or ulcers that can affect the gums, tongue, roof of the mouth or lips. Mouth sores sometimes begin as mild pain or burning, followed by white patches that may become large red lesions. Pain may range from mild to severe, making it difficult to talk, eat or swallow. Mouth sores are more easily managed when caught early. Talk to your doctor if you have symptoms.

■ **Swelling of the legs** (edema) is caused by fluid accumulation in the body's tissues. The effects of edema may be reversed. Talk to your doctor if you notice swelling, stiffness, recent weight gain, puffiness or a heavy feeling in your legs.

■ **Heart palpitations** may occur as a side effect of some immunotherapy treatments. If you notice an abnormal heart rhythm or feel dizzy or light-headed, contact your doctor immediately.

Because immunotherapy drugs work by altering the way that the immune system works, it is possible that the effect may cause the immune system to attack normal, healthy parts of the body, such as the intestines, liver, lungs, kidneys, hormone-making glands or others. Frequent communication with your health care team is important for monitoring your symptoms. Seek treatment immediately, regardless of time of day, for any medical emergencies, including high fever, inflammation, swelling, severe abdominal pain or shortness of breath. ■

ADDITIONAL RESOURCES

- **American Cancer Society:** www.cancer.org
  Cancer Immunotherapy
- **American Society of Clinical Oncology:** www.cancer.net
  Side Effects of Immunotherapy
- **National Cancer Institute:** www.cancer.gov
  Immunotherapy
- **Society for Immunotherapy of Cancer:** www.sitcancer.org

ABOUT CLINICAL TRIALS

The advances in cancer treatment helping to save lives today are all products of research, and much of that research is done through clinical trials. The discoveries made in immunotherapy clinical trials have resulted in some of the most promising cancer treatments we have seen in decades. They have changed the way that cancer is treated and will impact the way that we treat cancer in the future.

While immunotherapy is on the forefront of cancer research and is bringing new hope to many people with different cancer types, it has not been approved for every cancer type. This is why the research being conducted in clinical trials is so important.

Clinical trials may be an appropriate treatment option so it's important to understand what they may mean for you. Clinical trials are research studies that:

- Evaluate the safety and effectiveness of a medical strategy, treatment or device.
- Develop "standards of care" by helping identify which treatments work best for certain illnesses or groups of people.
- Offer opportunities for people with cancer to access cutting-edge treatments that are not yet widely available.

Along with enabling you to contribute to future advances, clinical trials present many potential benefits, such as the opportunity to access leading-edge treatments that aren't yet widely available. They may be an alternative if your current treatment isn't working as well as it once was, or if you have a rare type of cancer that hasn't been studied much. You will also be more closely monitored in a clinical trial because your regular oncologist and the clinical trial medical team will be attending to your needs. Even after treatment ends, you will be in close contact with the medical team.

TYPES OF CLINICAL TRIALS

There are three types of clinical trials.

■ **Treatment Trials** evaluate whether a new type of treatment (drug, surgery, radiation therapy) or a combination is better than the treatment options that are currently available.

■ **Quality-of-Life Trials** study ways to improve the quality of life for people being treated for cancer and cancer survivors who experience disease-related and treatment-related symptoms. This type of trial may evaluate the effects of such things as nutrition, group therapy or counseling.

■ **Prevention, Screening and Diagnostic Trials** assess ways to reduce the chance of getting cancer in general. In these trials, which may be treatment or nontreatment trials, many participants do not have cancer, but some have had cancer and are at risk of the cancer returning (recurring) or a second cancer type developing. Sometimes these trials consist of simply completing questionnaires and providing medical information.

WHAT TO EXPECT

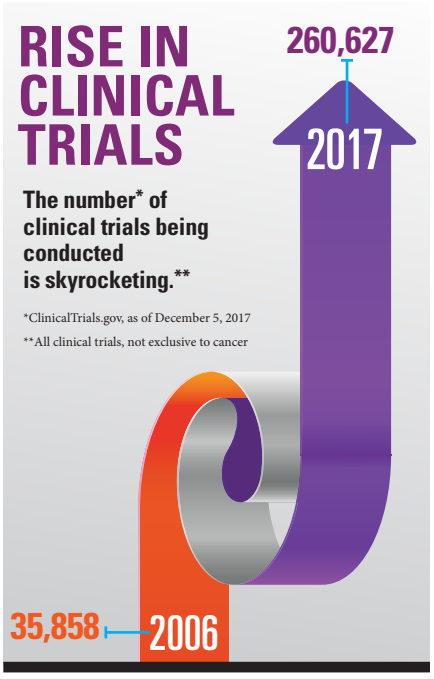
Clinical trials are carefully thought out, planned and performed in an extremely consistent manner so that all patients are treated exactly the same, from medication dosage and schedule to the frequency of follow-up appointments. Institutional review boards or ethics committees carefully set up safeguards to make sure that all patients in the clinical trial remain safe throughout the process. Whether you're at a small rural hospital or a large facility in a metropolitan area, your medical team is responsible for diligently following all of the same protocols and safety measures for your treatment plan across the board. You will be carefully monitored throughout the clinical trial. Even after the treatment ends, you will continue to be in close contact with the medical team.

When you volunteer to participate in a clinical trial, you will receive specific instructions and an Informed Consent form. You are encouraged to ask questions about anything you don't fully understand before signing and returning the form. This is the ideal time to talk with your medical team about the many falsehoods that persist about clinical trials. For example, there is a fear that by participating in a clinical trial, patients may receive a placebo or may not receive standard care. This is false. You will never receive a placebo instead of a cancer treatment. You will receive the standard of care as a foundation and then the experimental treatment or a placebo may be added to the standard treatment.

Participation in clinical trials is always voluntary, even after the study begins. Even though you sign the form saying that you understand the potential risks involved, you can decide to leave the trial at any time. If your expectations aren't met or if you experience too many side effects, you can withdraw and return to standard-of-care treatment.

FINANCIAL CONSIDERATIONS

Cost is a common concern when considering participating in clinical trials, and your doctor or study team can discuss if there will be any specific costs to you if you agree to participate in a clinical trial.



Routine patient care costs typically include those related to doctor visits, hospital stays and some testing procedures that are part of standard care and may be covered by your insurance. Research costs, which are directly related to the clinical trial and include drugs and procedures, are typically covered by the trial sponsor. Sponsors of clinical trials include government agencies (such as the National Cancer Institute), independent groups of doctors and health care institutions, or the pharmaceutical or biotechnology industries. Before dismissing the idea of participating because of the cost, research available resources and explore your insurance plan benefits. You may find that you can have access to an innovative treatment and be an integral part of cancer research without incurring a great deal of additional expense. ■

FIND A CLINICAL TRIAL

- **Center for Information and Study on Clinical Research Participation:** www.searchclinicaltrials.org
- **CenterWatch:** www.centerwatch.com
- **ClinicalTrials.gov:** www.clinicaltrials.gov
- **Clinical Trials and Me:** www.clinicaltrialsandme.com
- **Coalition of Cancer Cooperative Groups:** www.cancertrialshelp.com/cancer-trial-search
- **My Clinical Trial Locator:** myclinicaltriallocator.com
- **National Cancer Institute:** www.cancer.gov/about-cancer/treatment/clinical-trials/search
- **TrialCheck:** www.trialcheck.org

CLINICAL TRIALS BY DISEASE

Includes all studies categorized as "cancer immunotherapy" (as of October 31, 2017) by the U.S. National Institutes of Health at www.clinicaltrials.gov.

ADRENAL

Title	Cancer Type	Treatment	Location	NCT Number
Single Agent Pembrolizumab in Subjects With Advanced Adrenocortical Carcinoma	Adrenocortical Carcinoma	Drug: Pembrolizumab	NY	NCT02673333

ANAL

Title	Cancer Type	Treatment	Location	NCT Number
E7 TCR T Cells With or Without PD-1 Blockade for Human Papillomavirus-Associated Cancers	Cervical Cancer; Vaginal Cancer; Anal Cancer; Penile Cancer; Oropharyngeal Cancer	Biological: E7 TCR Transduced PBL cells; Drug: pembrolizumab; Drug: aldesleukin; Drug: fludarabine; Drug: cyclophosphamide	MD	NCT02858310

BLADDER

Title	Cancer Type	Treatment	Location	NCT Number
Evaluation for NCI Surgery Branch Clinical Studies	Synovial Cell Cancer; Melanoma; Colorectal Cancer; Lung Cancer; Bladder Cancer		MD	NCT00001823
T Cell Receptor Immunotherapy Targeting MAGE-A3 for Patients With Metastatic Cancer Who Are HLA-DP0401 Positive	Cervical Cancer; Renal Cancer; Urothelial Cancer; Melanoma; Breast Cancer	Biological: Anti-MAGE-A3-DP4 TCR; Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Aldesleukin	MD	NCT02111850
T Cell Receptor Immunotherapy Targeting MAGE-A3 for Patients With Metastatic Cancer Who Are HLA-A*01 Positive	Breast Cancer; Cervical Cancer; Renal Cancer; Melanoma; Bladder Cancer	Drug: Aldesleukin; Drug: Fludarabine; Drug: Cyclophosphamide; Biological: Anti-MAGE-A3 HLAA* 01-restricted TCR	MD	NCT02153905
Study of the CD40 Agonistic Monoclonal Antibody APX005M	Cancer; NSCLC; Melanoma; Urothelial Carcinoma; MSI-H; Head and Neck Cancer	Drug: APX005M	CA; OH; PA	NCT02482168
Phase I/Ib Study of Pembrolizumab With Vorinostat for Patients With Advanced Renal or Urothelial Cell Carcinoma	Renal Cell Carcinoma; Urinary Bladder Neoplasms	Drug: Pembrolizumab; Drug: Vorinostat	IN; MD	NCT02619253
Pembrolizumab (MK3475), Gemcitabine, and Concurrent Hypofractionated Radiation Therapy for Muscle-Invasive Urothelial Cancer of the Bladder	Muscle-invasive Urothelial Cancer of the Bladder	Biological: Pembrolizumab; Procedure: Transurethral Resection of Bladder Tumor; Drug: Gemcitabine; Radiation: External Beam Radiation Therapy	NY	NCT02621151
An Investigational Immuno-therapy Study of Nivolumab, Compared to Placebo, in Patients With Bladder or Upper Urinary Tract Cancer, Following Surgery to Remove the Cancer	Various Advanced Cancer	Biological: Nivolumab; Other: Placebo	AK; AZ; CA; CO; FL; IL; IN; LA; MI; MN; NC; NE; NV; NY; OR; PA; SC; TN	NCT02632409
A Personalized Cancer Vaccine (NEO-PV-01) w/ Nivolumab for Patients With Melanoma, Lung Cancer or Bladder Cancer	Urinary Bladder Cancer; Bladder Tumors; Transitional Cell Carcinoma of the Bladder; Malignant Melanoma; Melanoma; Skin Cancer; Carcinoma, Non-Small-Cell Lung; Lung Cancer	Biological: NEO-PV-01; Biological: Nivolumab; Other: Adjuvant	CA; MA; MO; NY; TX	NCT02897765
QUILT-3.032: A Multicenter Clinical Trial of Intravesical Bacillus Calmette-Guerin (BCG) in Combination With ALT-803 in Patients With BCG Unresponsive High Grade Non-Muscle Invasive Bladder Cancer	Bladder Cancer	Drug: ALT-803; Drug: BCG	AK; CA; CT; FL; HI; NY	NCT03022825
Study of Nivolumab in Combination With Ipilimumab or Standard of Care Chemotherapy Compared to the Standard of Care Chemotherapy Alone in Treatment of Patients With Untreated Inoperable or Metastatic Urothelial Cancer	Urothelial Cancer	Biological: nivolumab; Biological: ipilimumab; Drug: gemcitabine; Drug: cisplatin; Drug: carboplatin	AK; AL; AR; CA; FL; GA; IA; IL; LA; MA; MI; MN; MO; MS; NC; NH; NM; NY; OH; OR; PA; TX; UT; WA; WI	NCT03036098
Trial of Anti-PD-1 (Nivolumab) in Bladder Cancer Patients Recently Treated With Intravesical BCG Immunotherapy	Bladder Cancer	Drug: Nivolumab; Behavioral: Questionnaires	TX	NCT03106610
A Phase II Randomized Trial of Immunotherapy Plus Radiotherapy in Metastatic Genitourinary Cancers	Metastatic Renal Cell Carcinoma; Metastatic Urothelial Carcinoma	Drug: Nivolumab; Drug: Atezolizumab; Radiation: Radiation & immunotherapy	NY	NCT03115801
A Study of B-701 in Combination With Pembrolizumab in Treatment of Locally Advanced or Metastatic Urothelial Cell Carcinoma	Locally Advanced or Metastatic Urothelial Cell Carcinoma; Urinary Bladder Disease; Urological Diseases	Drug: B-701; Drug: Pembrolizumab	PA; TN	NCT03123055
Reconstitution of a Human Immune System in a Patient Derived Xenograft (PDX) Model of Genitourinary (GU) Cancers	Genito Urinary Cancer; Bladder Cancer; Kidney Cancer; Prostate Cancer	Procedure: Bone marrow biopsy	NC	NCT03134027

BRAIN

Title	Cancer Type	Treatment	Location	NCT Number
Vaccine Immunotherapy for Recurrent Medulloblastoma and Primitive Neuroectodermal Tumor	Medulloblastoma; Neuroectodermal Tumor	Biological: TTRNA-xALT; Biological: TTRNA-DCs	CA; DC; FL; NC	NCT01326104
CAR T Cell Receptor Immunotherapy Targeting EGFRvIII for Patients With Malignant Gliomas Expressing EGFRvIII	Malignant Glioma; Glioblastoma; Brain Cancer	Biological: Anti-EGFRvIII CAR transduced PBL; Drug: Aldesleukin; Drug: Fludarabine; Drug: Cyclophosphamide	MD	NCT01454596
Imiquimod and Tumor Lysate Vaccine Immunotherapy in Adults With High Risk or Recurrent Grade II Gliomas	High Risk WHO Grade II Glioma; Recurrent/ Post-Chemotherapy WHO Grade II Glioma	Biological: Tumor Lysate Vaccine; Drug: Imiquimod	PA	NCT01678352

BRAIN (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
Immunotherapy for Recurrent Ependymomas in Children Treatment for Recurrent Ependymomas Using HLA-A2 Restricted Tumor Antigen Peptides in Combination With Imiquimod	Ependymoma	Biological: HLA-A2 restricted synthetic tumor antigen; Drug: Imiquimod; Other: enzyme-linked immunosorbent assay; Other: flow cytometry; Other: immunohistochemistry staining method; Other: laboratory biomarker analysis	PA	NCT01795313
IDH1 Peptide Vaccine for Recurrent Grade II Glioma	Brain Cancer; Brain Neoplasm, Primary; Brain Neoplasms, Recurrent; Brain Tumor; Cancer of the Brain	Biological: PEPIDH1M vaccine; Biological: Tetanus-Diphtheria Toxoid (Td); Drug: Temozolomide	NC	NCT02193347
Genetically Modified T-cells in Treating Patients With Recurrent or Refractory Malignant Glioma	Malignant Glioma; Refractory Brain Neoplasm; Recurrent Brain Neoplasm; Glioblastoma	Biological: IL13RÎ±2-specific, hinge-optimized, 41BB-costimulatory CAR/ truncated CD19-expressing Autologous T lymphocytes; Other: laboratory biomarker analysis; Other: quality-of-life assessment; Procedure: Magnetic Resonance Imaging; Procedure: Magnetic Resonance Spectroscopic Imaging	CA	NCT02208362
A Pilot Study to Evaluate PBR PET in Brain Tumor Patients Treated With Chemoradiation or Immunotherapy	Intracranial Tumors; Glioblastoma; Melanoma	Other: PBR PET; Biological: Cancer Immunotherapy; Radiation: Radiation and chemotherapy	MA	NCT02431572
Study of the IDO Pathway Inhibitor, Indoximod, and Temozolomide for Pediatric Patients With Progressive Primary Malignant Brain Tumors	Glioblastoma Multiforme; Glioma; Gliosarcoma; Malignant Brain Tumor; Ependymoma; Medulloblastoma	Drug: Indoximod; Drug: Temozolomide; Radiation: Conformal Radiation	GA	NCT02502708
Antisense102: Pilot Immunotherapy for Newly Diagnosed Malignant Glioma	Malignant Glioma; Neoplasms	Drug: IGF-1R/AS ODN; Surgery with tissue harvest and implantation 20 diffusion chambers in the rectus sheath with IGF-1R/AS ODN within 24 hours of craniotomy, implanted for 48 hours.	PA	NCT02507583
An Investigational Immuno-therapy Study of Nivolumab Compared to Temozolomide, Each Given With Radiation Therapy, for Newly-diagnosed Patients With Glioblastoma (GBM, a Malignant Brain Cancer)	Brain Cancer	Drug: Nivolumab; Drug: Temozolomide; Radiation: Radiotherapy	AL; AZ; CA; CT; DC; FL; GA; IL; KS; KY; MA; MD; MI; MO; NC; NJ; NY; OH; OK; PA; SC; TN; TX; UT; WA	NCT02617589
A Study of Nivolumab in Adult Participants With Recurrent High-Grade Meningioma	Meningiomas	Drug: Nivolumab	MA	NCT02648997
An Investigational Immuno-therapy Study of Temozolomide Plus Radiation Therapy With Nivolumab or Placebo, for Newly Diagnosed Patients With Glioblastoma (GBM, a Malignant Brain Cancer)	Brain Neoplasms	Drug: Nivolumab; Drug: Temozolomide; Radiation: Radiotherapy; Other: Nivolumab Placebo	AL; AZ; CA; CT; DC; FL; IL; KS; KY; MA; MD; MI; MO; NC; NJ; NY; OH; PA; SC; TN; TX; UT; WA	NCT02667587
Radiation Therapy Plus Temozolomide and Pembrolizumab With and Without HSPPC-96 in Newly Diagnosed Glioblastoma (GBM)	Glioblastoma	Drug: Pembrolizumab; Biological: HSPPC-96; Drug: Temozolomide; Other: Placebo; Radiation: radiation treatment	MD	NCT03018288
Phase 1b Study PVSRIPO for Recurrent Malignant Glioma in Children	Malignant Glioma; Anaplastic Astrocytoma; Anaplastic Oligoastrocytoma; Anaplastic Oligodendroglioma; Glioblastoma; Gliosarcoma	Biological: Polio/Rhinovirus Recombinant (PVSRIPO)	NC	NCT03043391
Neoadjuvant Avelumab and Hypofractionated Proton Radiation Therapy Followed by Surgery for Recurrent Radiation-refractory Meningioma	Meningioma; Meningioma, Adult	Drug: Avelumab; Radiation: Proton Therapy; Procedure: Surgery	MO	NCT03267836
Phase II Trial of Pembrolizumab in Recurrent or Residual High Grade Meningioma	High Grade Meningioma	Drug: Pembrolizumab	MA	NCT03279692
PEP-CMV in Recurrent MEdulloblastoma/Malignant Glioma	Recurrent Medulloblastoma; Recurrent Brain Tumor, Childhood; Malignant Glioma	Drug: PEP-CMV	NC	NCT03299309

BREAST

Title	Cancer Type	Treatment	Location	NCT Number
Vaccine Therapy in Treating Patients With Metastatic Solid Tumors	Malignant Solid Tumour; Breast Cancer; Malignant Tumor of Colon; GIST; Ovarian Cancer	Biological: HER-2 vaccine; Biological: Extension HER-2 vaccine trial at OBD	OH	NCT01376505
Combination Immunotherapy With Herceptin and the HER2 Vaccine NeuVax	Breast Cancer	Drug: Herceptin; Drug: NeuVax vaccine; Drug: GM-CSF	CA; CO; DC; FL; HI; IN; KS; MD; NJ; NY; OR; PA; TX; VA; WA; WI	NCT01570036
Immune Responses in Prostate, Lung, Melanoma and Breast Cancer Patients Following Stereotactic Body Radiotherapy (SBRT), Intensity Modulated Radiotherapy (IMRT) or Brachytherapy	Prostate Cancer; Breast Cancer; Lung Cancer; Melanoma	Radiation: SBRT; Radiation: IMRT; Radiation: Brachytherapy	MN	NCT01777802
T Cell Receptor Immunotherapy Targeting NY-ESO-1 for Patients With NY-ESO-1 Expressing Cancer	Melanoma; Synovial Sarcoma; Breast Cancer; Non-Small Cell Lung Cancer; Hepatocellular Cancer	Biological: Anti-NY ESO-1 mTCR PBL; Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Aldesleukin	MD	NCT01967823

Title	Cancer Type	Treatment	Location	NCT Number
T Cell Receptor Immunotherapy Targeting MAGE-A3 for Patients With Metastatic Cancer Who Are HLA-DP0401 Positive	Cervical Cancer; Renal Cancer; Urothelial Cancer; Melanoma; Breast Cancer	Biological: Anti-MAGE-A3-DP4 TCR; Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Aldesleukin	MD	NCT02111850
T Cell Receptor Immunotherapy Targeting MAGE-A3 for Patients With Metastatic Cancer Who Are HLA-A*01 Positive	Breast Cancer; Cervical Cancer; Renal Cancer; Melanoma; Bladder Cancer	Drug: Aldesleukin; Drug: Fludarabine; Drug: Cyclophosphamide; Biological: Anti-MAGE-A3 HLAA* 01-restricted TCR	MD	NCT02153905
Phase II Trial of Combination Immunotherapy With NeuVax and Trastuzumab in High-risk HER2+ Breast Cancer Patients	Breast Cancer	Biological: NeuVax vaccine; Drug: Trastuzumab; Drug: GM-CSF	CA; CO; DC; FL; IL; IN; KS; MD; NJ; NM; NY; TX; VA; WA; WI	NCT02297698
Trial of Active Immunotherapy With OBI-833 (Globo H-CRM197) in Advanced/Metastatic Gastric, Lung, Colorectal or Breast Cancer Subjects	Metastatic Gastric Cancer; Metastatic Breast Cancer; Metastatic Colorectal Cancer; Metastatic Lung Cancer	Drug: OBI-833/OBI-821	OH; TX	NCT02310464
Malignant Pleural Disease Treated With Autologous T Cells Genetically Engineered to Target the Cancer-Cell Surface Antigen Mesothelin	Malignant Pleural Disease; Mesothelioma; Metastases; Lung Cancer; Breast Cancer	Genetic: iCasp9M28z T cell infusions; Drug: cyclophosphamide	NY	NCT02414269
Pilot Study of Durvalumab and Vigil in Advanced Women's Cancers	Breast Cancer; Ovarian Cancer; Fallopian Tube Cancer; Primary Peritoneal Carcinoma; Uterine Cancer; Cervical Cancer; Endometrial Cancer	Biological: Vigil; Drug: Durvalumab	TX	NCT02725489
Standard of Care Chemotherapy Plus Pembrolizumab for Breast Cancer	Triple Negative Breast Cancer	Drug: Pembrolizumab; Drug: Paclitaxel; Drug: Capecitabine	OR	NCT02734290
T-Cell Therapy for Advanced Breast Cancer	Breast Cancer; Metastatic HER2-negative Breast	Drug: Cyclophosphamide; Biological: Mesothelin-targeted T cells; Drug: AP1903	NJ; NY	NCT02792114
Adjuvant PVX-410 Vaccine and Durvalumab in Stage II/III Triple Negative Breast Cancer	Breast Cancer	Biological: PVX-410; Biological: Durvalumab; Drug: Hiltonol	MA	NCT02826434
Trial of Intratumoral Injections of TTI-621 in Subjects With Relapsed and Refractory Solid Tumors and Mycosis Fungoides	Solid Tumors; Mycosis Fungoides; Melanoma; Merkel-cell Carcinoma; Squamous Cell Carcinoma; Breast Carcinoma; Human Papillomavirus-Related Malignant Neoplasm; Soft Tissue Sarcoma	Drug: TTI-621	CA; OR; PA; WA	NCT02890368
Pre-operative IRX-2 in Early Stage Breast Cancer (ESBC)	Breast Neoplasm; Breast Neoplasm, Male	Drug: Cyclophosphamide; Drug: Indomethacin; Drug: Omeprazole; Dietary Supplement: Multivitamin	OR	NCT02950259
Neoadj Pembrolizumab + Decitabine Followed by Std Neoadj Chemo for Locally Advanced HER2- Breast Cancer	Breast Adenocarcinoma; Estrogen Receptor-Negative Breast Cancer; Estrogen Receptor-positive Breast Cancer; HER2/Neu Negative; Invasive Breast Carcinoma; Progesterone Receptor Negative; Progesterone Receptor Positive Tumor; Stage II Breast Cancer; Stage IIA Breast Cancer; Stage IIB Breast Cancer; Stage IIIA Breast Cancer; Stage IIIB Breast Cancer; Triple-negative Breast Carcinoma	Drug: Doxorubicin; Drug: Cyclophosphamide; Drug: Paclitaxel; Drug: Carboplatin	VA	NCT02957968
hTERT Immunotherapy Alone or in Combination With IL-12 DNA Followed by Electroporation in Adults With Solid Tumors at High Risk of Relapse	Breast Cancer; Lung Cancer; Pancreatic Cancer; Head and Neck Cancer; Ovarian Cancer; ColoRectal Cancer; Gastric Cancer; Esophageal Cancer; HepatoCellular Carcinoma	Biological: INO-1400; Biological: INO-9012	MI; MN; NC; PA	NCT02960594
A Study Of Changes In PD-L1 Expression During Preoperative Treatment With Nab-Paclitaxel And Pembrolizumab In Hormone Receptor-Positive Breast Cancer	Breast Cancer	Drug: Pembrolizumab; Drug: Nab-Paclitaxel; Procedure: Biopsy	MA	NCT02999477
A Dose Escalation Phase I Study to Assess the Safety and Clinical Activity of Multiple Cancer Indications	Colorectal Cancer (CRC); Ovarian Cancer (Epithelial and Fallopian Tube); Urothelial Carcinoma; Triple-negative Breast Cancer (TNBC); Pancreatic Cancer; Acute Myeloid Leukemia/Myelodysplastic Syndrome; Multiple Myeloma (MM)	Biological: NKR-2 cells	FL; NY; PA	NCT03018405
Pembrolizumab in Advanced BRCA-mutated Breast Cancer	Breast Cancer	Drug: Pembrolizumab	CA	NCT03025035
A Randomized Phase II Study Of Eribulin Mesylate With or Without Pembrolizumab For Metastatic Hormone Receptor Positive Breast Cancer	Breast Cancer	Drug: Eribulin Mesylate; Drug: Pembrolizumab	MA	NCT03051659
Phase II PEMBROLIZUMAB + PALLIATIVE RADIOTHERAPY IN BC	Metastatic Breast Cancer	Drug: Pembrolizumab; Radiation: Palliative radiotherapy	MA	NCT03051672
BriaVax in Metastatic or Locally Recurrent Breast Cancer	Breast cancer; Breast Neoplasm	Biological: BriaVax™; Drug: Cyclophosphamide; Biological: Interferon-alpha-2b	CA; FL; WA	NCT03066947
Focused Ultrasound and Pembrolizumab in Metastatic Breast Cancer	Breast Cancer	Drug: Pembrolizumab; Device: High-intensity focused ultrasound (HIFU)	VA	NCT03237572
Her2-BATS and Pembrolizumab in Metastatic Breast Cancer	Metastatic Breast Cancer	Drug: HER2 BATs with Pembrolizumab	VA	NCT03272334
A Study of Multiple Immunotherapy-Based Treatment Combinations in Hormone Receptor (HR)-Positive Human Epidermal Growth Factor Receptor 2 (HER2)-Negative Breast Cancer	Breast Neoplasms	Drug: Atezolizumab (MPDL3280A), an engineered anti-programmed death-ligand 1 (PD-L1) antibody; Drug: Bevacizumab; Drug: Cobimetinib; Drug: Exemestane; Drug: Fulvestrant; Drug: Ipatasertib; Drug: Tamoxifen	AL; CA; CT; GA; MD; MI; NC; NY; OR; PA; TN; WA	NCT03280563

BREAST (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
Ribociclib + PDR001 in Breast Cancer and Ovarian Cancer	Metastatic Hormone-Receptor-Positive (HR+) Breast Cancer; HER2-Negative Breast Cancer; Metastatic Epithelial Ovarian Cancer	Drug: Ribociclib; Drug: PDR001; Drug: Fulvestrant	MA	NCT03294694
Ability of a Dendritic Cell Vaccine to Immunize Melanoma or Epithelial Cancer Patients Against Defined Mutated Neoantigens Expressed by the Autologous Cancer	Melanoma; Gastrointestinal Cancer; Breast Cancer; Ovarian Cancer; Pancreatic Cancer	Biological: Peptide loaded dendritic cell vaccine	MD	NCT03300843
EPR Tumor Oximetry With CE India Ink	Neoplasms, Malignant; Breast Neoplasm; Carcinoma, Basal Cell; Carcinoma, Squamous Cell; Melanoma; Skin Neoplasm; Head and Neck Neoplasms	Device: Carlo Erba Ink Injection; Other: EPR Oximetry Measurement	NH	NCT03321903

CERVICAL

Title	Cancer Type	Treatment	Location	NCT Number
CAR T Cell Receptor Immunotherapy Targeting Mesothelin for Patients With Metastatic Cancer	Cervical Cancer; Pancreatic Cancer; Ovarian Cancer; Mesothelioma; Lung Cancer	Drug: Fludarabine; Biological: Anti-mesothelin CAR; Drug: Cycolphosphamide; Drug: Aldesleukin	MD	NCT01583686
T Cell Receptor Immunotherapy Targeting MAGE-A3 for Patients With Metastatic Cancer Who Are HLA-DP0401 Positive	Cervical Cancer; Renal Cancer; Urothelial Cancer; Melanoma; Breast Cancer	Biological: Anti-MAGE-A3-DP4 TCR; Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Aldesleukin	MD	NCT02111850
T Cell Receptor Immunotherapy Targeting MAGE-A3 for Patients With Metastatic Cancer Who Are HLA-A*01 Positive	Breast Cancer; Cervical Cancer; Renal Cancer; Melanoma; Bladder Cancer	Drug: Aldesleukin; Drug: Fludarabine; Drug: Cyclophosphamide; Biological: Anti-MAGE-A3 HLAA* 01-restricted TCR	MD	NCT02153905
Pembrolizumab and Chemoradiation Treatment for Advanced Cervical Cancer	Cervical Cancer	Drug: Pembrolizumab; Radiation: Brachytherapy; Drug: Cisplatin	AL; MO; NC; SC; VA	NCT02635360
Pilot Study of Durvalumab and Vigil in Advanced Women's Cancers	Breast Cancer; Ovarian Cancer; Fallopian Tube Cancer; Primary Peritoneal Carcinoma; Uterine Cancer; Cervical Cancer; Endometrial Cancer	Biological: Vigil; Drug: Durvalumab	TX	NCT02725489
E7 TCR T Cells With or Without PD-1 Blockade for Human Papillomavirus-Associated Cancers	Cervical Cancer; Vaginal Cancer; Anal Cancer; Penile Cancer; Oropharyngeal Cancer	Biological: E7 TCR Transduced PBL cells; Drug: pembrolizumab; Drug: aldesleukin; Drug: fludarabine; Drug: cyclophosphamide	MD	NCT02858310
Trial of Atezolizumab and Vigil for Advanced Gynecological Cancers (A Companion Study to CL-PTL-119)	Advanced Gynecological Cancers; Ovarian Cancer; Cervical Cancer; Uterine Cancer	Biological: Vigil; Drug: Atezolizumab	AL; GA; MI; MT; NH; SC	NCT03073525
Durvalumab, Tremelimumab + Radiotherapy in Gynecologic Cancer	Recurrent Gynecological Cancer; Metastatic Cervical Cancer; Metastatic Ovarian Cancer; Metastatic Vaginal Cancer; Metastatic Vulvar Cancer; Metastatic Endometrial Cancer; Recurrent Cervical Carcinoma; Recurrent Ovarian Carcinoma; Recurrent Vaginal Cancer; Recurrent Vulvar Cancer; Recurrent Endometrial Cancer	Drug: Durvalumab; Drug: Tremelimumab; Radiation: Radiation Therapy	MA	NCT03277482

COLORECTAL

Title	Cancer Type	Treatment	Location	NCT Number
Evaluation for NCI Surgery Branch Clinical Studies	Synovial Cell Cancer; Melanoma; Colorectal Cancer; Lung Cancer; Bladder Cancer		MD	NCT00001823
Immunotherapy Using Tumor Infiltrating Lymphocytes for Patients With Metastatic Cancer	Metastatic Colorectal Cancer; Metastatic Gastric Cancer; Metastatic Pancreatic Cancer; Metastatic Hepatocellular Carcinoma; Metastatic Cholangiocarcinoma	Biological: Young TIL; Drug: Aldesleukin; Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Pembrolizumab	MD	NCT01174121
Vaccine Therapy in Treating Patients With Metastatic Solid Tumors	Malignant Solid Tumour; Breast Cancer; Malignant Tumor of Colon; GIST; Ovarian Cancer	Biological: HER-2 vaccine; Biological: Extension HER-2 vaccine trial at OBD	OH	NCT01376505
An Investigational Immuno-therapy Study of Nivolumab, and Nivolumab in Combination With Other Anti-cancer Drugs, in Colon Cancer That Has Come Back or Has Spread	Microsatellite Unstable Colorectal Cancer; Microsatellite Stable Colorectal Cancer; Mismatch Repair Proficient Colorectal Cancer; Mismatch Repair Deficient Colorectal Cancer	Drug: Ipilimumab; Drug: Nivolumab; Drug: Cobimetinib; Drug: Daratumumab; Drug: anti-LAG-3 antibody	AZ; CA; GA; MA; MN; NC; OR; PA; TN; TX	NCT02060188
Trial of Active Immunotherapy With OBI-833 (Globo H-CRM197) in Advanced/Metastatic Gastric, Lung, Colorectal or Breast Cancer Subjects	Metastatic Gastric Cancer; Metastatic Breast Cancer; Metastatic Colorectal Cancer; Metastatic Lung Cancer	Drug: OBI-833/OBI-821	OH; TX	NCT02310464
Increased Frequency of AlloStim® Immunotherapy Dosing in Combination With Cryoablation in Metastatic Colorectal Cancer	Colorectal Cancer Metastatic	Biological: AlloStim; Procedure: Cryoablation	AZ	NCT02380443
A Multicenter Study of Active Specific Immunotherapy With OncoVax® in Patients With Stage II Colon Cancer	Stage II Colon Cancer	Biological: OncoVAX and Surgery; Procedure: Surgery	FL	NCT02448173
Pembrolizumab + Poly-ICLC in MRP Colon Cancer	Metastatic Colon Cancer; Solid Tumor	Drug: pembrolizumab; Drug: Poly-ICLC	GA	NCT02834052
Study of Cobimetinib in Combination With Atezolizumab and Bevacizumab in Participants With Gastrointestinal and Other Tumors	Colorectal Cancer	Drug: Atezolizumab; Drug: Bevacizumab; Drug: Cobimetinib	CO; MA; NC; NY; TN; TX	NCT02876224
Gut Microbiome in Fecal Samples From Patients With Metastatic Cancer Undergoing Chemotherapy or Immunotherapy	Metastatic Carcinoma; Stage IV Colorectal Cancer; Stage IVA Colorectal Cancer; Stage IVB Colorectal Cancer	Procedure: Biospecimen Collection; Other: Laboratory Biomarker Analysis	CA	NCT02960282

COLORECTAL (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
hTERT Immunotherapy Alone or in Combination With IL-12 DNA Followed by Electroporation in Adults With Solid Tumors at High Risk of Relapse	Breast Cancer; Lung Cancer; Pancreatic Cancer; Head and Neck Cancer; Ovarian Cancer; ColoRectal Cancer; Gastric Cancer; Esophageal Cancer; HepatoCellular Carcinoma	Biological: INO-1400; Biological: INO-9012	MI; MN; NC; PA	NCT02960594
Combination Chemotherapy, Bevacizumab, and/or Atezolizumab in Treating Patients With Microsatellite Instability-High Metastatic Colorectal Cancer	Colorectal Adenocarcinoma; High-Frequency Microsatellite Instability; Stage IV Colorectal Cancer AJCC v7; Stage IVA Colorectal Cancer AJCC v7; Stage IVB Colorectal Cancer AJCC v7	Drug: Atezolizumab; Biological: Bevacizumab; Drug: Fluorouracil; Other: Laboratory Biomarker Analysis; Drug: Leucovorin Calcium; Drug: Oxaliplatin; Other: Quality-of-Life Assessment	PA	NCT02997228
A Dose Escalation Phase I Study to Assess the Safety and Clinical Activity of Multiple Cancer Indications	Colorectal Cancer (CRC); Ovarian Cancer (Epithelial and Fallopian Tube); Urothelial Carcinoma; Triple-negative Breast Cancer (TNBC); Pancreatic Cancer; Acute Myeloid Leukemia/Myelodysplastic Syndrome; Multiple Myeloma (MM)	Biological: NKR-2 cells	FL; NY; PA	NCT03018405
Nivolumab and Ipilimumab and Radiation Therapy in MSS and MSI High Colorectal and Pancreatic Cancer	Microsatellite Stable Colorectal Cancer; Pancreatic Cancer; MSI High Colorectal Cancer	Drug: Nivolumab; Drug: Ipilimumab; Radiation: Radiation Therapy	MA	NCT03104439
Study of Personalized Immunotherapy in Adults With Metastatic Colorectal Cancer	Colorectal Neoplasms	Biological: pLADD	CA	NCT03189030
Administering Peripheral Blood Lymphocytes Transduced With a Murine T-Cell Receptor Recognizing the G12V Variant of Mutated RAS in HLA-A*1101 Patients	Pancreatic Cancer; Gastric Cancer; Gastrointestinal Cancer; Colon Cancer; Rectal Cancer	Drug: Cyclophosphamide; Drug: Fludarabine; Biological: anti-KRAS G12V mTCR; Drug: Aldesleukin	MD	NCT03190941

FALLOPIAN TUBE

Title	Cancer Type	Treatment	Location	NCT Number
PARP-inhibition and CTLA-4 Blockade in BRCA-deficient Ovarian Cancer	Ovarian Cancer; Fallopian Tube Cancer; Peritoneal Neoplasms	Drug: Olaparib; Drug: Tremelimumab	NM	NCT02571725
Pilot Study of Durvalumab and Vigil in Advanced Women's Cancers	Breast Cancer; Ovarian Cancer; Fallopian Tube Cancer; Primary Peritoneal Carcinoma; Uterine Cancer; Cervical Cancer; Endometrial Cancer	Biological: Vigil; Drug: Durvalumab	TX	NCT02725489
GL-ONC1 Oncolytic Immunotherapy in Patients With Recurrent Ovarian Cancer	Ovarian Cancer; Peritoneal Carcinomatosis; Fallopian Tube Cancer	Biological: GL-ONC1	FL	NCT02759588
Study of DPX-Survivac Vaccine Therapy and Epacadostat in Patients With Recurrent Ovarian Cancer	Recurrent Epithelial Ovarian Cancer; Recurrent Fallopian Tube Cancer; Recurrent Peritoneal Cancer	Biological: DPX-Survivac; Drug: Cyclophosphamide; Drug: Epacadostat (INCB024360)	CA; NY; OR; PA; TX	NCT02785250
Intraperitoneal Infusion of Autologous Monocytes With Sylatron (Peginterferon Alfa-2b) and Actimmune (Interferon Gamma-1b) in Women With Recurrent or Refractory Ovarian Cancer, Fallopian Tube Cancer or Primary Peritoneal Cancer	Fallopian Tube Cancer; Ovarian Cancer; Primary Peritoneal Cancer	Biological: Autologous Monocytes + ACTIMMUNE + SYLATRON	MD	NCT02948426
A Dose Escalation Phase I Study to Assess the Safety and Clinical Activity of Multiple Cancer Indications	Colorectal Cancer (CRC); Ovarian Cancer (Epithelial and Fallopian Tube); Urothelial Carcinoma; Triple-negative Breast Cancer (TNBC); Pancreatic Cancer; Acute Myeloid Leukemia/Myelodysplastic Syndrome; Multiple Myeloma (MM)	Biological: NKR-2 cells	FL; NY; PA	NCT03018405

HEAD & NECK

Title	Cancer Type	Treatment	Location	NCT Number
ADXS 11-001 Vaccination Prior to Robotic Surgery, HPV-Positive Oropharyngeal Cancer	Head and Neck Cancer; Squamous Cell Carcinoma of the Head and Neck; Human Papillomavirus Positive Oropharyngeal Squamous Cell Carcinoma	Biological: ADXS11-001 (ADXS-HPV)	NY	NCT02002182
Immunotherapy With MK-3475 in Surgically Resectable Head and Neck Squamous Cell Carcinoma	Cancer of Head and Neck; Head and Neck Cancer; Neoplasms, Head and Neck; Carcinoma, Squamous Cell of Head and Neck; Squamous Cell Carcinoma of the Head and Neck; Squamous Cell Carcinoma, Head and Neck	Biological: MK-3475; Procedure: Surgery; Radiation: Intensity modulated radiation therapy; Radiation: Image-guided radiation therapy; Drug: Cisplatin	MA; MO	NCT02296684
In Situ, Autologous Therapeutic Vaccination Against Solid Cancers With Intratumoral Hiltonol®	Melanoma; Head and Neck Cancer; Sarcoma; Non-Melanoma Skin Cancers	Biological: Hiltonol	GA; MD; MO; NY; PA; SC	NCT02423863
Study of the CD40 Agonistic Monoclonal Antibody APX005M	Cancer; NSCLC; Melanoma; Urothelial Carcinoma; MSI-H; Head and Neck Cancer	Drug: APX005M	CA; OH; PA	NCT02482168
A Trial of Intratumoral Injections of SD-101 in Combination With Pembrolizumab in Patients With Metastatic Melanoma or Recurrent or Metastatic Head and Neck Squamous Cell Carcinoma	Metastatic Melanoma; Head & Neck Cancer	Drug: SD-101; Biological: Pembrolizumab	AL; AZ; CA; CO; FL; GA; IA; IL; IN; MI; MN; NC; NE; NJ; NY; OH; OK; OR; PA; SC; TX; UT; VA; WV	NCT02521870
GR-MD-02 Plus Pembrolizumab in Melanoma, Non-small Cell Lung Cancer, and Squamous Cell Head and Neck Cancer Patients	Melanoma; Non-Small Cell Lung Cancer; Squamous Cell Carcinoma of the Head and Neck	Drug: GR-MD-02; Drug: Pembrolizumab	OR	NCT02575404
Multicentre, Randomized, Open-Label, Phase III Clinical Trial for Advanced Nasopharyngeal Carcinoma Patients	Nasopharyngeal Cancer	Biological: autologous EBV specific Cytotoxic T Lymphocytes; Drug: combination IV gemcitabine and IV carboplatin (AUC2)	CA; MA; TX	NCT02578641

HEAD & NECK (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
IRX-2 Regimen in Patients With Newly Diagnosed Stage II, III, or IVA Squamous Cell Carcinoma of the Oral Cavity	Squamous Cell Carcinoma of the Oral Cavity	Biological: IRX-2; Drug: Cyclophosphamide; Drug: Indomethacin; Dietary Supplement: Zinc-containing multivitamin; Drug: Omeprazole	AK; AZ; CA; DC; GA; KY; MA; MI; NE; NY; OK; OR; PA	NCT02609386
Combination Margetuximab and Pembrolizumab for Advanced, Metastatic HER2(+) Gastric or Gastroesophageal Junction Cancer	Gastric Cancer; Stomach Cancer; Esophageal Cancer	Drug: margetuximab in combination with pembrolizumab	CT; DC; IL; MA; MD; MI; MO; NC; PA; TN; WA	NCT02689284
An Investigational Immuno-therapy Study of Nivolumab or Placebo in Patients With Resected Esophageal or Gastroesophageal Junction Cancer	Advanced Cancer	Drug: Nivolumab; Other: Placebo	CA; CO; DC; FL; IL; MA; MD; MO; NC; NJ; NY; OH; OK; OR; PA; TN; TX; WA; WI	NCT02743494
Ipilimumab for Head and Neck Cancer Patients	Squamous Cell Carcinoma of the Head and Neck	Drug: Intratumoral Ipilimumab	OR	NCT02812524
E7 TCR T Cells With or Without PD-1 Blockade for Human Papillomavirus-Associated Cancers	Cervical Cancer; Vaginal Cancer; Anal Cancer; Penile Cancer; Oropharyngeal Cancer	Biological: E7 TCR Transduced PBL cells; Drug: pembrolizumab; Drug: aldesleukin; Drug: fludarabine; Drug: cyclophosphamide	MD	NCT02858310
hTERT Immunotherapy Alone or in Combination With IL-12 DNA Followed by Electroporation in Adults With Solid Tumors at High Risk of Relapse	Breast Cancer; Lung Cancer; Pancreatic Cancer; Head and Neck Cancer; Ovarian Cancer; ColoRectal Cancer; Gastric Cancer; Esophageal Cancer; HepatoCellular Carcinoma	Biological: INO-1400; Biological: INO-9012	MI; MN; NC; PA	NCT02960594
Targeting PD-1 Therapy Resistance With Focused High or High and Low Dose Radiation in SCCHN	Head and Neck Cancer	Drug: Pembrolizumab; Radiation: Radiation	MA	NCT03085719
Pembrolizumab With or Without Radiation in Patients With Recurrent or Metastatic Adenoid Cystic Carcinoma	Adenoid Cystic Carcinoma	Radiation: Radiation; Drug: Pembrolizumab	MA	NCT03087019
Immunotherapy Study of Evofosfamide in Combination With Ipilimumab	Pancreatic Cancer; Melanoma; Squamous Cell Carcinoma of the Head and Neck; Prostate Cancer	Drug: Evofosfamide; Drug: Ipilimumab	TX	NCT03098160
Immunotherapy and Stereotactic Body Radiotherapy (SBRT) for Metastatic Anaplastic Thyroid Cancer	Metastatic Anaplastic Thyroid Cancer	Drug: durvalumab; Drug: tremelimumab; Radiation: Stereotactic Body Radiotherapy (SBRT)	NJ; NY	NCT03122496
Study to Evaluate Immunological Response to PD-1 Inhibition in Squamous Cell Carcinoma of the Head and Neck (SCCHN)	Squamous Cell Carcinoma of the Head and Neck	Drug: [18F]F-AraG PET Scan, baseline + post anti-PD-1 therapy	CA	NCT03129061
Safety and Efficacy of MEDI0457 and Durvalumab in Patients With HPV Associated Recurrent/Metastatic Head and Neck Cancer	Head and Neck Cancer; Human Papilloma Virus	Drug: MEDI0457; Device: CELLECTRA®5P device (CELLECTRA 2000); Drug: Durvalumab	NY; PA	NCT03162224
RAI Plus Immunotherapy for Recurrent/Metastatic Thyroid Cancers	Thyroid Cancer	Drug: Durvalumab (Medi4736); Radiation: Radioiodine (RAI)	NY	NCT03215095
Pembrolizumab in Combination With Anti-platelet Therapy for Patients With Recurrent or Metastatic Squamous Cell Carcinoma of the Head and Neck	Head and Neck Cancer	Drug: Pembrolizumab; Drug: Clopidogrel; Drug: acetylsalicylic acid	SC	NCT03245489
Nivolumab Plus Ipilimumab in Thyroid Cancer	Thyroid Cancer	Drug: Nivolumab; Drug: Ipilimumab	MA	NCT03246958
TCR-engineered T Cells in NSCLC and HNSCC Patients (ACTengine)	Solid Tumor; Cancer; Head and Neck Squamous Cell Carcinoma; Squamous Cell Non-small Cell Lung Cancer	Biological: IMA201 T-Cells; Diagnostic Test: IMA201_Detect; Diagnostic Test: ACT-HLA; Drug: Fludarabine; Drug: Cyclophosphamide; Biological: Recombinant human interleukin-2	TX	NCT03247309
Priming Immunotherapy in Advanced Disease With Radiation	Non-small Cell Lung Cancer; Squamous Cell Carcinoma of the Head and Neck	Drug: Immune checkpoint inhibitor; Radiation: Radiation Therapy	KY	NCT03313804
EPR Tumor Oximetry With CE India Ink	Neoplasms, Malignant; Breast Neoplasm; Carcinoma, Basal Cell; Carcinoma, Squamous Cell; Melanoma; Skin Neoplasm; Head and Neck Neoplasms	Device: Carlo Erba Ink Injection; Other: EPR Oximetry Measurement	NH	NCT03321903
Neoadjuvant Pembrolizumab + Epacadostat Prior to Curative Surgical Care for Squamous Cell Carcinoma of the Head and Neck	Squamous Cell Carcinoma of the Head and Neck	Drug: Pembrolizumab; Drug: Epacadostat	IL	NCT03325465

KIDNEY

Title	Cancer Type	Treatment	Location	NCT Number
High Dose IL-2 and Stereotactic Ablative Body Radiation Therapy for Metastatic Renal Cancer	Metastatic Clear Cell Renal Cell Carcinoma	Drug: IL-2; Radiation: Stereotactic Ablative Body Radiation Therapy	TX	NCT01896271
T Cell Receptor Immunotherapy Targeting MAGE-A3 for Patients With Metastatic Cancer Who Are HLA-DP0401 Positive	Cervical Cancer; Renal Cancer; Urothelial Cancer; Melanoma; Breast Cancer	Biological: Anti-MAGE-A3-DP4 TCR; Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Aldesleukin	MD	NCT02111850
T Cell Receptor Immunotherapy Targeting MAGE-A3 for Patients With Metastatic Cancer Who Are HLA-A*01 Positive	Breast Cancer; Cervical Cancer; Renal Cancer; Melanoma; Bladder Cancer	Drug: Aldesleukin; Drug: Fludarabine; Drug: Cyclophosphamide; Biological: Anti-MAGE-A3 HLAA* 01-restricted TCR	MD	NCT02153905
Phase I/Ib Study of Pembrolizumab With Vorinostat for Patients With Advanced Renal or Urothelial Cell Carcinoma	Renal Cell Carcinoma; Urinary Bladder Neoplasms	Drug: Pembrolizumab; Drug: Vorinostat	IN; MD	NCT02619253
Trial of SBRT in Combination With Nivolumab/Ipilimumab in RCC / Kidney Cancer Patients	Kidney Cancer Metastatic; Kidney Cancer; Kidney Cancer, Stage IV	Drug: Nivolumab/Ipilimumab; Radiation: SBRT	MD; TX	NCT03065179

KIDNEY (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
A Phase II Randomized Trial of Immunotherapy Plus Radiotherapy in Metastatic Genitourinary Cancers	Metastatic Renal Cell Carcinoma; Metastatic Urothelial Carcinoma	Drug: Nivolumab; Drug: Atezolizumab; Radiation: Radiation & immunotherapy	NY	NCT03115801
Reconstitution of a Human Immune System in a Patient Derived Xenograft (PDX) Model of Genitourinary (GU) Cancers	Genito Urinary Cancer; Bladder Cancer; Kidney Cancer; Prostate Cancer	Procedure: Bone marrow biopsy	NC	NCT03134027
Phase-I Trial of Pembrolizumab and Percutaneous Cryoablation Combination Followed by Nephron-Sparing Surgery or Cytoreductive Nephrectomy in Locally Advanced and Metastatic Renal Cell Carcinomas	Renal Cell Carcinoma; Metastatic Kidney Cancer	Drug: Pembrolizumab Injection [Keytruda]; Procedure: Cryoablation; Procedure: Nephrectomy	CA	NCT03189186
Software Monitoring of Treatment Related Toxicities in Advanced Renal Cell Carcinoma	Advanced Renal Cell Carcinoma	Other: Carevive software	NY	NCT03229083

LEUKEMIA/LYMPHOMA/MULTIPLE MYELOMA

Title	Cancer Type	Treatment	Location	NCT Number
Biological Therapy in Treating Patients at High-Risk or With Lymphoma, Lymphoproliferative Disease, or Malignancies	EBV-induced Lymphomas; EBV-associated Malignancies; Transplant Patients With EBV Viremia at High Risk of Developing a Recurrent EBV Lymphoma	Biological: allogeneic Epstein-Barr virus-specific cytotoxic T lymphocytes	NY	NCT00002663
Administration of Anti-CD19-chimeric-antigen-receptor-transduced T Cells From the Original Transplant Donor to Patients With Recurrent or Persistent B-cell Malignancies After Allogeneic Stem Cell Transplantation	Leukemia, B-cell; Lymphoma, Hodgkins; Lymphoma, Non-hodgkins; Lymphoma, B-Cell	Procedure: Allogeneic stem cell transplant; Biological: Anti-CD19-chimeric-antigen-receptor- transduced T cell; Drug: Cyclophosphamide; Drug: Pentostatin	MD	NCT01087294
Immunotherapy for Asymptomatic Phase Lymphoplasmacytic Lymphoma	Lymphoma; Lymphoplasmacytic Lymphoma; Waldenstram Macroglobulinemia	Biological: DNA Vaccine	TX	NCT01209871
Continuous Infusion of rhIL-15 for Adults With Advanced Cancer	Lymphoma; Carcinoma	Biological: rh IL-15	MD	NCT01572493
Phase I Dose Escalation Study of IMMU-114 in Relapsed or Refractory NHL and CLL	Non-hodgkin's Lymphoma; Follicular Lymphoma; Mantle Cell Lymphoma; Marginal Zone Lymphoma; Chronic Lymphocytic Leukemia; Small Lymphocytic Lymphoma	Drug: IMMU-114	DE; GA; IN; OH; UT	NCT01728207
Treatment for Advanced B-Cell Lymphoma	Diffuse Large Cell Lymphoma; Burkitt's Lymphoma; High Grade B-cell Lymphoma	Drug: Rituximab; Drug: IT Cytarabine	NC; NY; OK; UT	NCT01859819
Laboratory Treated T Cells in Treating Patients With Relapsed or Refractory Chronic Lymphocytic Leukemia, Non-Hodgkin Lymphoma, or Acute Lymphoblastic Leukemia	CD19-Positive Neoplastic Cells Present; Recurrent Adult Acute Lymphoblastic Leukemia; Recurrent Chronic Lymphocytic Leukemia; Recurrent Diffuse Large B-Cell Lymphoma; Recurrent Mantle Cell Lymphoma; Recurrent Non-Hodgkin Lymphoma; Recurrent Small Lymphocytic Lymphoma; Refractory Chronic Lymphocytic Leukemia; Refractory Diffuse Large B-Cell Lymphoma; Refractory Mantle Cell Lymphoma; Refractory Non-Hodgkin Lymphoma; Refractory Small Lymphocytic Lymphoma	Biological: Autologous Anti-CD19CAR-4-1BB-CD3zeta-EGFRt-expressing T Lymphocytes; Other: Laboratory Biomarker Analysis	WA	NCT01865617
QUILT-3.005: A Study of ALT-803 in Patients With Relapsed or Refractory Multiple Myeloma	Relapsed or Refractory Multiple Myeloma	Biological: ALT-803	MN; MO; NY; PA	NCT02099539
A Pilot Study of Immunotherapy Including Haploidentical NK Cell Infusion Following CD133+ Positively-Selected Autologous Hematopoietic Stem Cells in Children With High Risk Solid Tumors or Lymphomas	Neuroblastoma; Lymphoma; High-risk Tumor	Biological: CD133+ selected autologous stem cell infusion; Biological: IL-2; Biological: hu14.18K322A; Drug: Busulfan; Drug: Melphalan; Biological: GM-CSF; Drug: Bendamustine; Drug: Etoposide; Drug: Cytarabine; Drug: Carboplatin; Device: Haploidentical natural killer cell infusion; Biological: G-CSF; Drug: Etoposide phosphate; Device: CliniMACS	TN	NCT02130869
Cellular Immunotherapy in Treating Patients With High-Risk Acute Lymphoblastic Leukemia	B-cell Adult Acute Lymphoblastic Leukemia; Recurrent Adult Acute Lymphoblastic Leukemia; Minimal Residual Disease	Biological: Chimeric Antigen Receptor T-Cell Therapy; Other: laboratory biomarker analysis	CA	NCT02146924
Genetically Modified T-cell Immunotherapy in Treating Patients With Relapsed/Refractory Acute Myeloid Leukemia and Persistent/Recurrent Blastic Plasmacytoid Dendritic Cell Neoplasm	Adult Acute Myeloid Leukemia in Remission; Donor; Early Relapse of Acute Myeloid Leukemia; Late Relapse of Acute Myeloid Leukemia; Recurrent Adult Acute Myeloid Leukemia; Secondary Acute Myeloid Leukemia; Blastic Plasmacytoid Dendritic Cell Neoplasm	Drug: cyclophosphamide; Biological: Autologous CD123CAR-CD28-CD3zeta-EGFRt-expressing T Lymphocytes; Other: laboratory biomarker analysis; Biological: Allogeneic CD123CAR-CD28-CD3zeta-EGFRt-expressing T-lymphocytes; Drug: Fludarabine Phosphate	CA	NCT02159495
Immunochemotherapy and AlloSCT in Patients With High Risk CD33+ AML/MDS	Acute Myelogenous Leukemia; Myelodysplastic Syndrome	Drug: Gemtuzumab Ozogamicin	NY; WI	NCT02221310
An Investigational Immuno-therapy Study to Determine the Safety of Urelumab Given in Combination With Nivolumab in Solid Tumors and B-cell Non-Hodgkin's Lymphoma	Advanced Solid Tumors; Advanced B-cell NHL	Biological: Urelumab; Biological: Nivolumab	CA; FL; IL; MA; MD; NY; OR; PA; TX	NCT02253992
Cord Blood Natural Killer (NK) Cells in Leukemia/Lymphoma	Leukemia	Drug: Lenalidomide; Drug: Rituximab; Drug: Fludarabine; Drug: Cyclophosphamide; Procedure: NK Cells; Drug: Cytarabine	TX	NCT02280525
Anti-CD22 Chimeric Receptor T Cells in Pediatric and Young Adults With Recurrent or Refractory CD22-expressing B Cell Malignancies	Follicular Lymphoma; ALL; NHL; Large Cell Lymphoma	Biological: CD22-CAR	MD	NCT02315612

LEUKEMIA/LYMPHOMA/MULTIPLE MYELOMA (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
Rituximab With or Without Yttrium Y-90 Ibritumomab Tiuxetan in Treating Patients With Untreated Follicular Lymphoma	Stage I Grade 1 Follicular Lymphoma; Stage I Grade 2 Follicular Lymphoma; Stage II Grade 1 Contiguous Follicular Lymphoma; Stage II Grade 1 Non-Contiguous Follicular Lymphoma; Stage II Grade 2 Contiguous Follicular Lymphoma; Stage II Grade 2 Non-Contiguous Follicular Lymphoma; Stage III Grade 1 Follicular Lymphoma; Stage III Grade 2 Follicular Lymphoma; Stage IV Grade 1 Follicular Lymphoma; Stage IV Grade 2 Follicular Lymphoma	Other: Laboratory Biomarker Analysis; Other: Quality-of-Life Assessment; Biological: Rituximab; Radiation: Yttrium Y-90 Ibritumomab Tiuxetan	IA; MN	NCT02320292
Pilot Project for Creation of the Diffuse Large B-cell Lymphoma (DLBCL) Response Prediction Model	Lymphoma	Drug: 18F-fluorodeoxyglucose; Procedure: FDG PET/CT Imaging; Procedure: Blood Draws	TX	NCT02405078
IPA Targeted Adoptive Immunotherapy vs Adult Haplo-identical Cell Infusion During Induction of High Risk Leukemia	Acute Myeloid Leukemia; Myelodysplastic Syndrome	Biological: haplo-identical cells (donor); Biological: umbilical cord blood unit (CBU)	NY	NCT02508324
Study of Pembrolizumab in Combination With Ublituximab and TGR-1202 in Patients With Relapsed-refractory CLL or Richter's Transformation	Chronic Lymphocytic Leukemia	Drug: Pembrolizumab; Drug: TGR-1202; Biological: ublituximab	PA; WA	NCT02535286
Allogeneic Stem Cell Transplantationin Relapsed Hematological Malignancy: Early GVHD Prophylaxis	Hodgkin's Lymphoma; Lymphoid Leukemia; Lymphoma; Leukemia; Myeloma; Acute Lymphocytic Leukemia; Non Hodgkin Lymphoma; Chronic Lymphocytic Leukemia; Multiple Myeloma; Chronic Myelogenous Leukemia; Myelodysplastic Syndromes; Recurrent Acute Myeloid Leukemia, Adult; Recurrent Hodgkin Lymphoma; Recurrent Non-Hodgkin Lymphoma; Recurrent Plasma Cell Myeloma; Recurrent Chronic Lymphocytic Leukemia; Recurrent Chronic Myelogenous Leukemia; Acute Myelogenous Leukemia	Drug: mycophenolate mofetil; Biological: Sargramostim; Biological: Filgrastim	VA	NCT02593123
Pembrolizumab in Treating Patients With HIV and Relapsed, Refractory, or Disseminated Malignant Neoplasms	AIDS-Related Non-Hodgkin Lymphoma; Classical Hodgkin Lymphoma; HIV Infection; Locally Advanced Malignant Neoplasm; Metastatic Malignant Neoplasm; Recurrent Hepatocellular Carcinoma; Recurrent Hodgkin Lymphoma; Recurrent Kaposi Sarcoma; Recurrent Malignant Neoplasm; Recurrent Melanoma of the Skin; Recurrent Non-Hodgkin Lymphoma; Recurrent Non-Small Cell Lung Carcinoma; Refractory Hodgkin Lymphoma; Refractory Malignant Neoplasm; Solid Neoplasm; Stage IIIA Cutaneous Melanoma AJCC v7; Stage IIIA Hepatocellular Carcinoma AJCC v7; Stage IIIA Non-Small Cell Lung Cancer AJCC v7; Stage IIIB Cutaneous Melanoma AJCC v7; Stage IIIB Hepatocellular Carcinoma AJCC v7; Stage IIIB Non-Small Cell Lung Cancer AJCC v7; Stage IIIC Cutaneous Melanoma AJCC v7; Stage IIIC Hepatocellular Carcinoma AJCC v7; Stage IV Cutaneous Melanoma AJCC v6 and v7; Stage IV Non-Small Cell Lung Cancer AJCC v7; Stage IVA Hepatocellular Carcinoma AJCC v7; Stage IVB Hepatocellular Carcinoma AJCC v7	Other: Laboratory Biomarker Analysis; Biological: Pembrolizumab	CA; CT; LA; MD; NY; WA	NCT02595866
Study of Copanlisib in Combination With Standard Immunochemotherapy in Relapsed Indolent Non-Hodgkin's Lymphoma (iNHL)	Lymphoma, Non-Hodgkin	Drug: Copanlisib (BAY 80-6946); Drug: Placebo; Drug: Rituximab; Drug: Cyclophosphamide; Drug: Doxorubicin; Drug: Vincristine; Drug: Bendamustine; Drug: Prednisone	AK; CA; CO; CT; IL; IN; MA; MI; MN; MS; NE; NJ; NY; OH; PA; SD; WA	NCT02626455
Biospecimen Procurement for Experimental Transplantation and Immunology Branch Immunotherapy Protocols	Multiple Myeloma; Lymphoma, Non-Hodgkin; Leukemia-Lymphoma, Adult T-Cell; Hodgkin Disease; Non-Small Cell Lung Cancer		MD	NCT02682667
Genetically Modified T-Cell Therapy in Treating Patients With Advanced ROR1+ Malignancies	Estrogen Receptor Negative; HER2/Neu Negative; Progesterone Receptor Negative; Recurrent Adult Acute Lymphoblastic Leukemia; Recurrent Mantle Cell Lymphoma; Refractory Chronic Lymphocytic Leukemia; Stage IV Breast Cancer; Stage IV Non-Small Cell Lung Cancer AJCC v7; Triple-Negative Breast Carcinoma	Other: Laboratory Biomarker Analysis; Biological: ROR1 CAR-specific Autologous T-Lymphocytes	WA	NCT02706392
JCAR014 and Durvalumab in Treating Patients With Relapsed or Refractory B-cell Non-Hodgkin Lymphoma	Diffuse Large B-Cell Lymphoma, Not Otherwise Specified; Recurrent Diffuse Large B-Cell Lymphoma; Recurrent Mediastinal (Thymic) Large B-Cell Lymphoma; Refractory Diffuse Large B-Cell Lymphoma; Refractory Mediastinal (Thymic) Large B-Cell Lymphoma	Biological: Autologous Anti-CD19CAR-4-1BB-CD3zeta-EGFRt-expressing CD4+/CD8+ Central Memory T-lymphocytes JCAR014; Drug: Cyclophosphamide; Biological: Durvalumab; Drug: Fludarabine Phosphate; Other: Laboratory Biomarker Analysis; Other: Pharmacological Study	WA	NCT02706405

LEUKEMIA/LYMPHOMA/MULTIPLE MYELOMA (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
Cellular Immunotherapy for Viral Induced Cancer - EBV Positive Lymphomas	Hodgkin Lymphoma; Lymphoma, Large B-Cell, Diffuse; Post-transplant Lymphoproliferative Disorder	Biological: CMD-003	CA; DC; MA; MD; MN; NY; PA; TX	NCT02763254
A Randomized, Double-blind, Multi-center, Multi-national Trial to Evaluate the Efficacy, Safety, and Immunogenicity of SAIT101 Versus Rituximab as a First-line Immunotherapy Treatment in Patients With Low Tumor Burden Follicular Lymphoma	Lymphoma, Follicular	Biological: SAIT101; Biological: MabThera®	CA	NCT02809053
A Dose Escalation Phase I Study to Assess the Safety and Clinical Activity of Multiple Cancer Indications	Colorectal Cancer (CRC); Ovarian Cancer (Epithelial and Fallopian Tube); Urothelial Carcinoma; Triple-negative Breast Cancer (TNBC); Pancreatic Cancer; Acute Myeloid Leukemia/Myelodysplastic Syndrome; Multiple Myeloma (MM)	Biological: NKR-2 cells	FL; NY; PA	NCT03018405
Immunotherapy With Ex Vivo-Expanded Cord Blood-Derived NK Cells Combined With Rituximab High-Dose Chemotherapy and Autologous Stem Cell Transplant for B-Cell Non-Hodgkin's Lymphoma	B-Cell Non-Hodgkin Lymphoma	Biological: NK Cells; Drug: Rituximab; Drug: Carmustine; Drug: Etoposide; Drug: Cytarabine; Drug: Melphalan; Drug: Lenalidomide; Drug: G-CSF; Biological: Auto SCT; Other: Apheresis	TX	NCT03019640
Immunotherapy After Chemotherapy in Treating Patients With Relapsed or Refractory B Cell Non-Hodgkin Lymphoma	CD20 Positive; Recurrent B-Cell Non-Hodgkin Lymphoma; Recurrent Chronic Lymphocytic Leukemia; Recurrent Diffuse Large B-Cell Lymphoma; Recurrent Follicular Lymphoma; Recurrent Lymphoplasmacytic Lymphoma; Recurrent Mantle Cell Lymphoma; Recurrent Marginal Zone Lymphoma; Refractory B-Cell Non-Hodgkin Lymphoma; Refractory Transformed Indolent Lymphoma; Refractory Diffuse Large B-Cell Lymphoma; Refractory Follicular Lymphoma; Refractory Lymphoplasmacytic Lymphoma; Refractory Mantle Cell Lymphoma	Biological: Chimeric Antigen Receptor T-Cell Therapy; Drug: Cyclophosphamide; Drug: Fludarabine; Other: Laboratory Biomarker Analysis; Procedure: Leukapheresis	WA	NCT03277729
Phase I/II Trial of Epacadostat, Intralesional SD101, Radiotherapy in Patients With Lymphoma	Advanced Solid Tumors; Lymphoma	Drug: epacadostat; Drug: SD-101; Radiation: Radiotherapy	CA	NCT03322384
HA-1 T TCR T Cell Immunotherapy for the Treating of Patients With Relapsed or Refractory Acute Leukemia After Donor Stem Cell Transplant	Acute Biphenotypic Leukemia in Relapse (Diagnosis); Acute Undifferentiated Leukemia in Relapse (Diagnosis); HLA-A*0201 HA-1 Positive Cells Present; Recurrent Adult Acute Lymphoblastic Leukemia; Recurrent Adult Acute Myeloid Leukemia; Recurrent Childhood Acute Lymphoblastic Leukemia; Recurrent Childhood Acute Myeloid Leukemia; Refractory Acute Myeloid Leukemia; Refractory Adult Acute Lymphoblastic Leukemia; Refractory Childhood Acute Lymphoblastic Leukemia; Refractory Childhood Acute Myeloid Leukemia	Drug: Fludarabine Phosphate; Biological: Immunotherapy; Other: Laboratory Biomarker Analysis	WA	NCT03326921

LIVER

Title	Cancer Type	Treatment	Location	NCT Number
Immunotherapy Using Tumor Infiltrating Lymphocytes for Patients With Metastatic Cancer	Metastatic Colorectal Cancer; Metastatic Gastric Cancer; Metastatic Pancreatic Cancer; Metastatic Hepatocellular Carcinoma; Metastatic Cholangiocarcinoma	Biological: Young TIL; Drug: Aldesleukin; Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Pembrolizumab	MD	NCT01174121
An Immuno-therapy Study to Evaluate the Effectiveness, Safety and Tolerability of Nivolumab or Nivolumab in Combination With Other Agents in Patients With Advanced Liver Cancer	Hepatocellular Carcinoma	Biological: Nivolumab; Drug: Sorafenib; Drug: Ipilimumab; Drug: Cabozantinib	CA; DC; FL; GA; MA; MI; NJ; OR; TX	NCT01658878
T Cell Receptor Immunotherapy Targeting NY-ESO-1 for Patients With NY-ESO-1 Expressing Cancer	Melanoma; Synovial Sarcoma; Breast Cancer; Non-Small Cell Lung Cancer; Hepatocellular Cancer	Biological: Anti-NY ESO-1 mTCR PBL; Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Aldesleukin	MD	NCT01967823
Ipilimumab and Stereotactic Body Radiation Therapy (SBRT) in Advanced Solid Tumors	Liver Cancer; Lung Cancer	Drug: Ipilimumab; Radiation: Stereotactic Body Radiation Therapy (SBRT)	TX	NCT02239900
Hepatocellular Carcinoma Study Comparing Vaccinia Virus Based Immunotherapy Plus Sorafenib vs Sorafenib Alone	Hepatocellular Carcinoma (HCC)	Biological: Pexastimogene Devacirepvec (Pexa Vec); Drug: Sorafenib	AL; AZ; CA; FL; IL; KS; KY; LA; MD; MN; MO; MT; NJ; OH; PA; TN; TX; WA	NCT02562755
Study of Nivolumab in Patients With Advanced Refractory Biliary Tract Cancers	Biliary Tract Cancer; Biliary Tract Neoplasms	Drug: Nivolumab	CA; FL; GA	NCT02829918
Glypican 3-specific Chimeric Antigen Receptor Expressing T Cells for Hepatocellular Carcinoma (GLYCAR)	Hepatocellular Carcinoma	Genetic: GLYCAR T cells; Drug: Cytoxan; Drug: Fludarabine	TX	NCT02905188
Evaluating Combination Immunotherapy for Advanced Cholangiocarcinoma With Pembrolizumab and PEG-Intron	Advanced Cholangiocarcinoma	Drug: Pembrolizumab; Drug: Sylatron	DC	NCT02982720
Sorafenib and Bavituximab Plus SBRT in Unresectable Hepatocellular Carcinoma	HepatoCellular Carcinoma; Unresectable HepatoCellular Carcinoma; Liver Cancer	Radiation: Stereotactic Body Radiation Therapy (SBRT); Drug: Sorafenib; Drug: Bavituximab	FL	NCT02989870
Study of Nivolumab in Combination With Gemcitabine/ Cisplatin or Ipilimumab for Patients With Advanced Unresectable Biliary Tract Cancer	Biliary Tract Neoplasms	Drug: Gemcitabine; Drug: Cisplatin; Drug: Ipilimumab; Drug: Nivolumab	MI	NCT03101566

LUNG

Title	Cancer Type	Treatment	Location	NCT Number
Evaluation for NCI Surgery Branch Clinical Studies	Synovial Cell Cancer; Melanoma; Colorectal Cancer; Lung Cancer; Bladder Cancer		MD	NCT00001823
CAR T Cell Receptor Immunotherapy Targeting Mesothelin for Patients With Metastatic Cancer	Cervical Cancer; Pancreatic Cancer; Ovarian Cancer; Mesothelioma; Lung Cancer	Drug: Fludarabine; Biological: Anti-mesothelin CAR; Drug: Cycolphosphamide; Drug: Aldesleukin	MD	NCT01583686
Immune Responses in Prostate, Lung, Melanoma and Breast Cancer Patients Following Stereotactic Body Radiotherapy (SBRT), Intensity Modulated Radiotherapy (IMRT) or Brachytherapy	Prostate Cancer; Breast Cancer; Lung Cancer; Melanoma	Radiation: SBRT; Radiation: IMRT; Radiation: Brachytherapy	MN	NCT01777802
T Cell Receptor Immunotherapy Targeting NY-ESO-1 for Patients With NY-ESO-1 Expressing Cancer	Melanoma; Synovial Sarcoma; Breast Cancer; Non-Small Cell Lung Cancer; Hepatocellular Cancer	Biological: Anti-NY ESO-1 mTCR PBL; Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Aldesleukin	MD	NCT01967823
T Cell Receptor Immunotherapy for Patients With Metastatic Non-Small Cell Lung Cancer	Metastatic Non-Small Cell Lung Cancer; Squamous Cell Carcinoma; Advanced NSCLC; Adenosquamous Carcinoma; Adenocarcinomas	Drug: Aldesleukin; Drug: Fludarabine; Drug: Cyclophosphamide; Biological: Young TIL	MD	NCT02133196
Ipilimumab and Stereotactic Body Radiation Therapy (SBRT) in Advanced Solid Tumors	Liver Cancer; Lung Cancer	Drug: Ipilimumab; Radiation: Stereotactic Body Radiation Therapy (SBRT)	TX	NCT02239900
Neoadjuvant Nivolumab, or Nivolumab in Combination With Ipilimumab, in Resectable NSCLC	Non-Small Cell Lung Cancer	Drug: Nivolumab; Drug: Ipilimumab	MD; NY	NCT02259621
Trial of Active Immunotherapy With OBI-833 (Globo H-CRM197) in Advanced/Metastatic Gastric, Lung, Colorectal or Breast Cancer Subjects	Metastatic Gastric Cancer; Metastatic Breast Cancer; Metastatic Colorectal Cancer; Metastatic Lung Cancer	Drug: OBI-833/OBI-821	OH; TX	NCT02310464
Trial of PBF-509 and PDR001 in Patients With Advanced Non-small Cell Lung Cancer (NSCLC)	Non-small Cell Lung Cancer (NSCLC)	Drug: PBF-509_80 mg; Drug: PBF-509_160 mg; Drug: PBF-509_320 mg; Drug: PBF-509_640 mg; Drug: Combo PBF-509 (160 mg) + PDR001; Drug: Combo PBF-509 (320 mg) + PDR001; Drug: Combo PBF-509 (640 mg) + PDR001; Drug: RP2D (PBF-509+PDR001)_immuno naïve; Drug: Experimental: RP2D (PBF-509+PDR001)_ immuno treated	FL	NCT02403193
Malignant Pleural Disease Treated With Autologous T Cells Genetically Engineered to Target the Cancer-Cell Surface Antigen Mesothelin	Malignant Pleural Disease; Mesothelioma; Metastases; Lung Cancer; Breast Cancer	Genetic: iCasp9M28z T cell infusions; Drug: cyclophosphamide	NY	NCT02414269
MK-3475 and Gemcitabine in Non-Small Cell Lung Cancer (NSCLC)	Carcinoma, Non-Small-Cell Lung	Drug: MK-3475; Drug: Gemcitabine	OR	NCT02422381
A Study of Combination Therapies With Viagenpumatucel-L (HS-110) in Patients With Non-Small Cell Lung Cancer	Non-small Cell Lung Cancer	Biological: Viagenpumatucel-L; Drug: Nivolumab	AL; IN; KY; MO; OH; OR; PA	NCT02439450
Immunotherapy Combination Study in Advanced Previously Treated Non-Small Cell Lung Cancer	Non-small Cell Lung Cancer; Progression of Non-small Cell Lung Cancer; Non-small Cell Lung Cancer Recurrent	Drug: Docetaxel; Biological: Tergenpumatucel-L; Drug: Indoximod 600mg; Drug: Indoximod 1200mg	MO	NCT02460367
Study of Nivolumab in Combination With GM.CD40L Vaccine in Adenocarcinoma of the Lung	Lung Cancer; Adenocarcinoma of the Lung	Drug: Nivolumab; Biological: GM.CD40L Vaccine	FL	NCT02466568
An Investigational Immuno-therapy Trial of Nivolumab, or Nivolumab Plus Ipilimumab, or Nivolumab Plus Platinum-doublet Chemotherapy, Compared to Platinum Doublet Chemotherapy in Patients With Stage IV Non-Small Cell Lung Cancer (NSCLC)	Non-Small Cell Lung Cancer	Drug: Nivolumab; Drug: Ipilimumab; Drug: Carboplatin; Drug: Cisplatin; Drug: Gemcitabine; Drug: Pemetrexed; Drug: Paclitaxel	AL; CA; CT; GA; KY; MA; MD; MI; MN; MO; NC; NY; OH; PA; SC; TN; TX; UT; WA	NCT02477826
An Investigational Immuno-therapy Study of Nivolumab, or Nivolumab in Combination With Ipilimumab, or Placebo in Patients With Extensive-Stage Disease Small Cell Lung Cancer (ED-SCLC) After Completion of Platinum-based Chemotherapy	Lung Cancer	Biological: Nivolumab; Biological: Ipilimumab; Other: Placebo	CT; FL; GA; IN; KS; KY; MA; MD; MI; MO; NC; ND; NY; OH; OR; PA; SC; SD; UT; VA	NCT02538666
GR-MD-02 Plus Pembrolizumab in Melanoma, Non-small Cell Lung Cancer, and Squamous Cell Head and Neck Cancer Patients	Melanoma; Non-Small Cell Lung Cancer; Squamous Cell Carcinoma of the Head and Neck	Drug: GR-MD-02; Drug: Pembrolizumab	OR	NCT02575404
Safety & Immunogenicity of JNJ-64041757, Live-attenuated Double-deleted Listeria Immunotherapy, in Subjects With Non Small Cell Lung Cancer	Carcinoma, Non-Small-Cell Lung	Biological: JNJ-64041757 (Cohort 1A and 1B); Biological: JNJ-64041757 (Cohort 2A and 2B)	CA; MA; MD; MI; MO; PA; TN	NCT02592967
Serial [18F]Fluorodeoxyglucose ([18F]FDG)PET/CT as a Biomarker of Therapeutic Response in Anti-PD1/PDL1 Therapy	Non-Small Cell Lung Cancer (NSCLC)	Radiation: [18F]fluoroglucose(FDG)	PA	NCT02608528
An Investigational Immuno-therapy Study of BMS-986205 Given in Combination With Nivolumab and in Combination With Both Nivolumab and Ipilimumab in Cancers That Are Advanced or Have Spread	Advanced Cancer; Melanoma; Non-Small Cell Lung Cancer	Drug: BMS-986205; Drug: Nivolumab; Drug: Ipilimumab	AZ; CA; FL; GA; IL; MD; MI; MN; MO; NJ; NY; OH; PA; TN	NCT02658890
A Safety and Feasibility Study of AGS-003-LNG for the Treatment of Stage 3 Non Small Cell Lung Cancer	Non-small Cell Lung Cancer (NSCLC)	Biological: AGS-003-LNG; Drug: Carboplatin; Drug: Abraxane; Drug: Alimta; Drug: Cisplatin; Drug: Taxol; Radiation: Radiation Therapy	NE	NCT02662634

LUNG (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
Pharmacologically Rational EpigenetiC Immunotherapy for Second Line Therapy in Patients With Non-Small Cell Lung Cancer	Lung Cancer; Non-small Cell Lung Cancer	Drug: Nivolumab; Drug: oral decitabine; Drug: Tetrahydrouridine	FL; MD; OH	NCT02664181
Biospecimen Procurement for Experimental Transplantation and Immunology Branch Immunotherapy Protocols	Multiple Myeloma; Lymphoma, Non-Hodgkin; Leukemia-Lymphoma, Adult T-Cell; Hodgkin Disease; Non-Small Cell Lung Cancer		MD	NCT02682667
Phase II Trial of Sequential Consolidation With Pembrolizumab Followed by Nab-paclitaxel	Non Small Cell Lung Cancer	Drug: Pembrolizumab	FL; NC; TX; VA	NCT02684461
An Investigational Immuno-therapy Study to Test Combination Treatments in Patients With Advanced Non-Small Cell Lung Cancer	Advanced Cancer	Biological: Nivolumab; Drug: Dasatinib; Biological: BMS-986016; Biological: Ipilimumab	CA; CO; CT; DC; GA; KS; MA; MD; MI; MO; NC; NV; NY; OH; OR; PA; TN; TX; UT; VA; WA	NCT02750514
Oncology Research Information Exchange Network (ORIEN) Lung Cancer Study	Lung Cancer; Non-small Cell Lung Cancer	Other: No Intervention	FL	NCT02803333
Neoadjuvant Pembrolizumab	Non-small Cell Lung Carcinoma	Drug: Pembrolizumab	NC	NCT02818920
Trial of Stereotactic Body Radiation and Gene Therapy Before Nivolumab for Metastatic Non-Small Cell Lung Carcinoma	Lung Squamous Cell Carcinoma Stage IV; Nonsquamous Nonsmall Cell Neoplasm of Lung	Biological: ADV/HSV-tk; Drug: Valacyclovir; Radiation: SBRT; Drug: nivolumab	TX	NCT02831933
FLT3 Ligand Immunotherapy and Stereotactic Radiotherapy for Advanced Non-small Cell Lung Cancer	Non-small Cell Lung Cancer (NSCLC)	Drug: FLT3 Ligand Therapy (CDX-301); Radiation: Stereotactic Body Radiotherapy (SBRT)	NY	NCT02839265
Anti-Mesothelin Antibody Drug Conjugate Anetumab Ravtansine for Mesothelin Expressing Lung Adenocarcinoma	Lung Neoplasms	Drug: Anetumab Ravtansine	MD	NCT02839681
Evaluation of Tumor and Blood Immune Biomarkers in Resected Non-small Cell Lung Cancer	Non-small Cell Lung Carcinoma		NC	NCT02848872
An Investigational Immuno-therapy Study for Safety of Nivolumab in Combination With Ipilimumab to Treat Advanced Cancers	Lung Cancer	Drug: Nivolumab in combination with Ipilimumab	AL; AR; AZ; CA; CO; FL; GA; IL; KS; KY; MD; MS; NC; NE; NJ; NV; OH; OR; PA; SC; TN; TX; VA; WA	NCT02869789
A Personalized Cancer Vaccine (NEO-PV-01) w/ Nivolumab for Patients With Melanoma, Lung Cancer or Bladder Cancer	Urinary Bladder Cancer; Bladder Tumors; Transitional Cell Carcinoma of the Bladder; Malignant Melanoma; Melanoma; Skin Cancer; Carcinoma, Non-Small-Cell Lung; Lung Cancer	Biological: NEO-PV-01; Biological: Nivolumab; Other: Adjuvant	CA; MA; MO; NY; TX	NCT02897765
Bronchoscopy With Bronchoalveolar Lavage in Identifying Biomarkers of Response to Immune Checkpoint Inhibitors in Patients With Non-small Cell or Small Cell Lung Cancer	Non-Small Cell Lung Carcinoma; Small Cell Lung Carcinoma	Procedure: Bronchoscopy with Bronchoalveolar Lavage; Other: Laboratory Biomarker Analysis	TN	NCT02937402
Targeted Therapy in Treating Patients With Incurable Non-Small Cell Lung Cancer With Genetic Mutations	EGFR Activating Mutation; Recurrent Non-Small Cell Lung Carcinoma; Stage IV Non-Small Cell Lung Cancer	Drug: Chemotherapy; Biological: Immunotherapy; Other: Laboratory Biomarker Analysis; Biological: Nivolumab; Biological: Pembrolizumab; Drug: Targeted Molecular Therapy; Drug: Tyrosine Kinase Inhibitor	NC	NCT02949843
Adjuvant Pembrolizumab After Radiation Therapy for Lung-Intact Malignant Pleural Mesothelioma	Malignant Pleural Mesothelioma	Radiation: Hemithoracic Radiation Therapy; Radiation: Palliative Radiation Therapy; Drug: Pembrolizumab	TX	NCT02959463
hTERT Immunotherapy Alone or in Combination With IL-12 DNA Followed by Electroporation in Adults With Solid Tumors at High Risk of Relapse	Breast Cancer; Lung Cancer; Pancreatic Cancer; Head and Neck Cancer; Ovarian Cancer; ColoRectal Cancer; Gastric Cancer; Esophageal Cancer; HepatoCellular Carcinoma	Biological: INO-1400; Biological: INO-9012	MI; MN; NC; PA	NCT02960594
MEDI4736 With Selumetinib for KRAS Mutant Non-Small Cell Lung Cancer (NSCLC)	Malignant Neoplasm of Respiratory and Intrathoracic Organ Carcinoma; Advanced Lung Cancer; Recurrent Nonsmall Cell Lung Cancer	Drug: Selumetinib; Drug: Durvalumab; Behavioral: Phone Calls	TX	NCT03004105
Hypofractionated Radiation Therapy to Improve Immunotherapy Response in Non-Small Cell Lung Cancer	Non Small Cell Lung Cancer Metastatic	Radiation: Radiation; Drug: Immuno-Therapeutic Agent	WV	NCT03035890
Ipilimumab + Nivolumab w/Thoracic Radiotherapy for Extensive-Stage Small Cell Lung Cancer	Small Cell Lung Cancer; Extensive-stage Small Cell Lung Cancer	Radiation: Thoracic Radiation Therapy; Drug: Ipilimumab; Drug: Nivolumab	FL	NCT03043599
A Pilot Study to Develop Predictive Biomarkers for the Response to Immunotherapy in Lung Cancer	Lung Cancer	Other: Blood and Urine Collection	PA	NCT03047616
Nivolumab and Metformin Hydrochloride in Treating Patients With Stage III-IV Non-small Cell Lung Cancer That Cannot Be Removed by Surgery	Recurrent Non-Small Cell Lung Carcinoma; Stage III Non-Small Cell Lung Cancer; Stage IIIA Non-Small Cell Lung Cancer; Stage IIIB Non-Small Cell Lung Cancer; Stage IV Non-Small Cell Lung Cancer	Other: Laboratory Biomarker Analysis; Drug: Metformin Hydrochloride; Biological: Nivolumab	IL	NCT03048500
Phase II Trial of Continuation Therapy in Advanced NSCLC	Non-Small-Cell Lung Cancer	Drug: Pembrolizumab	IN	NCT03083808
Ceritinib + Trametinib in Patients With Advanced ALK-Positive Non-Small Cell Lung Cancer (NSCLC)	Non-small Cell Lung Cancer	Drug: Ceritinib; Drug: Trametinib	CA	NCT03087448
Clinical Trials Comparing Immunotherapy Plus Stereotactic Ablative Radiotherapy (I-SABR) Versus SABR Alone for Stage I, Selected Stage IIa or Isolated Lung Parenchymal Recurrent Non-Small Cell Lung Cancer: I-SABR	Malignant Neoplasms of Respiratory and Intrathoracic Organs; Non-small Cell Lung Cancer	Radiation: Stereotactic Ablative Radiotherapy; Drug: Nivolumab	TX	NCT03110978

LUNG (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
CD40 Agonistic Antibody APX005M in Combination With Nivolumab	Cancer; Non Small Cell Lung Cancer Metastatic; Metastatic Melanoma; Neoplasm of Lung; Melanoma	Drug: APX005M; Drug: Nivolumab	AZ; CA; MI; PA; TN	NCT03123783
Intratumoral Gene Mediated Cytotoxic Immunotherapy in Patients With Resectable Non-Small Cell Lung Cancer	Lung Cancer	Biological: AdV-tk (aglatimagene besadenovec) + valacyclovir	PA	NCT03131037
Phase 1/2 Study of Combination Immunotherapy and mRNA Vaccine in Subjects With NSCLC	Metastatic Non-small Cell Lung Cancer; NSCLC	Drug: Durvalumab; Drug: Tremelimumab; Biological: BI 1361849	FL; MA; MN; NY; TX	NCT03164772
Combination of a Personalized Therapeutic Anti-tumor Vaccine With Pembrolizumab in Non-Small Cell Lung Cancer	Non Small Cell Lung Cancer; NSCLC	Drug: Pembrolizumab; Biological: Personalized synthetic long peptide vaccine; Procedure: Biopsy; Drug: Poly ICLC; Procedure: Leukapheresis; Procedure: Peripheral blood draw	MO	NCT03166254
Radiation and Immune Checkpoints Blockade in Metastatic NSCLC (BMS # CA209-632)	Non Small Cell Lung Cancer Metastatic	Drug: Ipilimumab and Radiation therapy; Drug: Nivolumab	NY	NCT03168464
Radical-Dose Image Guided Radiation Therapy in Treating Patients With Metastatic Non-small Cell Lung Cancer Undergoing Immunotherapy	Stage IV Non-Small Cell Lung Cancer	Biological: Immunotherapy (standard of care); Radiation: Image Guided Radiation Therapy; Other: Laboratory Biomarker Analysis	CA	NCT03176173
A Study to Evaluate Efficacy and Safety of Multiple Targeted Therapies as Treatments for Participants With Non-Small Cell Lung Cancer (NSCLC)	Non-Small Cell Lung Cancer	Drug: Alectinib; Drug: Atezolizumab; Drug: Pemetrexed; Drug: Cisplatin; Drug: Carboplatin; Drug: Gemcitabine	CA; CT; GA; IL; NJ; NY; OH; RI; TX; WA	NCT03178552
Beating Lung Cancer in Ohio Protocol in Improving Survival in Patients With Stage IV Non-Small Cell Lung Cancer	Cigarette Smoker; Current Smoker; Lung Adenocarcinoma; Squamous Cell Lung Carcinoma; Stage IV Non-Small Cell Lung Cancer	Other: Best Practice; Procedure: Biospecimen Collection; Other: Laboratory Biomarker Analysis; Other: Medical Chart Review; Other: Quality-of-Life Assessment; Other: Questionnaire Administration; Behavioral: Smoking Cessation Intervention	OH	NCT03199651
Nivolumab and Tumor Infiltrating Lymphocytes (TIL) in Advanced Non-Small Cell Lung Cancer	Non-Small Cell Lung Cancer; Metastatic Non-small Cell Lung Cancer; Squamous Cell Carcinoma; Advanced NSCLC; Adenosquamous Carcinoma; Adenocarcinomas	Procedure: Tumor-infiltrating Lymphocytes (TIL); Drug: Nivolumab; Drug: Cyclophosphamide; Drug: Fludarabine; Other: Tumor-infiltrating Lymphocyte Therapy; Drug: Interleukin-2	FL	NCT03215810
Pembrolizumab (Immunotherapy Drug) in Combination With Guadecitabine and Mocetinostat (Epigenetic Drugs) for Patients With Advanced Lung Cancer.	Lung Cancer	Drug: Pembrolizumab; Drug: Guadecitabine; Drug: Mocetinostat	MD; NY; PA	NCT03220477
Evaluate Concurrent Or Sequential Ipilimumab, Nivolumab, and Stereotactic Body Radiotherapy in Patients With Stage IV Non-Small Cell Lung Cancer	Stage IV Small Cell Lung Cancer	Drug: Nivolumab; Drug: Ipilimumab; Radiation: Stereotactic body radiation therapy	IL	NCT03223155
A Pilot Study of Interlesional IL-2 and RT in Patients With NSCLC	Metastatic non-small cell lung cancer	Drug: Intralesional IL-2; Drug: Nivolumab; Drug: Pembrolizumab; Radiation: Radiotherapy	CA	NCT03224871
BATTLE-2 Program - A Biomarker-Integrated Targeted Therapy in Non-Small Cell Lung Cancer (NSCLC)	Lung Diseases Due to External Agents; Non-Small Cell Lung Cancer	Drug: Trametinib; Drug: Pembrolizumab	TX	NCT03225664
TCR-engineered T Cells in NSCLC and HNSCC Patients (ACTengine)	Solid Tumor; Cancer; Head and Neck Squamous Cell Carcinoma; Squamous Cell Non-small Cell Lung Cancer	Biological: IMA201 T-Cells; Diagnostic Test: IMA201_Detect; Diagnostic Test: ACT-HLA; Drug: Fludarabine; Drug: Cyclophosphamide; Biological: Recombinant human interleukin-2	TX	NCT03247309
Pembrolizumab + Idelalisib for Lung Cancer Study	Non Small Cell Lung Cancer; Metastasis; Recurrence	Drug: Pembrolizumab; Drug: Idelalisib	GA	NCT03257722
Ipilimumab and Nivolumab in Patients With Anti-PD-1-axis Therapy-resistant Advanced Non-small Cell Lung Cancer	Carcinoma, Non-Small-Cell Lung	Biological: combination nivolumab and ipilimumab	CT	NCT03262779
Phase Ib Study of Stereotactic Body Radiotherapy (SBRT) in Oligometastatic Non-small Lung Cancer (NSCLC) With Dual Immune Checkpoint Inhibition	Non-small Cell Lung Cancer; Non-small Cell Lung Cancer Stage IV	Drug: Durvalumab; Drug: Tremelimumab; Radiation: Stereotactic Body Radiotherapy	WI	NCT03275597
Unresectable Stage IIIA/IIIB Non-small Cell Lung Cancer (NSCLC)	Non-small Cell Lung Cancer	Drug: Nivolumab; Drug: Ipilimumab	IN	NCT03285321
Clinical Effectiveness Assessment of VeriStrat® Testing and Validation of Immunotherapy Tests in NSCLC Subjects	Non-Small Cell Lung Cancer		AL; AR; CA; CT; FL; GA; IN; LA; MS; NC; NJ; NY; OH; PA; SC; TX; VA; WA	NCT03289780
Depletion of Myeloid Derived Suppressor Cells to Enhance Anti PD-1 Therapy	Non Small Cell Lung Cancer Stage IIIB	Biological: Nivolumab; Drug: Nivolumab+Gemcitabine	PA	NCT03302247
Priming Immunotherapy in Advanced Disease With Radiation	Non-small Cell Lung Cancer; Squamous Cell Carcinoma of the Head and Neck	Drug: Immune checkpoint inhibitor; Radiation: Radiation Therapy	KY	NCT03313804

MELANOMA

Title	Cancer Type	Treatment	Location	NCT Number
Evaluation for NCI Surgery Branch Clinical Studies	Synovial Cell Cancer; Melanoma; Colorectal Cancer; Lung Cancer; Bladder Cancer		MD	NCT00001823

Title	Cancer Type	Treatment	Location	NCT Number
Dendritic Cell Activating Scaffold in Melanoma	Melanoma	Biological: WDVAX	MA	NCT01753089
Immune Responses in Prostate, Lung, Melanoma and Breast Cancer Patients Following Stereotactic Body Radiotherapy (SBRT), Intensity Modulated Radiotherapy (IMRT) or Brachytherapy	Prostate Cancer; Breast Cancer; Lung Cancer; Melanoma	Radiation: SBRT; Radiation: IMRT; Radiation: Brachytherapy	MN	NCT01777802
Dendritic Cell Vaccines + Dasatinib for Metastatic Melanoma	Metastatic Melanoma	Biological: DC vaccine; Drug: Dasatinib	PA	NCT01876212
T Cell Receptor Immunotherapy Targeting NY-ESO-1 for Patients With NY-ESO-1 Expressing Cancer	Melanoma; Synovial Sarcoma; Breast Cancer; Non-Small Cell Lung Cancer; Hepatocellular Cancer	Biological: Anti-NY ESO-1 mTCR PBL; Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Aldesleukin	MD	NCT01967823
Immunotherapy Using Tumor Infiltrating Lymphocytes for Patients With Metastatic Melanoma	Metastatic Melanoma	Drug: Aldesleukin; Drug: Fludarabine; Drug: Cyclophosphamide; Biological: Young Tumor Infiltrating Lymphocytes (Young TIL); Drug: Keytruda (pembrolizumab) - ONLY FOR RETREATMENT	MD	NCT01993719
Cellular Adoptive Immunotherapy Using Autologous CD8+ Antigen-Specific T Cells and Anti-CTLA4	Melanoma	Drug: Cyclophosphamide; Procedure: CD8+ T Cells; Drug: Interleukin-2; Drug: Ipilimumab	TX	NCT02027935
T Cell Receptor Immunotherapy Targeting MAGE-A3 for Patients With Metastatic Cancer Who Are HLA-DP0401 Positive	Cervical Cancer; Renal Cancer; Urothelial Cancer; Melanoma; Breast Cancer	Biological: Anti-MAGE-A3-DP4 TCR; Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Aldesleukin	MD	NCT02111850
T Cell Receptor Immunotherapy Targeting MAGE-A3 for Patients With Metastatic Cancer Who Are HLA-A*01 Positive	Breast Cancer; Cervical Cancer; Renal Cancer; Melanoma; Bladder Cancer	Drug: Aldesleukin; Drug: Fludarabine; Drug: Cyclophosphamide; Biological: Anti-MAGE-A3 HLAA* 01-restricted TCR	MD	NCT02153905
Dabrafenib and Trametinib Followed by Ipilimumab and Nivolumab or Ipilimumab and Nivolumab Followed by Dabrafenib and Trametinib in Treating Patients With Stage III-IV BRAFV600 Melanoma	BRAF NP_004324.2:p.V600X; Metastatic Melanoma; Recurrent Melanoma; Stage III Cutaneous Melanoma AJCC v7; Stage IIIA Cutaneous Melanoma AJCC v7; Stage IIIB Cutaneous Melanoma AJCC v7; Stage IIIC Cutaneous Melanoma AJCC v7; Stage IV Cutaneous Melanoma AJCC v6 and v7	Drug: Dabrafenib; Biological: Ipilimumab; Other: Laboratory Biomarker Analysis; Biological: Nivolumab; Other: Quality-of-Life Assessment; Drug: Trametinib	AK; AL; AR; CA; CO; CT; DC; DE; FL; GA; HI; IA; ID; IL; IN; KS; KY; LA; MA; MD; MI; MN; MO; MS; MT; NC; ND; NE; NJ; NM; NV; NY; OH; OK; OR; PA; RI; SC; SD; TN; TX; VA; WA; WI; WV	NCT02224781
RTA 408 Capsules in Patients With Melanoma - REVEAL	Melanoma; Unresectable (Stage III) Melanoma; Metastatic (Stage IV) Melanoma	Drug: Omaveloxolone Capsules (2.5 mg/capsule); Drug: Ipilimumab (3 mg/kg); Drug: Nivolumab (240 mg)	AL; AR; CO; DC; DE; FL; MA; NC; NJ; TX	NCT02259231
A Study of Glembatumumab Vedotin as Monotherapy or in Combination With Immunotherapies in Patients With Advanced Melanoma	Melanoma	Drug: glembatumumab vedotin; Drug: glembatumumab vedotin and varlilumab; Drug: glembatumumab vedotin and PD-1 targeted checkpoint inhibitor (nivolumab OR pembrolizumab)	CA; FL; GA; IL; MA; MI; NC; NY; TN; TX	NCT02302339
In Situ, Autologous Therapeutic Vaccination Against Solid Cancers With Intratumoral Hiltonol®	Melanoma; Head and Neck Cancer; Sarcoma; Non-Melanoma Skin Cancers	Biological: Hiltonol	GA; MD; MO; NY; PA; SC	NCT02423863
A Pilot Study to Evaluate PBR PET in Brain Tumor Patients Treated With Chemoradiation or Immunotherapy	Intracranial Tumors; Glioblastoma; Melanoma	Other: PBR PET; Biological: Cancer Immunotherapy; Radiation: Radiation and chemotherapy	MA	NCT02431572
Study of the CD40 Agonistic Monoclonal Antibody APX005M	Cancer; NSCLC; Melanoma; Urothelial Carcinoma; MSI-H; Head and Neck Cancer	Drug: APX005M	CA; OH; PA	NCT02482168
A Trial of Intratumoral Injections of SD-101 in Combination With Pembrolizumab in Patients With Metastatic Melanoma or Recurrent or Metastatic Head and Neck Squamous Cell Carcinoma	Metastatic Melanoma; Head Neck Cancer	Drug: SD-101; Biological: Pembrolizumab	AL; AZ; CA; CO; FL; GA; IA; IL; IN; MI; MN; NC; NE; NJ; NY; OH; OK; OR; PA; SC; TX; UT; VA; WV	NCT02521870
GR-MD-02 Plus Pembrolizumab in Melanoma, Non-small Cell Lung Cancer, and Squamous Cell Head and Neck Cancer Patients	Melanoma; Non-Small Cell Lung Cancer; Squamous Cell Carcinoma of the Head and Neck	Drug: GR-MD-02; Drug: Pembrolizumab	OR	NCT02575404
A Prospective Randomized and Phase 2 Trial for Metastatic Melanoma Using Adoptive Cell Therapy With Tumor Infiltrating Lymphocytes Plus IL-2 Either Alone or Following the Administration of Pembrolizumab	Melanoma	Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Aldeslaukin; Drug: Pembrolizumab; Biological: young TIL	MD	NCT02621021
Combining PD-1 Blockade, CD137 Agonism and Adoptive Cell Therapy for Metastatic Melanoma	Melanoma (Skin); Skin Cancer	Drug: Nivolumab; Procedure: Surgery to Remove Tumor for Growth of TIL; Drug: CD137; Drug: Cyclophosphamide; Drug: Fludarabine; Biological: TIL Infusion; Drug: Interleukin-2	FL	NCT02652455
An Investigational Immuno-therapy Study of BMS-986205 Given in Combination With Nivolumab and in Combination With Both Nivolumab and Ipilimumab in Cancers That Are Advanced or Have Spread	Advanced Cancer; Melanoma; Non-Small Cell Lung Cancer	Drug: BMS-986205; Drug: Nivolumab; Drug: Ipilimumab	AZ; CA; FL; GA; IL; MD; MI; MN; MO; NJ; NY; OH; PA; TN	NCT02658890
A Pilot Study to Evaluate the Safety and Efficacy of Combination Checkpoint Blockade Plus External Beam Radiotherapy in Subjects With Stage IV Melanoma	Melanoma	Drug: Ipilimumab; Drug: Nivolumab; Radiation: Radiotherapy	CA; NY	NCT02659540
Ipilimumab (Immunotherapy) and MGN1703 (TLR Agonist) in Patients With Advanced Solid Malignancies	Advanced Cancers; Melanoma	Drug: MGN1703; Drug: Ipilimumab	TX	NCT02668770
Phase 1 Study of GRN-1201 in HLA-A*02 Subjects With Resected Melanoma	Melanoma	Biological: GRN-1201	OH; OR; PA; UT	NCT02696356

MELANOMA (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
Ipilimumab vs Ipilimumab Plus Nivolumab in Patients With Stage III-IV Melanoma Who Have Progressed or Relapsed on PD-1 Inhibitor Therapy	Melanoma	Drug: ipilimumab; Drug: nivolumab	NJ; NY; PA	NCT02731729
GI Complications in Cancer Immunotherapy Patients	Malignant Melanoma		MA	NCT02784366
Adoptive T Cell Immunotherapy for Advanced Melanoma Using Engineered Lymphocytes	Melanoma	Biological: Escalating Doses	IL	NCT02870244
Trial of Intratumoral Injections of TTI-621 in Subjects With Relapsed and Refractory Solid Tumors and Mycosis Fungoides	Solid Tumors; Mycosis Fungoides; Melanoma; Merkel-cell Carcinoma; Squamous Cell Carcinoma; Breast Carcinoma; Human Papillomavirus-Related Malignant Neoplasm; Soft Tissue Sarcoma	Drug: TTI-621	CA; OR; PA; WA	NCT02890368
A Personalized Cancer Vaccine (NEO-PV-01) w/ Nivolumab for Patients With Melanoma, Lung Cancer or Bladder Cancer	Urinary Bladder Cancer; Bladder Tumors; Transitional Cell Carcinoma of the Bladder; Malignant Melanoma; Melanoma; Skin Cancer; Carcinoma, Non-Small-Cell Lung; Lung Cancer	Biological: NEO-PV-01; Biological: Nivolumab; Other: Adjuvant	CA; MA; MO; NY; TX	NCT02897765
Yttrium90, Ipilimumab, & Nivolumab for Uveal Melanoma With Liver Metastases	Uveal Melanoma; Hepatic Metastases	Device: SIR-Spheres® Yttrium 90; Drug: ipilimumab; Drug: nivolumab	CA; IL; PA	NCT02913417
An Investigational Immuno-therapy Study of Nivolumab Combined With Ipilimumab Compared to Nivolumab by Itself After Complete Surgical Removal of Stage IIIb/c/d or Stage IV Melanoma	Melanoma	Biological: nivolumab; Biological: ipilimumab	AZ; CA; CO; CT; DC; FL; GA; IL; MA; MI; MN; MO; NC; NY; OR; PA; TN; TX; UT; VA; WA	NCT03068455
Study of Cellular Adoptive Immunotherapy Using Autologous CD8+ Antigen-Specific T Cells and Anti-CTLA4 for Patients With Metastatic Uveal Melanoma	Melanoma and Other Malignant Neoplasms of Skin	Biological: CD 8+ T Cells; Drug: Cyclophosphamide; Drug: Interleukin-2; Drug: Ipilimumab	TX	NCT03068624
Immunotherapy Study of Evofosfamide in Combination With Ipilimumab	Pancreatic Cancer; Melanoma; Squamous Cell Carcinoma of the Head and Neck; Prostate Cancer	Drug: Evofosfamide; Drug: Ipilimumab	TX	NCT03098160
A Study to Evaluate Adaptive Dosing of Ipilimumab and Nivolumab Combination Immunotherapy	Metastatic Melanoma	Drug: ipilimumab; Drug: nivolumab	NJ; NY; PA	NCT03122522
CD40 Agonistic Antibody APX005M in Combination With Nivolumab	Cancer; Non Small Cell Lung Cancer Metastatic; Metastatic Melanoma; Neoplasm of Lung; Melanoma	Drug: APX005M; Drug: Nivolumab	AZ; CA; MI; PA; TN	NCT03123783
SX-682 Treatment in Subjects With Metastatic Melanoma Concurrently Treated With Pembrolizumab	Melanoma Stage III; Melanoma Stage IV	Drug: SX-682; Biological: Pembrolizumab	MA	NCT03161431
Cobimetinib (Targeted Therapy) Plus Atezolizumab (Immunotherapy) in Participants With Advanced Melanoma Whose Cancer Has Worsened During or After Treatment With Previous Immunotherapy and Atezolizumab Monotherapy in Participants With Previously Untreated Advanced Melanoma	Malignant Melanoma	Biological: Atezolizumab; Drug: Cobimetinib	AZ; CA; CO; MO; MY; TN; TX	NCT03178851
Ability of a Dendritic Cell Vaccine to Immunize Melanoma or Epithelial Cancer Patients Against Defined Mutated Neoantigens Expressed by the Autologous Cancer	Melanoma; Gastrointestinal Cancer; Breast Cancer; Ovarian Cancer; Pancreatic Cancer	Biological: Peptide loaded dendritic cell vaccine	MD	NCT03300843
EPR Tumor Oximetry With CE India Ink	Neoplasms, Malignant; Breast Neoplasm; Carcinoma, Basal Cell; Carcinoma, Squamous Cell; Melanoma; Skin Neoplasm; Head and Neck Neoplasms	Device: Carlo Erba Ink Injection; Other: EPR Oximetry Measurement	NH	NCT03321903

MISCELLANEOUS

Title	Cancer Type	Treatment	Location	NCT Number
Follow-Up Study of Subjects Previously Enrolled in Poxviral Vector Gene Transfer Studies	Vaccine		MD	NCT00451022
Ipilimumab and Imatinib Mesylate in Advanced Cancer	Advanced Cancers	Drug: Ipilimumab; Drug: Imatinib Mesylate	TX	NCT01738139
An Investigational Immuno-therapy Study to Assess the Safety, Tolerability and Effectiveness of Anti-LAG-3 With and Without Anti-PD-1 in the Treatment of Solid Tumors	Neoplasms by Site	Biological: Relatlimab; Biological: BMS-936558	IL; MA; MD; MI; NY; OR; PA; WA	NCT01968109
Tocilizumab and Hemophagocytic Lymphohistiocytosis (HLH)	Hemophagocytic Lymphohistiocytosis	Drug: tocilizumab	PA	NCT02007239
Immunotherapy in Subjects With HPV-6 Associated Aerodigestive Precancerous Lesions and Malignancies	Aerodigestive Precancerous Lesions and Malignancies	Biological: INO-3106, INO-9012	PA	NCT02241369
Detection of Tumor DNA in Blood Samples From Cancer Patients	Cancer; Tumors	Diagnostic Test: Blood test	CA	NCT02288754
Study of Kinetics, Dosimetry & Safety of [18F]F-AraG, a Positron Emission Tomography Imaging Tracer in Healthy Humans	Cancer	Drug: [18F]F-AraG	CA	NCT02323893
Adoptive Immunotherapy With Activated Marrow Infiltrating Lymphocytes and Cyclophosphamide Graft-Versus-Host Disease Prophylaxis in Patients With Relapse of Hematologic Malignancies After Allogeneic Hematopoietic Cell Transplantation	Hematologic Malignancies; Graft-Versus-Host Disease	Biological: Activated PTCy-MILs	MD	NCT02342613

MISCELLANEOUS (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
Phase IIA Open Label Study to Evaluate Efficacy and Safety of BL-8040 Followed by (hATG), Cyclosporine and Methyprednisolone in Adult Subjects With Aplastic Anemia or Hypoplastic Myelodysplastic Syndrome	Aplastic Anemia; Hypoplastic Myelodysplastic Syndrome	Drug: BL-8040; Drug: horse anti-thymocyte globulin (hATG); Drug: Methylprednisolone; Drug: Cyclosporine	TX	NCT02462252
A Study of BBI608 Administered in Combination With Immune Checkpoint Inhibitors in Adult Patients With Advanced Cancers	Cancer	Drug: BBI608; Drug: Ipilimumab; Drug: Nivolumab; Drug: Pembrolizumab	CO; GA; IL; MA; NY; SC; TX	NCT02467361
An Investigational Immuno-therapy Study to Investigate the Safety and Effectiveness of Nivolumab, and Nivolumab Combination Therapy in Virus-associated Tumors	Various Advanced Cancer	Drug: Nivolumab; Drug: Ipilimumab; Drug: BMS-986016; Drug: Daratumumab	FL; GA; LA; MA; MD; MI; NC; NY; OK; OR; PA; SD; WA	NCT02488759
A Study Of Avelumab In Combination With Other Cancer Immunotherapies In Advanced Malignancies (JAVELIN Medley)	Advanced Cancer	Drug: Avelumab; Drug: Utomilumab; Drug: PF-04518600; Drug: PD 0360324	CA	NCT02554812
A Study in Adult Subjects With Select Advanced Solid Tumors	Advanced Solid Tumors	Biological: MEDI1873	AZ; CA; FL; MN; NY; OK; PA; SC; TN; TX	NCT02583165
An Investigational Immuno-therapy Study of Experimental Medication BMS-986156, Given by Itself or in Combination With Nivolumab in Patients With Solid Cancers or Cancers That Have Spread	Solid Tumors	Drug: BMS-986156; Drug: Nivolumab	AL; CA; GA; OH; OR; PA; TN	NCT02598960
Combination of Interferon-gamma and Nivolumab for Advanced Solid Tumors	Advanced Solid Tumors	Drug: interferon-gamma and nivolumab	PA	NCT02614456
Gene-Modified T Cells in Treating Patients With Locally Advanced or Stage IV Solid Tumors Expressing NY-ESO-1	Adult Solid Neoplasm	Drug: Cyclophosphamide; Other: Laboratory Biomarker Analysis; Biological: NY-ESO-1 Reactive TCR Retroviral Vector Transduced Autologous PBL; Biological: TGFbDNRII-transduced Autologous Tumor Infiltrating Lymphocytes	NY	NCT02650986
Trial of Salvage Radiation Therapy to Induce Systemic Disease Regression After Progression on Systemic Immunotherapy	Metastatic Cancer	Radiation: Radiation Therapy	TX	NCT02710253
Safety and Immunogenicity of Personalized Genomic Vaccine to Treat Malignancies	Solid Tumors	Biological: Peptides; Drug: Poly-ICLC; Drug: Lenalidomide	NY	NCT02721043
An Investigational Immuno-therapy Study of Experimental Medication BMS-986178 by Itself or in Combination With Nivolumab and/or Ipilimumab in Patients With Solid Cancers That Are Advanced or Have Spread	Advanced Cancer	Drug: BMS-986178; Drug: Nivolumab; Drug: Ipilimumab	CO; DC; NJ; NY; OR; PA	NCT02737475
An Investigational Immuno-therapy Study of Experimental Medication BMS-986179 Given in Combination With Nivolumab in Solid Cancers That Are Advanced or Have Spread	Malignant Solid Tumor	Biological: BMS-986179; Biological: Nivolumab	MD; NY; TN	NCT02754141
Research Study Utilizing Expanded Multi-antigen Specific Lymphocytes for the Treatment of Solid Tumors	Solid Tumors	Biological: Tumor associated antigen lymphocytes (TAA-CTL)	DC	NCT02789228
A Study of the Effects of ALKS 4230 on Subjects With Solid Tumors	Advanced Solid Tumors	Drug: ALKS 4230	FL; MA; MI; NY; OH	NCT02799095
An Open Label Investigational Immuno-therapy Trial of Nivolumab in Cancers That Are Advanced or Have Spread	Cancer	Biological: BMS936558	AZ; CA; CO; FL; IL; IN; KS; MD; MN; MO; NE; NJ; NV; NY; OR; SC; TN; TX; VA	NCT02832167
Checkpoint Blockade Immunotherapy Combined With Stereotactic Body Radiation in Advanced Metastatic Disease	Metastatic Cancer	Drug: CBI; Radiation: CBI plus SBRT	CA	NCT02843165
ACTolog in Patients With Solid Cancers	Cancer; Solid Tumor	Drug: Fludarabine; Drug: Cyclophosphamide; Biological: IMA101 T-cell product; Biological: Recombinant human interleukin-2; Diagnostic Test: IMA101_Detect	TX	NCT02876510
Clofarabine PET/CT in Imaging Cancer Patients Before and After Interventions	Malignant Neoplasm	Procedure: Computed Tomography; Radiation: Fluorine F 18 Clofarabine; Procedure: Positron Emission Tomography	CA	NCT02888301
An Investigational Immuno-therapy Study to Evaluate the Safety and Effectiveness of Experimental Medication BMS-986207 by Itself and in Combination With Nivolumab in Solid Cancers That Are Advanced or Have Spread	Broad Solid Tumor	Drug: BMS-986207; Biological: Nivolumab	NJ; NY; PA; UT	NCT02913313
Glypican 3-specific Chimeric Antigen Receptor Expressed in T Cells for Patients With Pediatric Solid Tumors (GAP)	Solid Tumors	Genetic: GAP T cells; Drug: Cytoxan; Drug: Fludara	TX	NCT02932956
A Study Evaluating Safety and Pharmacokinetics, and the Recommended Phase 2 Dose (RPTD) of ABBV-428 in Participants With Advanced Solid Tumors	Advance Solid Tumors	Drug: ABBV-428; Drug: Nivolumab	AZ; CA; IL; SC; TX	NCT02955251
T Cell Therapy of Opportunistic Cytomegalovirus Infection	Cytomegalovirus Infections; Hematopoietic Stem Cell Transplant; Opportunistic Infections	Biological: CMV specific adoptive t-cells	OH	NCT02982902
HDCRT Plus Pembrolizumab in Advanced Malignancies	Solid Tumor	Radiation: High-Dose Conformal Radiation Therapy; Drug: Pembrolizumab	VA	NCT02987166
A Study of ABBV-927, an Immunotherapy, in Participants With Advanced Solid Tumors	Advance Solid Tumors	Drug: ABBV-927; Drug: Nivolumab	CA; IL; MA; NC; TN; TX; VA	NCT02988960

MISCELLANEOUS (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
Pembrolizumab and Interferon Gamma-1b in Treating Patients With Stage IB-IVB Relapsed or Refractory Mycosis Fungoides and Sezary Syndrome	Recurrent Mycosis Fungoides and Sezary Syndrome; Refractory Mycosis Fungoides; Stage IB Mycosis Fungoides and Sezary Syndrome; Stage II Mycosis Fungoides and Sezary Syndrome; Stage IIA Mycosis Fungoides and Sezary Syndrome; Stage IIB Mycosis Fungoides and Sezary Syndrome; Stage III Mycosis Fungoides and Sezary Syndrome; Stage IIIA Mycosis Fungoides and Sezary Syndrome; Stage IIIB Mycosis Fungoides and Sezary Syndrome; Stage IV Mycosis Fungoides and Sezary Syndrome; Stage IVA Mycosis Fungoides and Sezary Syndrome; Stage IVB Mycosis Fungoides and Sezary Syndrome	Biological: Interferon Gamma-1b; Other: Laboratory Biomarker Analysis; Biological: Pembrolizumab	WA	NCT03063632
A Phase 2 Study of Durvalumab in Combination With Tremelimumab in Malignant Pleural Mesothelioma	Mesothelioma	Drug: Tremelimumab; Drug: Durvalumab	MA	NCT03075527
A Study to Test the Safety and Effectiveness of Nivolumab Combined With Daratumumab in Patients With Pancreatic, Non-Small Cell Lung or Triple Negative Breast Cancers, That Have Advanced or Have Spread	Advanced Cancer	Biological: Nivolumab; Biological: Daratumumab	CA; CO; FL; MI; OR	NCT03098550
An Investigational Immuno-therapy Study of Nivolumab Monotherapy and Nivolumab in Combination With Ipilimumab in Pediatric Patients With High Grade Primary CNS Malignancies	Various Advanced Cancer	Biological: Nivolumab; Biological: Ipilimumab	CA; CO; FL; IL; MA; MD; MO; NY; OH; PA; SC; TN; TX	NCT03130959
PET Imaging for Analysis of Biodistribution in Cancer Patients Expected to Undergo Immunotherapy	Cancer	Drug: [18F]F-AraG	CA	NCT03142204
Immune Checkpoint Inhibitor Nivolumab in People With Select Rare CNS Cancers	Ependymoma; Meningioma; Chordoma	Drug: Nivolumab	MD	NCT03173950
Immunotherapy With E6 T Cell Receptor (TCR) T Cells for Vulvar High-Grade Squamous Intraepithelial Lesions	Human Papillomavirus; HPV-16; High Grade Squamous Intraepithelial Lesion	Drug: Aldesleukin; Biological: E6 TCR	MD	NCT03197025
Collection of Immunology Specimens From Patients With Cancer or Blood Disorders, and Healthy Volunteers	Healthy Subject; Hematologic and Lymphocytic Disorder; Hematopoietic and Lymphoid Cell Neoplasm; Immune System Disorder; Malignant Neoplasm	Procedure: Biospecimen Collection; Other: Laboratory Biomarker Analysis; Other: Questionnaire Administration	CA	NCT03207854
Study of TSR-033 With an Anti-PD-1	Advanced Solid Tumors; Antibodies; Immunotherapy	Drug: TSR-033; Drug: Anti-PD-1	FL; MA; OK; TX	NCT03250832
A Dose Escalation and Combination Immunotherapy Study to Evaluate BMS-986226 Alone or in Combination With Nivolumab or Ipilimumab in Patients With Advanced Solid Tumors	Cancer; Tumors; Neoplasm; Malignancy	Drug: BMS-986226; Biological: Nivolumab; Biological: Ipilimumab	NJ; PA	NCT03251924
A Study of RO7198457 (Personalized Cancer Vaccine [PCV]) as a Single Agent and in Combination With Atezolizumab in Participants With Locally Advanced or Metastatic Tumors	Tumors	Drug: RO7198457; Drug: Atezolizumab	AZ; CA; CO; CT; DC; MA; NV; NY; OK; OR; PA; TN; WA	NCT03289962

NEUROENDOCRINE

Title	Cancer Type	Treatment	Location	NCT Number
Anti-GD2 3F8 Monoclonal Antibody and GM-CSF for High-Risk Neuroblastoma	Neuroblastoma	Biological: Anti-GD2 3F8 Monoclonal Antibody; Drug: GM-CSF (granulocyte-macrophage colony-stimulating factor); Drug: oral isotretinoin	NY	NCT02100930
A Pilot Study of Immunotherapy Including Haploidentical NK Cell Infusion Following CD133+ Positively-Selected Autologous Hematopoietic Stem Cells in Children With High Risk Solid Tumors or Lymphomas	Neuroblastoma; Lymphoma; High-risk Tumor	Biological: CD133+ selected autologous stem cell infusion; Biological: IL-2; Biological: hu14.18K322A; Drug: Busulfan; Drug: Melphalan; Biological: GM-CSF; Drug: Bendamustine; Drug: Etoposide; Drug: Cytarabine; Drug: Carboplatin; Device: Haploidentical natural killer cell infusion; Biological: G-CSF; Drug: Etoposide phosphate; Device: CliniMACS	TN	NCT02130869
Activated T Cells Armed With GD2 Bispecific Antibody in Children and Young Adults With Neuroblastoma and Osteosarcoma	Desmoplastic Small Round Cell Tumor; Disseminated Neuroblastoma; Metastatic Osteosarcoma; Recurrent Neuroblastoma; Recurrent Osteosarcoma	Biological: IL-2; Biological: GD2Bi-aATC; Biological: GM-CSF; Other: laboratory evaluations of immune responses	MI; NY; VA	NCT02173093
Engineered Neuroblastoma Cellular Immunotherapy (ENCIT)-01	Neuroblastoma; Ganglioneuroblastoma	Biological: Patient Derived CD171 specific CAR T cells expressing EGFRt (2nd generation T cells); Biological: Patient Derived CD171 specific CAR T cells expressing EGFRt (3rd generation T cells)	WA	NCT02311621
Immunotherapy of Relapsed Refractory Neuroblastoma With Expanded NK Cells	Neuroblastoma	Drug: Ch14.18; Biological: NK Cells; Drug: Lenalidomide	CA; GA; IL; MA; MI; OH; PA; TX; WA	NCT02573896
A Study of the Effect of Hu3F8/GM-CSF Immunotherapy Plus Isotretinoin in Patients in First Remission of High-Risk Neuroblastoma	Neuroblastoma	Biological: Hu3F8; Drug: GM-CSF; Drug: Isotretinoin	NY	NCT03033303

OVARIAN

Title	Cancer Type	Treatment	Location	NCT Number
Vaccine Therapy in Treating Patients With Metastatic Solid Tumors	Malignant Solid Tumour; Breast Cancer; Malignant Tumor of Colon; GIST; Ovarian Cancer	Biological: HER-2 vaccine; Biological: Extension HER-2 vaccine trial at OBD	OH	NCT01376505
CAR T Cell Receptor Immunotherapy Targeting Mesothelin for Patients With Metastatic Cancer	Cervical Cancer; Pancreatic Cancer; Ovarian Cancer; Mesothelioma; Lung Cancer	Drug: Fludarabine; Biological: Anti-mesothelin CAR; Drug: Cycolphosphamide; Drug: Aldesleukin	MD	NCT01583686
A Phase 1/2 Study of Motolimod (VTX-2337) and MEDI4736 in Subjects With Recurrent, Platinum-Resistant Ovarian Cancer for Whom Pegylated Liposomal Doxorubicin (PLD) is Indicated	Ovarian Cancer	Drug: Durvalumab; Drug: Pegylated Liposomal Doxorubicin	AZ; NY; OH; RI	NCT02431559
PARP-inhibition and CTLA-4 Blockade in BRCA-deficient Ovarian Cancer	Ovarian Cancer; Fallopian Tube Cancer; Peritoneal Neoplasms	Drug: Olaparib; Drug: Tremelimumab	NM	NCT02571725
A Study of Pembrolizumab With Standard Treatment in Patients With Recurrent Platinum-resistant Ovarian Cancer	Ovarian Cancer	Drug: Pembrolizumab; Drug: Gemcitabine; Drug: Cisplatin	CA	NCT02608684
Pilot Study of Durvalumab and Vigil in Advanced Women's Cancers	Breast Cancer; Ovarian Cancer; Fallopian Tube Cancer; Primary Peritoneal Carcinoma; Uterine Cancer; Cervical Cancer; Endometrial Cancer	Biological: Vigil; Drug: Durvalumab	TX	NCT02725489
GL-ONC1 Oncolytic Immunotherapy in Patients With Recurrent Ovarian Cancer	Ovarian Cancer; Peritoneal Carcinomatosis; Fallopian Tube Cancer	Biological: GL-ONC1	FL	NCT02759588
Study of DPX-Survivac Vaccine Therapy and Epacadostat in Patients With Recurrent Ovarian Cancer	Recurrent Epithelial Ovarian Cancer; Recurrent Fallopian Tube Cancer; Recurrent Peritoneal Cancer	Biological: DPX-Survivac; Drug: Cyclophosphamide; Drug: Epacadostat (INCB024360)	CA; NY; OR; PA; TX	NCT02785250
Intraperitoneal Infusion of Autologous Monocytes With Sylatron (Peginterferon Alfa-2b) and Actimmune (Interferon Gamma-1b) in Women With Recurrent or Refractory Ovarian Cancer, Fallopian Tube Cancer or Primary Peritoneal Cancer	Fallopian Tube Cancer; Ovarian Cancer; Primary Peritoneal Cancer	Biological: Autologous Monocytes + ACTIMMUNE + SYLATRON	MD	NCT02948426
hTERT Immunotherapy Alone or in Combination With IL-12 DNA Followed by Electroporation in Adults With Solid Tumors at High Risk of Relapse	Breast Cancer; Lung Cancer; Pancreatic Cancer; Head and Neck Cancer; Ovarian Cancer; ColoRectal Cancer; Gastric Cancer; Esophageal Cancer; HepatoCellular Carcinoma	Biological: INO-1400; Biological: INO-9012	MI; MN; NC; PA	NCT02960594
A Dose Escalation Phase I Study to Assess the Safety and Clinical Activity of Multiple Cancer Indications	Colorectal Cancer (CRC); Ovarian Cancer (Epithelial and Fallopian Tube); Urothelial Carcinoma; Triple-negative Breast Cancer (TNBC); Pancreatic Cancer; Acute Myeloid Leukemia/Myelodysplastic Syndrome; Multiple Myeloma (MM)	Biological: NKR-2 cells	FL; NY; PA	NCT03018405
Trial of Atezolizumab and Vigil for Advanced Gynecological Cancers (A Companion Study to CL-PTL-119)	Advanced Gynecological Cancers; Ovarian Cancer; Cervical Cancer; Uterine Cancer	Biological: Vigil; Drug: Atezolizumab	AL; GA; MI; MT; NH; SC	NCT03073525
The Safety and Antitumor Activity of the Combination of Oregovomab and Hiltonol in Recurrent Advanced Ovarian Cancer	Cancer of Ovary; Neoplasms, Ovarian; Ovarian Cancer Stage IV; Ovarian Cancer Recurrent; Ovarian Cancer Stage III; Ovary Cancer	Biological: Oregovomab; Drug: Poly ICLC	FL; VA	NCT03162562
Durvalumab, Tremelimumab + Radiotherapy in Gynecologic Cancer	Recurrent Gynecological Cancer; Metastatic Cervical Cancer; Metastatic Ovarian Cancer; Metastatic Vaginal Cancer; Metastatic Vulvar Cancer; Metastatic Endometrial Cancer; Recurrent Cervical Carcinoma; Recurrent Ovarian Carcinoma; Recurrent Vaginal Cancer; Recurrent Vulvar Cancer; Recurrent Endometrial Cancer	Drug: Durvalumab; Drug: Tremelimumab; Radiation: Radiation Therapy	MA	NCT03277482
Ribociclib + PDR001 in Breast Cancer and Ovarian Cancer	Metastatic Hormone-Receptor-Positive (HR+) Breast Cancer; HER2-Negative Breast Cancer; Metastatic Epithelial Ovarian Cancer	Drug: Ribociclib; Drug: PDR001; Drug: Fulvestrant	MA	NCT03294694
Ability of a Dendritic Cell Vaccine to Immunize Melanoma or Epithelial Cancer Patients Against Defined Mutated Neoantigens Expressed by the Autologous Cancer	Melanoma; Gastrointestinal Cancer; Breast Cancer; Ovarian Cancer; Pancreatic Cancer	Biological: Peptide loaded dendritic cell vaccine	MD	NCT03300843

PANCREATIC

Title	Cancer Type	Treatment	Location	NCT Number
A Trial of Boost Vaccinations of Pancreatic Tumor Cell Vaccine	Pancreatic Cancer	Biological: PANC 10.05 pcDNA-1/GM-Neo and PANC 6.03 pcDNA-1 neo vaccine	MD	NCT01088789
Immunotherapy Using Tumor Infiltrating Lymphocytes for Patients With Metastatic Cancer	Metastatic Colorectal Cancer; Metastatic Gastric Cancer; Metastatic Pancreatic Cancer; Metastatic Hepatocellular Carcinoma; Metastatic Cholangiocarcinoma	Biological: Young TIL; Drug: Aldesleukin; Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Pembrolizumab	MD	NCT01174121
CAR T Cell Receptor Immunotherapy Targeting Mesothelin for Patients With Metastatic Cancer	Cervical Cancer; Pancreatic Cancer; Ovarian Cancer; Mesothelioma; Lung Cancer	Drug: Fludarabine; Biological: Anti-mesothelin CAR; Drug: Cycolphosphamide; Drug: Aldesleukin	MD	NCT01583686
Combination Chemotherapy With or Without Oregovomab Followed by Stereotactic Body Radiation Therapy and Nelfinavir Mesylate in Treating Patients With Locally Advanced Pancreatic Cancer	Pancreatic Adenocarcinoma; Resectable Pancreatic Carcinoma; Stage I Pancreatic Cancer; Stage IA Pancreatic Cancer; Stage IB Pancreatic Cancer; Stage II Pancreatic Cancer; Stage IIA Pancreatic Cancer; Stage IIB Pancreatic Cancer; Stage III Pancreatic Cancer	Procedure: 4-Dimensional Computed Tomography; Drug: Fluorouracil; Drug: Gemcitabine Hydrochloride; Other: Laboratory Biomarker Analysis; Drug: Leucovorin Calcium; Drug: Nelfinavir Mesylate; Biological: Oregovomab; Radiation: Stereotactic Body Radiation Therapy; Procedure: Therapeutic Conventional Surgery	NE	NCT01959672

PANCREATIC (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
Safety and Immunological Effect of Pembrolizumab in Resectable or Borderline Resectable Pancreatic Cancer	Pancreatic Cancer	Drug: Pembrolizumab; Radiation: Neoadjuvant Chemoradiation	FL; MA; TX; VA	NCT02305186
QUILT-2.001: ALT-803 in Patients With Advanced Pancreatic Cancer in Conjunction With Gemcitabine and Nab-Paclitaxel	Advanced Pancreatic Cancer	Biological: Gemcitabine; Biological: Nab-paclitaxel; Biological: ALT-803	HI	NCT02559674
Study With CY, Pembrolizumab, GVAX, and SBRT in Patients With Locally Advanced Pancreatic Cancer	Pancreatic Cancer	Drug: Cyclophosphamide; Drug: GVAX; Drug: Pembrolizumab; Radiation: SBRT	MD	NCT02648282
A Study of Galunisertib (LY2157299) and Durvalumab (MEDI4736) in Participants With Metastatic Pancreatic Cancer	Metastatic Pancreatic Cancer	Drug: Galunisertib; Drug: Durvalumab	AZ; NY; TN	NCT02734160
hTERT Immunotherapy Alone or in Combination With IL-12 DNA Followed by Electroporation in Adults With Solid Tumors at High Risk of Relapse	Breast Cancer; Lung Cancer; Pancreatic Cancer; Head and Neck Cancer; Ovarian Cancer; ColoRectal Cancer; Gastric Cancer; Esophageal Cancer; HepatoCellular Carcinoma	Biological: INO-1400; Biological: INO-9012	MI; MN; NC; PA	NCT02960594
Epacadostat, Pembrolizumab, and CRS-207, With or Without CY/GVAX Pancreas in Patients With Metastatic Pancreas Cancer	Metastatic Pancreatic Adenocarcinoma	Drug: Epacadostat; Drug: Pembrolizumab; Biological: CRS-207; Drug: CY; Biological: GVAX	MD	NCT03006302
A Dose Escalation Phase I Study to Assess the Safety and Clinical Activity of Multiple Cancer Indications	Colorectal Cancer (CRC); Ovarian Cancer (Epithelial and Fallopian Tube); Urothelial Carcinoma; Triple-negative Breast Cancer (TNBC); Pancreatic Cancer; Acute Myeloid Leukemia/Myelodysplastic Syndrome; Multiple Myeloma (MM)	Biological: NKR-2 cells	FL; NY; PA	NCT03018405
Immunotherapy and Irreversible Electroporation in the Treatment of Advanced Pancreatic Adenocarcinoma	Pancreatic Adenocarcinoma	Drug: Nivolumab; Procedure: Irreversible Electroporation	KY	NCT03080974
Study of Talimogene Laherparepvec in Pancreatic Cancer	Pancreatic Cancer	Drug: talimogene laherparepvec	NY	NCT03086642
Immunotherapy Study of Evofosfamide in Combination With Ipilimumab	Pancreatic Cancer; Melanoma; Squamous Cell Carcinoma of the Head and Neck; Prostate Cancer	Drug: Evofosfamide; Drug: Ipilimumab	TX	NCT03098160
Nivolumab and Ipilimumab and Radiation Therapy in MSS and MSI High Colorectal and Pancreatic Cancer	Microsatellite Stable Colorectal Cancer; Pancreatic Cancer; MSI High Colorectal Cancer	Drug: Nivolumab; Drug: Ipilimumab; Radiation: Radiation Therapy	MA	NCT03104439
QUILT-3.039: NANT Pancreatic Cancer Vaccine: Combination Immunotherapy in Subjects With Pancreatic Cancer Who Have Progressed on or After Standard-of-Care Therapy	Pancreatic Cancer	Drug: Cyclophosphamide; Drug: Oxaliplatin; Drug: Capecitabine; Drug: 5-Fluorouracil; Drug: Leucovorin; Drug: nab-paclitaxel; Biological: bevacizumab; Biological: avelumab; Biological: ALT-803; Biological: aNK for Infusion; Biological: ETBX-011; Biological: GI-4000	CA	NCT03136406
Pilot Study With CY, Pembrolizumab, GVAX, and IMC-CS4 (LY3022855) in Patients With Borderline Resectable Adenocarcinoma of the Pancreas	Pancreatic Cancer	Drug: Cyclophosphamide; Drug: GVAX; Drug: Pembrolizumab; Drug: IMC-CS4	MD	NCT03153410
Administering Peripheral Blood Lymphocytes Transduced With a Murine T-Cell Receptor Recognizing the G12V Variant of Mutated RAS in HLA-A*1101 Patients	Pancreatic Cancer; Gastric Cancer; Gastrointestinal Cancer; Colon Cancer; Rectal Cancer	Drug: Cyclophosphamide; Drug: Fludarabine; Biological: anti-KRAS G12V mTCR; Drug: Aldesleukin	MD	NCT03190941
A Study of Multiple Immunotherapy-Based Treatment Combinations in Participants With Metastatic Pancreatic Ductal Adenocarcinoma (Morpheus-Pancreatic Cancer)	Pancreatic Adenocarcinoma	Drug: Nab-Paclitaxel; Drug: Gemcitabine; Drug: Oxaliplatin; Drug: Leucovorin; Drug: Fluorouracil; Drug: Atezolizumab; Drug: Cobimetinib; Drug: PEGPH20; Drug: BL-8040	CA; CT; MA; NY; OR; PA; TN	NCT03193190
Safety and Efficacy of APX005M With Gemcitabine and Nab-Paclitaxel With or Without Nivolumab in Patients With Previously Untreated Metastatic Pancreatic Adenocarcinoma	Metastatic Pancreatic Adenocarcinoma	Drug: APX005M; Drug: Nivolumab; Drug: Nab-Paclitaxel; Drug: Gemcitabine	PA	NCT03214250
BATs Treatment for Pancreatic Cancer, Phase Ib/II	Locally Advanced Pancreatic Adenocarcinoma; Metastatic Pancreatic Adenocarcinoma	Drug: EGFR BATs after standard of care chemo	VA	NCT03269526
Ability of a Dendritic Cell Vaccine to Immunize Melanoma or Epithelial Cancer Patients Against Defined Mutated Neoantigens Expressed by the Autologous Cancer	Melanoma; Gastrointestinal Cancer; Breast Cancer; Ovarian Cancer; Pancreatic Cancer	Biological: Peptide loaded dendritic cell vaccine	MD	NCT03300843
CAR T Cell Immunotherapy for Pancreatic Cancer	Pancreatic Cancer; Cancer of the Pancreas	Biological: huCART-meso cells	PA	NCT03323944

PENILE

Title	Cancer Type	Treatment	Location	NCT Number
E7 TCR T Cells With or Without PD-1 Blockade for Human Papillomavirus-Associated Cancers	Cervical Cancer; Vaginal Cancer; Anal Cancer; Penile Cancer; Oropharyngeal Cancer	Biological: E7 TCR Transduced PBL cells; Drug: pembrolizumab; Drug: aldesleukin; Drug: fludarabine; Drug: cyclophosphamide	MD	NCT02858310

PERITONEAL

Title	Cancer Type	Treatment	Location	NCT Number
PARP-inhibition and CTLA-4 Blockade in BRCA-deficient Ovarian Cancer	Ovarian Cancer; Fallopian Tube Cancer; Peritoneal Neoplasms	Drug: Olaparib; Drug: Tremelimumab	NM	NCT02571725

PERITONEAL (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
Pilot Study of Durvalumab and Vigil in Advanced Women's Cancers	Breast Cancer; Ovarian Cancer; Fallopian Tube Cancer; Primary Peritoneal Carcinoma; Uterine Cancer; Cervical Cancer; Endometrial Cancer	Biological: Vigil; Drug: Durvalumab	TX	NCT02725489
Study of DPX-Survivac Vaccine Therapy and Epacadostat in Patients With Recurrent Ovarian Cancer	Recurrent Epithelial Ovarian Cancer; Recurrent Fallopian Tube Cancer; Recurrent Peritoneal Cancer	Biological: DPX-Survivac; Drug: Cyclophosphamide; Drug: Epacadostat (INCB024360)	CA; NY; OR; PA; TX	NCT02785250
Intraperitoneal Infusion of Autologous Monocytes With Sylatron (Peginterferon Alfa-2b) and Actimmune (Interferon Gamma-1b) in Women With Recurrent or Refractory Ovarian Cancer, Fallopian Tube Cancer or Primary Peritoneal Cancer	Fallopian Tube Cancer; Ovarian Cancer; Primary Peritoneal Cancer	Biological: Autologous Monocytes + ACTIMMUNE + SYLATRON	MD	NCT02948426

PROSTATE

Title	Cancer Type	Treatment	Location	NCT Number
Adoptive Transfer of Autologous T Cells Targeted to Prostate Specific Membrane Antigen (PSMA) for the Treatment of Castrate Metastatic Prostate Cancer (CMPC)	Prostate Cancer	Biological: engineered autologous T cells; Drug: cyclophosphamide	NY	NCT01140373
Phase 3 Study of ProstAtak® Immunotherapy With Standard Radiation Therapy for Localized Prostate Cancer	Prostate Cancer	Biological: ProstAtak®(AdV-tk) + valacyclovir; Biological: Placebo + valacyclovir	AZ; CO; DC; MA; MD; NM; NY; OH; PA; TX	NCT01436968
Immune Responses in Prostate, Lung, Melanoma and Breast Cancer Patients Following Stereotactic Body Radiotherapy (SBRT), Intensity Modulated Radiotherapy (IMRT) or Brachytherapy	Prostate Cancer; Breast Cancer; Lung Cancer; Melanoma	Radiation: SBRT; Radiation: IMRT; Radiation: Brachytherapy	MN	NCT01777802
A Randomized Phase 2 Trial of Combining Sipuleucel-T With Immediate vs. Delayed CTLA-4 Blockade for Prostate Cancer	Prostate Cancer	Drug: SipT Treatment; Drug: Ipilimumab	CA; TX	NCT01804465
Sipuleucel-T and Stereotactic Ablative Body Radiation (SABR) for Metastatic Castrate-resistant Prostate Cancer (mCRPC)	Metastatic Castrate-resistant Prostate Cancer; mCRPC	Drug: Sipuleucel-T; Radiation: Stereotactic Ablative Body Radiation	TX	NCT01818986
Dendreon Lymph Node Biopsy in Metastatic Castrate-Resistant Prostate Cancer	Prostate Cancer	Drug: Sipuleucel-T; Procedure: Lymph Node Biopsy	NC	NCT02036918
Pilot Study of DRibble Vaccine for Prostate Cancer Patients	Adenocarcinoma of the Prostate	Drug: Cyclophosphamide; Biological: DRibble Vaccine; Biological: HPV Vaccinations; Drug: Imiquimod	OR	NCT02234921
Ph 2 Study of Sipuleucel-T W/ or W/O Radium-223 in Men With Asymptomatic or Minimally Symptomatic Bone-MCRPC	Prostate Cancer	Drug: Radium-223; Biological: Sipuleucel-T	CA; DC; LA; MD; NC	NCT02463799
A Phase 1 Study To Evaluate Escalating Doses Of A Vaccine-Based Immunotherapy Regimen For Prostate Cancer (PrCa VBIR)	Prostatic Neoplasms	Biological: PF-06755992; Biological: PF-06755990; Device: TDS-IM Electroporation Device; Biological: Tremelimumab; Drug: Sunitinib; Biological: PF-06801591	CT; MD; MI; NC; NE; NV; NY; PA; WA	NCT02616185
Prostvac in Patients With Biochemically Recurrent Prostate Cancer	Prostate Cancer	Biological: PROSTVAC -V; Biological: PROSTVAC-F	MD; NY	NCT02649439
Docetaxel and PROSTVAC for Metastatic Castration-Sensitive Prostate Cancer	Prostate Cancer; Prostate Neoplasms; Neoplasms, Prostatic	Biological: PROSTVAC-V; Biological: PROSTVAC-F; Drug: Docetaxel	MD	NCT02649855
PROMOTE: Identifying Predictive Markers of Response for Prostate Cancer	Prostate Cancer	Other: Systemic therapy	CA	NCT02735252
Randomized Controlled Trial of ProstAtak® Immunotherapy During Active Surveillance for Prostate Cancer (ULYSSES)	Prostate Cancer	Biological: aglatimagene besadenovec; Biological: placebo; Drug: valacyclovir	CO; MA; MD; NY; OH; PA; TX	NCT02768363
PROSTVAC in Combination With Nivolumab in Men With Prostate Cancer	Prostate Cancer	Biological: PROSTVAC-V/F; Drug: Nivolumab	MD	NCT02933255
Immunotherapy Study of Evofosfamide in Combination With Ipilimumab	Pancreatic Cancer; Melanoma; Squamous Cell Carcinoma of the Head and Neck; Prostate Cancer	Drug: Evofosfamide; Drug: Ipilimumab	TX	NCT03098160
Reconstitution of a Human Immune System in a Patient Derived Xenograft (PDX) Model of Genitourinary (GU) Cancers	Genito Urinary Cancer; Bladder Cancer; Kidney Cancer; Prostate Cancer	Procedure: Bone marrow biopsy	NC	NCT03134027
Tremelimumab + Durvalumab Chemotherapy Naive CRPC	Castration-resistant Prostate Cancer	Drug: Durvalumab; Drug: Tremelimumab	TX	NCT03204812
Neoadjuvant Hiltonol® (PolyICLC) for Prostate Cancer	Prostate Cancer	Biological: Intratumoral (IT) Poly ICLC 0.5 mg; Biological: Intratumoral (IT) Poly ICLC 1.0 mg; Biological: Intramuscular (IM) Poly ICLC; Procedure: Radical Prostatectomy	NY	NCT03262103
Combination Immunotherapy in Biochemically Recurrent Prostate Cancer	Prostate Cancer	Biological: PROSTVAC-V; Biological: PROSTVAC-F; Drug: MSB0011359C (M7824); Biological: CV301	MD	NCT03315871

RECTAL

Title	Cancer Type	Treatment	Location	NCT Number
Administering Peripheral Blood Lymphocytes Transduced With a Murine T-Cell Receptor Recognizing the G12V Variant of Mutated RAS in HLA-A*1101 Patients	Pancreatic Cancer; Gastric Cancer; Gastrointestinal Cancer; Colon Cancer; Rectal Cancer	Drug: Cyclophosphamide; Drug: Fludarabine; Biological: anti-KRAS G12V mTCR; Drug: Aldesleukin	MD	NCT03190941

RECTAL (CONTINUED)

Title	Cancer Type	Treatment	Location	NCT Number
Talimogene Laherparepvec, Capecitabine, and Chemoradiation Before Surgery in Treating Patients With Locally Advanced or Metastatic Rectal Cancer	Rectal Adenocarcinoma; Stage III Rectal Cancer AJCC v7; Stage IIIA Rectal Cancer AJCC v7; Stage IIIB Rectal Cancer AJCC v7; Stage IIIC Rectal Cancer AJCC v7; Stage IV Rectal Cancer AJCC v7; Stage IVA Rectal Cancer AJCC v7; Stage IVB Rectal Cancer AJCC v7	Drug: Capecitabine; Drug: Fluorouracil; Other: Laboratory Biomarker Analysis; Drug: Oxaliplatin; Radiation: Radiation Therapy; Biological: Talimogene Laherparepvec	TX	NCT03300544

SARCOMA

Title	Cancer Type	Treatment	Location	NCT Number
Her2 Chimeric Antigen Receptor Expressing T Cells in Advanced Sarcoma	Sarcoma	Genetic: Autologous HER2-specific T cells; Drug: Fludarabine; Drug: Cyclophosphamide	TX	NCT00902044
T Cell Receptor Immunotherapy Targeting NY-ESO-1 for Patients With NY-ESO-1 Expressing Cancer	Melanoma; Synovial Sarcoma; Breast Cancer; Non-Small Cell Lung Cancer; Hepatocellular Cancer	Biological: Anti-NY ESO-1 mTCR PBL; Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Aldesleukin	MD	NCT01967823
Phase 2 STIR Trial: Haploidentical Transplant and Donor Natural Killer Cells for Solid Tumors	Ewing Sarcoma; Neuroblastoma; Rhabdomyosarcoma; Osteosarcoma; CNS Tumors	Procedure: Allogeneic HCT; Drug: Donor NK Cell Infusion	WI	NCT02100891
In Situ, Autologous Therapeutic Vaccination Against Solid Cancers With Intratumoral Hiltonol®	Melanoma; Head and Neck Cancer; Sarcoma; Non-Melanoma Skin Cancers	Biological: Hiltonol	GA; MD; MO; NY; PA; SC	NCT02423863
Trial of Intratumoral Injections of TTI-621 in Subjects With Relapsed and Refractory Solid Tumors and Mycosis Fungoides	Solid Tumors; Mycosis Fungoides; Melanoma; Merkel-cell Carcinoma; Squamous Cell Carcinoma; Breast Carcinoma; Human Papillomavirus-Related Malignant Neoplasm; Soft Tissue Sarcoma	Drug: TTI-621	CA; OR; PA; WA	NCT02890368
Neoadjuvant Durvalumab and Tremelimumab Plus Radiation for High Risk Soft-Tissue Sarcoma	Soft Tissue Sarcoma	Combination Product: Combination Radiation, Immunotherapy, Surgery	MD	NCT03116529
Trabectedin, Ipilimumab and Nivolumab as First Line Treatment for Advanced Soft Tissue Sarcoma	Advanced Soft Tissue Sarcoma; Metastatic Soft Tissue Sarcoma	Drug: Trabectedin; Drug: Ipilimumab; Drug: Nivolumab	CA	NCT03138161

STOMACH

Title	Cancer Type	Treatment	Location	NCT Number
Immunotherapy Using Tumor Infiltrating Lymphocytes for Patients With Metastatic Cancer	Metastatic Colorectal Cancer; Metastatic Gastric Cancer; Metastatic Pancreatic Cancer; Metastatic Hepatocellular Carcinoma; Metastatic Cholangiocarcinoma	Biological: Young TIL; Drug: Aldesleukin; Drug: Cyclophosphamide; Drug: Fludarabine; Drug: Pembrolizumab	MD	NCT01174121
Trial of Active Immunotherapy With OBI-833 (Globo H-CRM197) in Advanced/Metastatic Gastric, Lung, Colorectal or Breast Cancer Subjects	Metastatic Gastric Cancer; Metastatic Breast Cancer; Metastatic Colorectal Cancer; Metastatic Lung Cancer	Drug: OBI-833/OBI-821	OH; TX	NCT02310464
Combination Margetuximab and Pembrolizumab for Advanced, Metastatic HER2(+) Gastric or Gastroesophageal Junction Cancer	Gastric Cancer; Stomach Cancer; Esophageal Cancer	Drug: margetuximab in combination with pembrolizumab	CT; DC; IL; MA; MD; MI; MO; NC; PA; TN; WA	NCT02689284
An Investigational Immuno-therapy Study of Nivolumab or Placebo in Patients With Resected Esophageal or Gastroesophageal Junction Cancer	Advanced Cancer	Drug: Nivolumab; Other: Placebo	CA; CO; DC; FL; IL; MA; MD; MO; NC; NJ; NY; OH; OK; OR; PA; TN; TX; WA; WI	NCT02743494
T Cell Immunotherapy Plus Anti-PD1 Antibody in Advanced Solid Malignancies	Gastrointestinal Cancer Metastatic	Drug: Standard Chemotherapy; Drug: Cyclophosphamide; Biological: Adoptive T Cell Infusion; Drug: IL-2; Drug: Pembrolizumab; Behavioral: Phone Calls	TX	NCT02757391
hTERT Immunotherapy Alone or in Combination With IL-12 DNA Followed by Electroporation in Adults With Solid Tumors at High Risk of Relapse	Breast Cancer; Lung Cancer; Pancreatic Cancer; Head and Neck Cancer; Ovarian Cancer; ColoRectal Cancer; Gastric Cancer; Esophageal Cancer; HepatoCellular Carcinoma	Biological: INO-1400; Biological: INO-9012	MI; MN; NC; PA	NCT02960594
Administering Peripheral Blood Lymphocytes Transduced With a Murine T-Cell Receptor Recognizing the G12V Variant of Mutated RAS in HLA-A*1101 Patients	Pancreatic Cancer; Gastric Cancer; Gastrointestinal Cancer; Colon Cancer; Rectal Cancer	Drug: Cyclophosphamide; Drug: Fludarabine; Biological: anti-KRAS G12V mTCR; Drug: Aldesleukin	MD	NCT03190941
A Study of Multiple Immunotherapy-Based Treatment Combinations in Patients With Locally Advanced Unresectable or Metastatic Gastric or Gastroesophageal Junction Cancer (G/GEJ)	Gastric Adenocarcinoma or Gastroesophageal Junction Adenocarcinoma	Drug: 5-Fluorouracil (5-FU); Drug: Leucovorin; Drug: Oxaliplatin; Biological: Atezolizumab; Drug: Cobimetinib; Biological: Ramucirumab; Drug: Paclitaxel; Biological: PEGylated recombinant human hyaluronidase (PEGPH20); Drug: BL-8040; Drug: Linagliptin	AZ; CA; MA; NY; TN; TX	NCT03281369
Ability of a Dendritic Cell Vaccine to Immunize Melanoma or Epithelial Cancer Patients Against Defined Mutated Neoantigens Expressed by the Autologous Cancer	Melanoma; Gastrointestinal Cancer; Breast Cancer; Ovarian Cancer; Pancreatic Cancer	Biological: Peptide loaded dendritic cell vaccine	MD	NCT03300843

UTERINE

Title	Cancer Type	Treatment	Location	NCT Number
MK-3475 Immunotherapy in Endometrial Carcinoma	Endometrial Cancer; Endometrial Carcinoma; Neoplasms, Endometrial	Drug: MK-3475; Procedure: Surgical resection (standard of care); Drug: Paclitaxel (standard of care); Drug: Carboplatin (standard of care); Radiation: Radiation (standard of care); Procedure: Endometrial biopsy; Procedure: Peripheral blood draw	MO	NCT02630823
Pilot Study of Durvalumab and Vigil in Advanced Women's Cancers	Breast Cancer; Ovarian Cancer; Fallopian Tube Cancer; Primary Peritoneal Carcinoma; Uterine Cancer; Cervical Cancer; Endometrial Cancer	Biological: Vigil; Drug: Durvalumab	TX	NCT02725489
Trial of Atezolizumab and Vigil for Advanced Gynecological Cancers (A Companion Study to CL-PTL-119)	Advanced Gynecological Cancers; Ovarian Cancer; Cervical Cancer; Uterine Cancer	Biological: Vigil; Drug: Atezolizumab	AL; GA; MI; MT; NH; SC	NCT03073525

VAGINAL

Title	Cancer Type	Treatment	Location	NCT Number
E7 TCR T Cells With or Without PD-1 Blockade for Human Papillomavirus-Associated Cancers	Cervical Cancer; Vaginal Cancer; Anal Cancer; Penile Cancer; Oropharyngeal Cancer	Biological: E7 TCR Transduced PBL cells; Drug: pembrolizumab; Drug: aldesleukin; Drug: fludarabine; Drug: cyclophosphamide	MD	NCT02858310
Durvalumab, Tremelimumab + Radiotherapy in Gynecologic Cancer	Recurrent Gynecological Cancer; Metastatic Cervical Cancer; Metastatic Ovarian Cancer; Metastatic Vaginal Cancer; Metastatic Vulvar Cancer; Metastatic Endometrial Cancer; Recurrent Cervical Carcinoma; Recurrent Ovarian Carcinoma; Recurrent Vaginal Cancer; Recurrent Vulvar Cancer; Recurrent Endometrial Cancer	Drug: Durvalumab; Drug: Tremelimumab; Radiation: Radiation Therapy	MA	NCT03277482

This patient education guide was produced with support from: