

Behind the Breakthrough

1971

Mary Lasker - Research Advocate

President Nixon signs into law the National Cancer Act "to amend the Public Health Service Act so as to strengthen the National Cancer Institute in order to more effectively carry out the national effort against cancer." Mary Lasker was the principle driver of the National Cancer Act being signed into law. Nearly 20 years earlier, she transformed the American Cancer Society to get more funding for research. Her devotion to medical research helped lay a strong foundation for future advancements in the field.



1976

Herb Boyer, Bob Swanson - Venture Capitalist

Venture capitalist Bob Swanson teams up with Herb Boyer, a biochemist and expert on recombinant DNA, to build a business off of genetic engineering technology. The founding of their company, Genentech, marked the birth of the biotechnology industry.



1996

Napoleone Ferrara - Scientist

Building on the work of previous researchers like Judah Folkman, Napoleone Ferrara and his team demonstrate the importance of vascular endothelial growth factor (VEGF) in signaling the growth of new blood vessels (angiogenesis), a process that's essential for tumor growth. Their research ultimately led to the development of the first anti-angiogenic medicine.

2000

Katie Couric - Advocate

Award-winning journalist, TV personality, and philanthropist Katie Couric launches a national colon cancer awareness program. Couric's awareness-building efforts led to a statistically significant increase in colonoscopies, confirming that a celebrity spokesperson can have a "substantial impact" on public participation in awareness programs. This "Katie Couric Effect" was studied and published in a peer-reviewed journal. Later, in 2008, Katie Couric co-founded Stand Up To Cancer and her advocacy efforts continue to this day.



2006

Jack Whelan - Patient

After discussing his symptoms with his doctor, Jack is diagnosed with a rare type of non-Hodgkin's lymphoma, a blood cancer. After reviewing treatment options, Jack makes the decision to explore participating in a clinical trial. Over the past nine years, Jack has participated in seven clinical trials to treat his disease, and encourages other people with cancer to take an active role in exploring treatment options, including clinical trials.

2010

United States Preventative Services Task Force

Initial results of the Lung Cancer Screening Trial show that screening with low-dose computerized tomography (CT) reduced lung cancer deaths by about 20% in a large group of current and former heavy smokers. The United States Preventive Services Task Force recommended lung cancer screening for certain people with a history of heavy smoking to improve chances for curative treatment approaches to lung cancer.

2011

Richard Pazdur

Dr. Richard Pazdur, who leads the Office of Hematology and Oncology Products at the FDA, and his team move at lightning speed to approve the first cancer immunotherapy—a new class of medicines that retrains the body's own immune system to fight cancer.



2013

Dan Chen, Ira Mellman - Scientists

The publication of the Cancer-Immunity Cycle offered an intellectual framework that research a widely accepted basis for cancer immunotherapy research around the world. You can read more about their eureka moment [here](#).

2014

The Cancer Genome Atlas (TCGA) - Research Consortium

Researchers from TCGA project, a joint effort by NCI and the National Human Genome Research Institute to analyze the DNA and other molecular changes in more than 30 types of human cancer, find that gastric (stomach) cancer is actually four different diseases, not just one, based on differing tumor characteristics. This finding from TCGA and other related projects may potentially lead to a new classification system for cancer and is the result of advancements in genome sequencing technology.

1976

Dominique Stehelin, Harold Varmus, J. Michael Bishop, Peter Vogt - Scientists

Drs. Stehelin, Varmus, Bishop and Vogt discover that the DNA of normal chicken cells contains a gene related to the oncogene (cancer-causing gene) of avian sarcoma virus, which causes cancer in chickens. This finding eventually leads to the discovery of human oncogenes, laying the scientific basis for personalized medicine.

1985

Axel Ullrich, Art Levinson - Scientists

A team of Genentech scientists isolate or "clone" the human oncogene HER2 (also called neu or erbB2). Two years later, Dr. Dennis Slamon at UCLA and a team at Genentech simultaneously show excessive production of the protein encoded by this gene, which occurs in about a quarter of breast cancers (known as HER2-positive breast cancers), is associated with more aggressive disease and a poor prognosis. In 1998, an antibody against HER2, would become the first personalized medicine approved by the U.S. Food and Drug Administration (FDA) for certain types of breast cancer.

1990

Human Genome Project - Research Collaboration

Led by James Watson and Francis Collins, this massive international scientific research project aims at mapping the entire genetic sequence that makes up human DNA. The project, which was declared complete in 2003, has vastly improved our understanding of cancer and mutations linked to different forms of the disease. It remains the largest collaborative biological project in the history of the world.

2000

Gordon Freeman, Tasuku Honjo - Scientists

Gordon Freeman, Tasuku Honjo, and their colleagues discover that cancer cells often produce a protein called PD-L1 and that this signal flips a switch on immune cells, turning off the immune cell's attack on the cancer. This was one of the first papers showing that the PD-1 and PD-L1 proteins are used by cancer as a sort of "cellular camouflage," tricking the immune system into seeing it as a normal cell. Today there are approved medicines that target the PD-1 and PD-L1 pathways.

2001

Brian Druker - Doctor

FDA approves the first oral personalized medicine for cancer, which targets a unique protein produced by the Philadelphia chromosome, and was approved for chronic myelogenous leukemia (CML). Later, it is also approved for treatment of gastrointestinal stromal tumors (GIST) that carry the same genetic mutation. Importantly, Dr. Druker's work contributes to the fact that although some cancers may arise in different parts of the body, they may have the same underlying cancer-causing genes. Druker, along with biochemist Nicholas Lydon and other colleagues were awarded the Lasker-DeBakey Clinical Medical Research Award in 2009 for "converting a fatal cancer into a manageable condition."

2006

Concerned Parents

The FDA approves the first vaccine against human papilloma virus (HPV), which protects against infection by the two types of HPV that cause approximately 70% of all cases of cervical cancer. This landmark preventive cancer vaccine would not be available if not for the courage of parents and children who participated in the clinical trials.



2008

Stand Up To Cancer

Stand Up To Cancer raises funds to accelerate cancer research that can be translated into new therapies. Since its inception, over \$370 million has been pledged, supporting collaborative research by more than a thousand scientists and funding clinical trials involving more than 8,000 cancer patients.

2012

Ellen Sigal - Patient Advocate

When Ellen Sigal's sister died of breast cancer, she took action. Ellen founded Friends of Cancer Research (*Friends*), was a Presidential appointee to the National Cancer Institute's National Cancer Advisory Board, and served a 6-year term on the Board of Governors of the Patient Centered Outcomes Research Institute. Currently, she is Acting Chair of the board of directors of the Reagan-Udall Foundation and was named to Vice President Biden's Cancer Moonshot Blue Ribbon Panel, in addition to other leadership positions she holds within a broad range of cancer advocacy, public policy organizations, and academic health centers. *Friends* proposed the idea for the breakthrough therapy designation in 2011 and within 13 months the designation was signed into law. The "Advancing Breakthrough Therapies for Patients Act," in part, resulted in a change to FDA's legal authority that allowed them to grant Breakthrough Therapy Designation to investigational medicines that show early promise for treating a serious or life-threatening disease.

2013

Bob Carlson

Two years earlier in 2011, Bob would have told you that his health was good—up until that November, when he awoke with pain radiating downward from his neck. Bob was diagnosed with Stage IV lung cancer and enrolled in a clinical trial for an investigational immunotherapy. Bob understands that there are no guarantees, but for now he enjoys bird watching and travelling with his wife Julia. You can read more about Bob's story [here](#).

2016

American Association of Cancer Research (AACR)

In response to Vice President Biden's quest for "a moon shot in this country to cure cancer," the AACR convened a distinguished panel of cancer researchers and physician-scientists who met with the vice president's office to help realize his goal of making "an absolute national commitment to end cancer as we know it today." The fifteen AACR members, who are among the most prestigious cancer researchers in the world, highlighted the considerable progress in cancer research that has led to tremendous potential in areas such as precision medicine and immunotherapy.