Cancer and Immunology Researchers Win Lasker Prize

Prestigious prize goes to researchers who identified B cells and T cells and others who invented the HER2 targeted cancer therapy Herceptin.

September 14, 2019 By Liz Highleyman

Five of this year's Lasker Award winners, announced this week, made pioneering discoveries in fields of cancer and immunology, setting the stage for cancer immunotherapy and several avenues of HIV cure research.

The Lasker Awards, given since 1945, recognize "fundamental biological discoveries and clinical advances that improve human health, and draw attention to the important of public support for science." Mary Lasker, a champion of medical research, was a leading proponent of the National Cancer Act, signed by President Richard Nixon in 1971. This year's awards will be presented later this month in New York City.

B Cells and T Cells

The 2019 Albert Lasker Basic Medical Research Award honors Max D. Cooper, MD, of Emory University School of Medicine, and Jacques Miller, MD, of the Walter and Eliza Hall Institute of Medical Research at the University of Melbourne. In the late 1950s and 1960s, Cooper and Miller identified and characterized the function of B cells and T cells, two types of lymphocytes that play key roles in the immune system.

Max D. Cooper, MD, and Jacques Miller, MDCourtesy Albert and Mary Lasker Foundation

B cells give rise to antibodies, which protect against bacteria, viruses and other invaders. CD4 helper T cells coordinate immune responses, while CD8 killer or cytotoxic T cells attack virus-infected cells and cancer cells. CD4 T cells are the primary target of HIV. Blood cancers, including leukemia, lymphoma and multiple myeloma, result when B cells or, more rarely, T cells grow out of control.

Miller conducted research in mice showing that immune function relies on cells produced in the thymus, a gland in the upper chest, thus the name T cells. Cooper, a pediatrician interested in immune deficiency diseases in children, showed that antibody-producing cells arise in an organ called the bursa of Fabricus in chickens. Removing the thymus or the bursa of Fabricus knocked out different components of immune response. Cooper and others established that in mammals—which have no organ equivalent to the bursa of Fabricus—B cells originate in the fetal liver and later in the bone marrow. Miller's team further showed that B cells require direction from T cells to produce antibodies.

"This pioneering work has fueled a tremendous number of advances in basic and medical science, several of which have received previous recognition by Lasker Awards and Nobel Prizes, including those associated with monoclonal antibodies, generation of antibody diversity, MHC restriction for immune defense, antigen processing by dendritic cells, and checkpoint inhibition therapy for cancer," the Lasker Foundation wrote. "By delineating the adaptive immune system's two major branches, each of which performs distinct functions, Cooper and Miller opened a new era of cellular immunology. Virtually all fundamental discoveries in the field over the last 50 years can be traced to their pioneering work."

Writing in The New England Journal of Medicine, Ronald Germain, MD, PhD, wondered why it took so long for this fundamental work to be recognized, but suggested, "Perhaps as with some wines, aging has its benefits, and we can now all recognize how the seeds planted by these two scientists

produced a vintage half a century ago that has matured into the remarkably productive, powerful field of immunology that we savor today."

Herceptin

The 2019 Lasker-DeBakey Clinical Medical Research Award honors H. Michael Shepard, PhD, Dennis J. Slamon, MD, PhD, and Axel Ullrich, PhD, the inventors of Herceptin (trastuzumab), the first monoclonal antibody that targets a cancer-causing protein.

H. Michael Shepard, PhD, Dennis J. Slamon, MD, PhD, and Axel Ullrich, PhDCourtesy Albert and Mary Lasker Foundation

Shepard was a Damon Runyon Cancer Research Foundation Fellow at Indiana University. He and Ullrich did their work on Herceptin while at Genentech. Shepard is now at BetterOutcomes4Cancer and Ullrich is at the Max Planck Institute of Biochemistry in Martinsried, Germany. Slamon conducted his research at the University of California, Los Angeles, where he is now director of the Revlon/UCLA Women's Cancer Research Program at Jonsson Comprehensive Cancer Center.

Herceptin blocks a protein known as HER2 (human epidermal growth factor receptor 2) that plays a role in cancer cell growth. Around 20% of breast cancers are HER2-positive. HER2 also occurs in a smaller proportion of stomach, bladder, colorectal, ovarian, cervical and testicular cancers.

Ullrich's team at Genentech, as well as two other groups at the National Cancer Institute and the University of Tokyo, identified HER2. He and Shepard showed that HER2 not only spurs cancer cell growth, but also helps cancer evade the immune system. Ullrich and Slamon showed that HER2 was common in surgically removed breast tumor tissue samples, and that women whose cancer carries two copies of the HER2 gene had more rapid relapse and shorter survival.

Together, this work led to the development of a humanized monoclonal antibody that binds to and blocks the HER2 receptor on cancer cells. The Food and Drug Administration approved Herceptin in 1998. Clinical trials have shown that the drug both improves survival in women with advanced breast cancer and prevents cancer recurrence after surgery for early breast cancer. More than 2.3 million people have been treated with Herceptin since its approval, according to the Lasker announcement.

"The impact of Herceptin's development reaches beyond breast cancer by establishing that monoclonal antibodies can indeed combat solid tumors. Furthermore, the innovation offers a new

model for personalized medicine by deploying a diagnostic test that identifies the most appropriate patients to treat with a particular intervention," the Lasker Foundation wrote. "By uncovering and exploiting the molecular pathology of a devastating disease, Shepard, Slamon, and Ullrich conceived and executed a new blueprint for drug discovery that has already bestowed tens of thousands of women with time and quality of life."

Click here to read more about the 2019 Lasker Awards.

Click here to learn more about cancer mmunotherapy.

Click here to learn more about HIV cure research.

© 2026 Smart + Strong All Rights Reserved.

http://beta.docker.poz.com/article/cancer-immunology-researchers-win-lasker-prize