

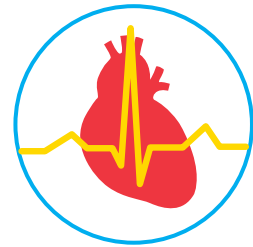
OUR RESEARCH FOCUS



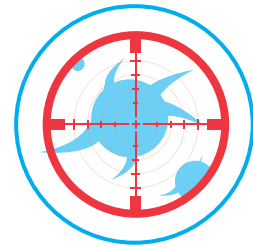
CANCER IMMUNOTHERAPY



AUTOIMMUNE TREATMENT



ARRHYTHMIA CORRECTION



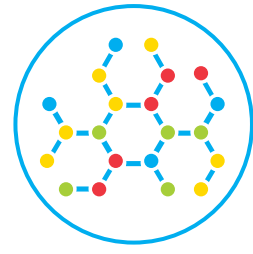
CANCER NANOTHERAPY



MODIFIER GENES



EPIGENOMICS



METABOLOMICS



GENOMIC BIOMARKERS

At LIMR, research is guided by our founding mission to advance science that improves human health. A major theme of our work is to identify broad-acting modifier genes that determine disease severity, using unique models of human disease to validate our inventions before clinical testing. In our clinical research, we focus on new devices and treatments that can improve patient outcomes.

Following are a few examples of current or recent research activity at LIMR:

- Phase II clinical trial of a novel immunochemotherapy to treat advanced breast cancer, using an IDO inhibitor discovered at LIMR
- Preclinical development and Phase I clinical trial of nanotherapy to treat advanced ovarian cancer
- Clinical development/testing of a blood test to predict prognosis of triple-negative breast cancer
- Clinical development/testing of a blood test to predict acute nausea due to chemotherapy
- Investigation of human antibodies cloned from patients who survived aggressive cancers
- Clinical testing of new drugs and devices to limit cardiac arrhythmia, arteriosclerosis, and heart failure
- Preclinical study of modifier genes that drive plaque formation and cardiac hypertrophy
- Clinical development of a test to detect joint infection during orthopaedic surgery
- Preclinical development/testing of an “anti-immune checkpoint” drug to broadly limit autoimmune disease
- Investigation of genetic factors involved in joint-specific autoimmunity in rheumatoid arthritis

LIMR PROGRAM LEADERSHIP

Cancer Research

George C. Prendergast, PhD

President and CEO

- Havens Chair in Biomedical Research
- Editor-in-Chief, *Cancer Research*

Paul B. Gilman, MD

Director, Center for Clinical Cancer Research

- Chief, Hematology and Medical Oncology, Main Line Health

Cardiovascular Research

Charles Antzelevitch, PhD

Executive Director of Cardiovascular Research

- Director of Research, Lankenau Heart Institute, Main Line Health
- Associate Editor, *Heart Rhythm*

Peter R. Kowey, MD

Director, Center for Clinical Cardiology

- William Wikoff Smith Chair in Cardiovascular Research

Lankenau Institute for Medical Research (LIMR), part of Main Line Health, is a nonprofit biomedical research center located on the campus of Lankenau Medical Center. Launched in 1927, LIMR specializes in basic, preclinical, clinical, and translational research, with a major focus on cancer, cardiovascular and other metabolic disease, and autoimmunity. An important goal of research at LIMR is to move rapidly from scientific discovery to exploration of methods to improve disease detection, diagnosis, treatment, and prevention. LIMR also oversees clinical trials offered through Main Line Health.

Learn more at limr.org



Main Line Health®



Main Line Health®

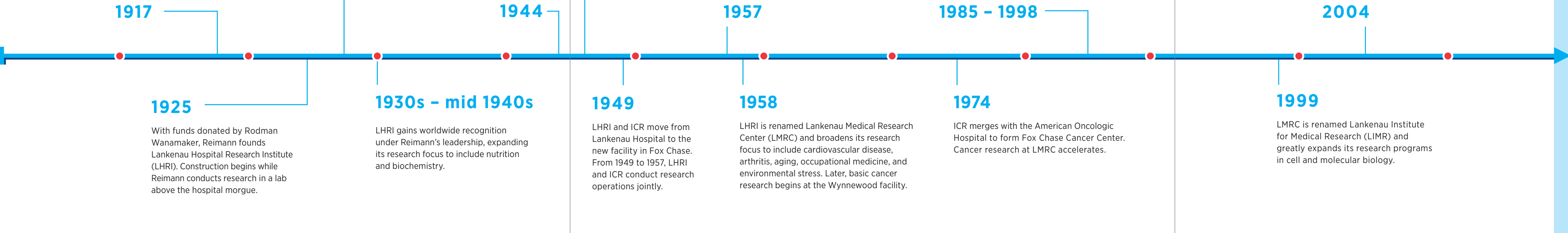
LANKENAU INSTITUTE FOR MEDICAL RESEARCH

product development polyamines basic arrhythmia publication research translational immunotherapy cancer research drug and device prognosis chemoprevention discovery population health inflammation cancer nanotherapy diabetes education research cardiovascular human antibodies as drugs disease scientific patient quality of life discovery preclinical proof of concept disease modifier infectious disease clinical pathways regenerative research biomedical medicine invention serum triglycerides

HISTORY AT A GLANCE



Pioneering cancer researcher Stanley Reimann joins Lankenau Hospital in Philadelphia as chief pathologist on condition that a biomedical research program is created at the hospital.



1937

The National Cancer Institute is created and identifies LHRI and Memorial Hospital (later known as Memorial Sloan Kettering Cancer Center) as the most significant cancer research labs in the U.S. at the time.

1943

Jack Schultz, one of the few geneticists working in the field of cancer research at the time, joins LHRI. With clinical specimens readily available from Lankenau Hospital, Reimann encourages Schultz to study human chromosomes.

1952

Sidney Weinhouse, head of metabolic chemistry at LHRI and ICR, receives the first grant ever awarded by the National Science Foundation (\$10,300). LHRI/ICR's Robert Briggs and Thomas King report the first successful cell nucleus transplantation. Their methods later enable the cloning of the sheep "Dolly" and are used by others in Nobel Prize-winning work.

1960

ICR's David Hungerford (a student of Schultz) and Penn's Peter Nowell codiscover the Philadelphia chromosome, the first genetic marker of cancer, launching the modern era of molecular genetics in cancer research.

1962

ICR's Beatrice Mintz creates the first mammal composed of genetically different cell populations in all tissues ("mosaic animal"). Her research methods enable later development of the first transgenic species, now widely used in research.

1967

ICR's cancer prevention pioneer Baruch Blumberg discovers the hepatitis B virus, shows it can cause liver cancer, and develops a blood test to detect the virus and a vaccine to fight it. He later receives the Nobel Prize for his work.

1980s

LMRC's James Mullin discovers how tumor-promoting substances break down organ tissue barriers, contributing to a growing understanding of the crucial role of the tumor microenvironment in cancer.

1990s

LMRC's Susan Gilmour and Thomas O'Brien discover a molecular explanation for solid tumors' addiction to polyamines, a key nutrient. Their work contributes to development of the first signal transduction inhibitor for cancer—a drug that blocks polyamine synthesis.

2000s

LIMR's George Prendergast and Alexander Muller discover how tumors hijack the IDO pathway to avoid immune attack. The researchers create the first IDO inhibitors that trigger anti-tumor host immunity.

2010s

LIMR's Laura Mandik-Nayak advances LIMR's pioneering studies of the IDO pathway to discover new therapeutic principles for treating autoimmune disease as a class.

2014

Ellen Heber-Katz, immunologist and leader in the field of regenerative biology, joins LIMR to advance her pursuit of tissue regeneration approaches that do not require stem cells.

2015

World-renowned cardiac electrophysiology researcher Charles Antzelevitch joins LIMR to continue investigating causes and mechanisms of arrhythmias and sudden cardiac arrest.

LIMR BY THE NUMBERS*



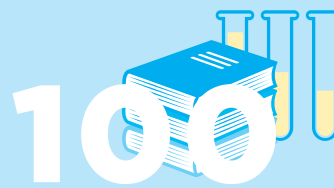
LIMR FACULTY INVENTIONS IN CLINICAL USE
(5 DRUGS, 4 TESTS)



INCUBATED BIOTECH COMPANIES



US PATENTS ISSUED OR PENDING



100 TRAINEES
(GRADUATE, PHD, POSTDOC, MD)



\$110 MILLION IN FEDERAL RESEARCH GRANTS
(TOTAL COSTS)

*TOTALS SHOWN ARE FROM 1999 TO PRESENT