OUR MISSION is to develop and translate innovations in biomedical sciences to improve clinical outcomes for patients with cancer, infectious disease, and other life-threatening, disabling and chronic conditions.

OUR VISION is to transform today’s ideas into tomorrow’s new health care delivery, taking medicine to the next level and, in turn establish Hackensack Meridian Health as a national leader for medical innovation.

Here at the Center for Discovery and Innovation, it’s all in the name. Founded in 2019, the Hackensack Meridian Health team has convened a world-class group of researchers tackling some of the largest, and fastest-growing, health problems in the world by discovering and innovating novel solutions, every day.

More than 100 professional researchers and physician-scientists at the CDI have set their sights on cancer, infectious diseases, autoimmune, and other acute and chronic diseases. Clinical need drives the scientific insights, and their application, for these researchers. They are exploiting a new wave of scientific advances involving genetics, cell engineering of the human immune system, and imaging to better diagnose, treat and prevent disease through personalized medicine approaches.

Finding solutions for patients who fail current therapies is a high priority for the CDI. We are studying the genesis of cancers like multiple myeloma and lymphoma at their fundamental biological levels, and addressing why current treatments sometimes fail. We are seeking to overcome the global crisis of multidrug-resistant and healthcare-associated infections (HAIs) as well as other emerging health threats like COVID-19. A cornerstone of our solution is a $33 million National Institutes of Health-sponsored Center of Excellence in Translational Research (CETR) committed to developing next-generation therapeutics.

While we are conducting this advanced work, we strive to remain relevant, relatable, and translatable to the public. We want patients, their families, their friends – as well as the future patients – to know they have the vanguard of science working for them. Key to our community outreach is the access to the large network of hospitals and other resources provided by Hackensack Meridian Health. Notable among these: our next-door neighbor, the Hackensack Meridian School of Medicine at Seton Hall University, just across the skybridge over Ideation Way. We are both on the former site of the Hoffmann-La Roche Institute of Molecular Biology, which was a leading global center for innovative medical research from the 1960s through the 1990s.

Here on the Nutley-Clifton border, a new hub of science has risen from what Roche left behind – and it continues to grow.

History is again being written, right here in New Jersey, at the HMH-CDI. Join us.

Yours,

David S. Perlin, Ph.D.
Chief Scientific Officer and Senior Vice President
Hackensack Meridian Health Center for Discovery and Innovation
Center for Discovery and Innovation: A New Age for Health Innovation

The Hackensack Meridian Health Center for Discovery and Innovation (CDI) is an academic-based entrepreneurial center with a mission to develop and translate innovations arising from a new renaissance in biomedical sciences to improve clinical outcomes for cancer patients and others with life threatening, disabling and chronic diseases. Our vision is to transform today’s insights into tomorrow’s new health care solutions.

The diagnosis, prevention and treatment of cancer, as well as other life-threatening and disabling diseases, has been catapulted into a new age spurred by major research advancements in genetics, immunology, cell biology and bioengineering. This has led to transformative, game-changing therapies including the use of stem cells and the engineering of components within the human immune system to overcome various cancers. New developments in the profiling of genes and genomes allows us to personalize medicine to improve therapies and outcomes and help predict new diseases. Finally, tissues and organs damaged because of disease or traumatic injury have the potential to be restored through advances in regenerative medicine.

There is a renaissance occurring in science that impacts therapy and diagnostics and the CDI seeks to be at the forefront. We can now effectively and efficiently manipulate the human immune system to cure diseases that were once untreatable.

The Institutes at CDI

The Institute for Cancer and Infectious Diseases (ICID), led by Dr. David Perlin and Dr. Benjamin Tycko, is dedicated to understanding fundamental biological insights of cancer cells and opportunistic pathogens (bacterial, viral and fungal) causing infection in immunocompromised patients, and to applying these insights to overcome these diseases through innovative strategies for detection, prevention, and therapeutic intervention.

The Institute for Multiple Myeloma and Lymphoma (iMML), headed by Dr. David Siegel, is dedicated to expediting the development of breakthrough ideas relating to the treatment of multiple myeloma, lymphoma and other related cancers to their full expression in preclinical studies, clinical trials and approved interventions, ultimately offering life-saving care for patients.

The Institute for Restorative Health (iRH), headed by Interim Clinical Director Dr. Michael Kelly, will offer novel solutions in regenerative medicine to heal damaged tissues and organs, offering new therapies for chronic diseases like type 1 diabetes and provide hope to restore health for patients with conditions that today cannot be treated.

CDI is focusing on solving unmet medical needs in cancer, infectious and chronic diseases, including:

- Making Genomics a key factor in disease management
- Overcoming barriers resulting in therapeutic failures
- Improving existing therapies and pioneering new solutions
- Exploiting the immune system to self-heal
- Developing more effective ways to diagnose and prevent disease
- Eliminating Healthcare-Associated Infections
- Unleashing stem cell technology to restore health
Extraordinary Leadership

Clinical Leadership

David S. Siegel, M.D., Ph.D.
Founding Director of the Institute for Multiple Myeloma, Hackensack Meridian Health Center for Discovery and Innovation; Chief of the Multiple Myeloma Division, John Theurer Cancer Center; Professor of Medicine, Georgetown University Medical Center and Rutgers University, New Jersey Medical School

André Goy, M.D., M.S.
Chair and Director, Chief of Lymphoma and Director of Clinical and Translational Cancer Research, John Theurer Cancer Center; Lydia Plumb Chair of Lymphoma, Hackensack Meridian School of Medicine at Seton Hall; Professor of Medicine, Georgetown University Medical Center

World-Class Faculty

This academic-based entrepreneurial center is comprised of accomplished faculty members who have been recruited from leading academic centers including Weill Cornell Medicine, Columbia University, Albert Einstein College of Medicine, Boston University, Rutgers University, Memorial Sloan Kettering Cancer Center and the National Institutes of Health. Areas of expertise include genomics, epigenetics, drug resistance, stem cell biology, drug discovery, diagnostics and biomarker development, and pharmacology. These areas confront critical unmet needs in targeting a variety of cancers including multiple myeloma, lymphoma, breast cancer, brain tumors, and other deadly cancers, and address crucial medical problems in diabetes, sepsis, and opportunistic bacterial, fungal and viral infections. In total, the inaugural faculty have published more than 1,500 peer-reviewed papers in leading journals such as Science and Nature, New England Journal of Medicine, mBio and Lancet. In addition, they bring more than 90 grants and contracts, 20 NIH and other government grants to the CDI, as well as numerous contracts with foundations, Pharma and biotech companies with research commitments exceeding $80 million.

Sol J. Barer, Ph.D.
Chairman of the Board
Chair of the Board of Directors,
Teva Pharmaceuticals; Managing Partner, SJB Barer Consulting

David S. Perlin, Ph.D.
Chief Scientific Officer and Senior Vice President

Jason Butler, Ph.D.
Mechanisms by which supportive niche cells promote organ regeneration, in the hope of translating these therapeutic modalities to repair injured organs.

Véronique Dartois, Ph.D.
Pharmacology of hard-to-cure infections by high-threat pathogens.

Barry Kreiswirth, Ph.D.
Molecular genetics of drug resistant Gram negative and Gram positive pathogens; overcoming healthcare associated infections.

Thomas Dick, Ph.D.
Discovery of new medicines for treatment of TB and lung disease caused by Non-Tuberculous Mycobacteria.

Olivier Loudig, Ph.D.
Biomarker (miRNA) discovery in breast cancer, and research projects on biomarker discovery in lung, prostate, and pancreatic cancers.

Rena Feinman, Ph.D.
Influence of the gut microbiome on antitumor immunosurveillance in patients with multiple myeloma (MM).

Jyothi Nagayothi, Ph.D.
Targeting immune/metabolic mechanisms of adipocytes/adipomes to identify biomarkers in the pathogenesis of metabolic syndromes, cancer, and cardiopulmonary diseases and to discover drug targets.

Derek Hanson, M.D.
Treatments for rare brain tumors, specifically embryonal tumor with multilayered rosettes (ETMR).

Olivier Loudig, Ph.D.
Diagnosing and overcoming drug-resistant fungal and bacterial infections in cancer, transplant and other high-risk patients.

Byungwoo Ryu, Ph.D.
Repurposing the epigenome of cancer cells by chemically and/or genetically targeting epigenetic modifiers.

Robert Korngold, Ph.D.
T-cell immunobiology related to allogeneic hematopoietic cell transplantation (HCT).

Benjamin Tycko, M.D., Ph.D.
Genetics and epigenetics in human development and disease.
A Unique Biomedical Research and Life Sciences Hub

CDI is co-located on the Interprofessional Health Sciences Campus that includes the Hackensack Meridian School of Medicine at Seton Hall University and the Seton Hall College of Nursing and School of Health and Medical Sciences. CDI forms the core translational research component of the National Cancer Institute’s (NCI)-designated Comprehensive Cancer Center Consortium with George Lombardi Cancer Center. The 116-acre campus is located on the former site of Hoffman La Roche in Clifton and Nutley, N.J., and the CDI resides at the former home of the Roche Institute of Molecular Biology, “The Birthplace of Interferon.” The CDI continues and extends this legacy as a life sciences hub devoted to science innovation, medical education, and biotechnology development.

State-of-the-Art Facilities and Resources

The CDI’s core facilities include:

- **State-of-the-art microscopy** and other imaging equipment.
- A modern **Flow Cytometry Core Facility** that includes high parameter fluorescent activated cell sorting (FACS) and flow cytometry instruments and services.
- **Mass spectrometry facilities** equipped with state-of-the-art instrumentation providing cutting-edge technologies and expertise to researchers within CDI and the local scientific community.
- **Research Animal Facility (RAF)** a six-story, 39,000 GSF building, that was customized to meet the unique needs of scientists and researchers in the fields of genetics, infectious diseases, oncologic and regenerative medicine.
- **Biosafety Level 3 (BSL-3) containment laboratories**, including a 3,000 GSF ABSL-3 facility, to safely study infectious pathogens.
- **Scenic skybridge** linking research facilities and School of Medicine, enabling scientists and research staff to easily interact.
- **A high-tech auditorium, board room and 4 video conferencing centers** serve as venues for both internal and external speakers to present their research to CDI scientists, faculty and medical students.
- **An additional 60,000 GSF of lab space** is available for expansion of the research enterprise.

World-Class Faculty (continued)

Timothy Vogel, M.D.
Treatments for rare brain tumors, specifically embryonal tumor with multilayered rosettes (ETMR).

Hai-Hui Xue, M.D., Ph.D.
Thymocyte development and T lymphocyte differentiation in response to infections and vaccination.

Johannes Zakrzewski, M.D.
Development of innovative therapies for the treatment of myeloma, lymphoma, and other cancers, as well as T-cell deficiency.

Yong Zhao, M.D., Ph.D.
Stem Cell Educator therapy for the treatment of diabetes and other autoimmune diseases in humans.

Jenny Zilberberg, Ph.D.
Technologies to reproduce the bone/bone marrow microenvironment of multiple myeloma (MM) as well as other malignancies.

Research Faculty

Claire Carter, Ph.D. – Mass spectrometry imaging; elucidating the microenvironments of cancer and infectious disease.

Liang Chen, Ph.D. - Molecular epidemiology of antimicrobial resistance and infectious disease.

Catherine Do, Ph.D. – Genetic-epigenetic interactions, such as allele-specific methylation, and how they play a role in the pathogenesis and susceptibility to common human diseases, including cancer, inflammatory disorders, and neurological disorders.

Martin Gengenbacher, Ph.D. - Immunopathology of bacterial pathogens.

Natalia Kurepina, Ph.D. - Molecular epidemiology of mycobacteria including Mycobacteria tuberculosis. Virulence factors and drug targets.

Claudia Manca, Ph.D. - Antimicrobial resistance and infectious disease.

Michael Poulos, Ph.D. - Examining the role of blood vessels in tissue regeneration.

Jansy Sarathy, Ph.D. - The development of relevant in vitro assays for tuberculosis drug discovery.

Erika Shor, Ph.D. - Drivers of genome instability and emergence of drug resistance in fungal pathogen Candida glabrata.

Yanan Zhao Ph.D. - Molecular diagnostics of drug resistant fungal infections and preclinical antifungal/antibacterial drug development.
The CDI Response To COVID-19

CDI science is guided by unmet medical need and is intended to address clinical urgency. There has been no greater challenge posed to patient and community health than COVID-19, which struck less than a year into the CDI’s existence. The scientists and staff members, including experts in global infectious diseases, embraced this unprecedented challenge. They have played a critical role in impacting clinical care through development of novel diagnostics, improved antiviral therapy, and support of numerous clinical trial regimens. The work was covered variously by The New York Times, The Wall Street Journal, and 60 Minutes, among other outlets. The work includes:

Clinical Support

Rapid Molecular Testing of Virus

CDI experts developed a highly accurate molecular assay for the rapid detection of COVID-19, which captured the best detection elements of tests developed by the CDC and WHO. This novel test was implemented at Hackensack University Medical Center, and allowed testing of thousands of patients at the peak of the pandemic.

Serology for Convalescent Therapy Program (CTP). Convalescent plasma, the use of survivors’ antibodies to infuse and treat sick patients, has been used in previous outbreaks of infectious disease. Early in the COVID-19 epidemic, it was sought as a therapy, due to the lack of drugs or a vaccine. A key component of plasma therapy is the identification of recovered patient/donors with high titers of neutralizing antibodies that kill or disable the virus. The CDI screening program actively evaluated potential donors by performing a detailed assessment of Immunoglobin G (IgG) and Immunoglobin M (IgM) antibodies to identify the best donors for Convalescent Plasma therapy trials conducted at HUMC. CDI scientists also provided immune profiling involving a variety of antivirals and anti-inflammatory agents to understand changes in T cell populations (CD4+, CD8+ CD25+), other lymphocytes, NK cells, cytokines and chemokines, etc.

Support of Clinical Trials throughout HMH

A wide variety of Pharmaceutical-Sponsored and Investigator-Sponsored clinical trials are underway at various Hackensack Meridian Health hospitals since the start of the epidemic in New Jersey. These trials involve national studies of therapies like Remdesivir, hydroxychloroquine, and NK cells, as well as studies of anti-inflammatory drug affecting IL-6, IL-1 and IL-2, and others. CDI scientists play a vital support role in many studies by evaluating virus status, and downstream assessment of immunologic markers.
to understand this disease. From the beginning of COVID-19, the Bio-R diligently collected thousands of specimens from patients after obtaining informed consent for those specimens to be used for research purposes.

Genomics and Beyond
The CDI partnered with the New York Genome Center (NYGC) as part of a large consortium of mostly New York metropolitan area universities and hospitals. The objective is to share data in real-time about emerging science related to COVID-19, and to exploit genomics and genetic sequencing to explore key questions of virus microevolution, host susceptibility and disease progression. A growing list of projects are underway involving CDI scientists and expertise.

Drug Discovery
Pharmaceutical, biotech companies and academic discovery groups have partnered with CDI to develop new drug candidates against COVID-19, and other coronaviruses. Utilizing a SARS-CoV-2 viral pathogenic screening assay that mimics viral infection of host cells in our Biosafety Level 3 lab suite, a team evaluated hundreds of compounds representing approved drugs, drug candidates in late-stage clinical development as antivirals, and as well as new chemical classes. Many of these compounds have the potential to be repurposed rapidly for clinical trials. This work is being performed as part of the NIH Center of Excellence in Translational Research focused on novel anti-infective development located at the CDI.

Biorepository (Bio-R)
It was recognized at the earliest stage of the COVID-19 epidemic that organized collection and processing of biological specimens from hospitalized patients linked to clinical data would be essential
A Unique Translational Science Ecosystem

The CDI was established to take advantage of the extensive clinical assets of one of the region’s largest and most comprehensive health care systems. As an academic accelerator, the CDI represents a unique translational ecosystem to integrate academic scientists with clinicians as well as small and large companies with the objective of taking innovative science and moving it rapidly into clinical settings to improve patient outcomes. Collaborations distinguish CDI including its interest in partnering with innovative life science companies – some of which will be located on site in state-of-the-art research and development (R&D) lab and office space. This highly integrated network includes the strong partnerships of researchers, physicians and health care professionals at Hackensack Meridian Health’s 17 network hospitals as well as the faculty and medical students of the School of Medicine located on campus. Other partners are HMH’s John Theurer Cancer Center, the National Cancer Institute-designated Georgetown Lombardi Comprehensive Cancer Center, and the New York Genome Center which provide access to thousands of patients and greatly expand CDI’s impact.

The new CDI Restorative Health Clinic will offer advanced therapies which will be assessed in a unique research environment that has the potential to transform the field. The facility will provide a full complement of high-end imaging, infusion, procedure/clinical space and other amenities. These advanced therapies will then be made available to the entire Hackensack Meridian Health network and beyond with a focus on pre-clinical studies, clinical trials, and approved interventions with the goal of offering lifesaving care for patients.

The CDI is led by a group of entrepreneurial scientists committed to translate scientific insights into treatments for some of the world’s worst diseases. They have created a new paradigm and the required infrastructure to enhance productivity, spark innovation, and accelerate the timeline from discovery at the bench to treatment at the bedside. The CDI’s robust research program directly informs and benefits from enhanced partnerships with some of the country’s most respected healthcare and research institutions, including Hackensack Meridian Health’s own extensive network and resources.