$133.5 MILLION
NIH Funding at Vanderbilt in FY 2021

$22.9 MILLION
National Cancer Institute

$22.0 MILLION
National Institute of General Medical Sciences

$14.9 MILLION
National Institute of Diabetes and Digestive and Kidney Disease

Vanderbilt-developed treatments for Alzheimer’s, Parkinson’s, Charcot-Marie-Tooth diseases

Vanderbilt University's Warren Center for Neuroscience Drug Discovery (WCNDD) has entered into an exclusive worldwide licensing and collaboration agreement with San Diego-based ACADIA Pharmaceuticals Inc., which will seek to develop and commercialize treatments for central nervous system disorders, such as Alzheimer's disease and schizophrenia. One of the compounds included in this agreement is a lead compound in the treatment of Alzheimer's disease and schizophrenia, VU319, which recently began Phase 1 clinical trials. VU319 was discovered by Vanderbilt researchers at WCNDD, with support from the National Institutes of Health and may slow memory loss accompanying serious brain disorders. The first human trial of VU319 was unique in that it was the first time Vanderbilt University had initiated a drug-discovery effort based on early basic science and advanced it into clinical trials in humans without partnering with a pharmaceutical company.

WCNDD has also developed a Parkinson's disease drug that has been selected for Phase 1 clinical trials by Appello Pharmaceuticals Inc., a clinical-stage therapeutics company focused on finding innovative early-stage drug candidates for patients with nervous system disorders. The drug is intended to work with an existing Parkinson's disease treatment, levodopa, to lengthen the time that people gain relief from their Parkinson’s symptoms without experiencing debilitating side effects such as dyskinesias (uncontrollable involuntary movements).

In addition, Vanderbilt School of Medicine Basic Sciences researchers, funded by NIH, have illuminated the cause of Charcot-Marie-Tooth disease, putting them on the road to developing therapeutic approaches for this often-debilitating peripheral neuropathy that affects one in 2,500 people. Ancora Innovation LLC, is funding a related early-stage drug discovery project targeting this disease, an inherited disorder involving progressive damage to peripheral nerves.

Vanderbilt researchers respond to COVID-19

NIH-funded researchers at Vanderbilt University applied their expertise to the COVID-19 response.

- A Vanderbilt biochemist has built up a lab with expertise in the mechanisms of gene expression and viral proteins. With funding from NIH and DARPA, her lab identified a new behavior of a SARS-CoV-2 protein which opens up the potential for new therapeutic targets for COVID-19.

- Vanderbilt biomedical engineers who are focused on developing new diagnostic tools for infectious diseases received funding from NIH to apply their skills to COVID-19. They have developed a panel of quick tests to diagnose COVID-19 infections, seasonal flu and other respiratory illnesses.

- An assistant professor of chemistry and biological sciences received NIH funding to conduct a fast-paced and comprehensive study on how SARS-CoV-2 replicates within host cells. This foundational work may lead to therapeutics that target the replication process, instead of targeting the virus overall.

- An assistant professor of psychology and human development has been funded by NIH to conduct one of the first studies tracking people's response to stress exposure before and during the pandemic. The work demonstrates that differences in reactivity to emotional images may play a role in individual cases of depression and traumatic intrusions.
NIH training grants

At Vanderbilt, a significant NIH funding mechanism consists National Research Service Awards, which include T (training grant) and F (fellowship) awards that support training doctoral students in the biomedical sciences. The Vanderbilt Medical Scientist Training Program, which has been supported by NIH T awards since 1976, prepares students for faculty and research positions with an integrated curriculum that features a strong core education in medicine and intensive training in scientific inquiry. Successful completion of the program leads to both M.D. and Ph.D. degrees, preparing the next generation of physician scientists. The Initiative for Maximizing Student Diversity at Vanderbilt University, which has been supported by NIH awards since 2000, aims to increase the number of Ph.D.’s. awarded to graduate students in biomedical research who are underrepresented in science.

 Currently, Vanderbilt has 82 individual F awards and 25 T awards, which support more than 200 students and provide more than $11 million in annual funding. Students supported by NIH NRSA fellowships have contributed to an understanding of fundamental biological principles and have discovered therapeutic strategies for treating diseases like Charcot-Marie-Tooth and COVID-19.

Vanderbilt contributes to the ‘Google Earth’ of the human body, starting with the kidney

Supported by NIH, the Human BioMolecular Atlas Program has brought together 18 research teams, including collaborators from the School of Medicine, to build a comprehensive, 3D molecular atlas of the human body. HuBMAP released its inaugural data of several organs, including that of the kidney, which the Biomedical Multimodal Imaging Center has been focused on developing for two years. Being able to accurately visualize how the human body’s trillions of cells interact, connect and arrange into tissues will provide greater understanding of human health. These data will support visualizing and explaining details of tissues and organs to patients or students and enable software development of novel solutions, computational understanding of the differences between healthy and diseased cells, and precision drug development.

Trans-institutional collaboration receives $2 million BRAIN Initiative grant

Two Vanderbilt faculty—an assistant professor of cell and developmental biology and an associate professor of mechanical engineering and biomedical engineering—have won a $2.3 million, three-year grant from the NIH Brain Research through Advancing Innovative Neurotechnologies Initiative. The researchers will be developing 3D brain organoids and related tissue—miniaturized and simplified versions produced in vitro—that resemble a human brain at 24 to 25 weeks post-conception. These will provide an unparalleled window into brain development and potentially into currently untreatable neurological disorders. Most neurodevelopmental disorders do not have treatments because there has been no way to discern the earliest signals of how the brain grows. By understanding what makes a brain a brain, there will be better access to the human side of disease mechanisms that can be very powerful for basic science.

Team’s sustained work in T-cell immune response awarded P01 grant totaling $11 million

The National Institute of Allergy and Infectious Diseases has awarded a group of researchers across the U.S., including a professor of chemical and biomolecular engineering at Vanderbilt University, a combined $11 million in the form of a prestigious P01 grant that involves characterizing the biological and structural features of T-cell signaling in even greater detail. For more than a decade this method has worked to re-create key components of T-cells—a type of white blood cell that develops in the thymus gland and plays a big role in immune response—and explore how they know when to start fighting disease. Although the grant targets seasonal flu (another ancient adaptive system), the work has application to cancer and other diseases, including COVID-19. A more complete understanding of T-cell activation paves the way for manipulating this line of defense, switching T-cells on to fight diseases or, for individuals with autoimmune disorders, blocking unwanted activation.

$8 million NIH grant to study infant/child brain development

Faculty members from Peabody College and VUMC have received an $8 million NIH grant as part of a groundbreaking, multi-institutional overview of variables influencing infant and child brain development, including substance exposure. The study, which will be conducted over at least 10 years with two dozen other institutions, aims to understand how pre- and post-natal exposures to substances and environments may alter developmental trajectories of children from birth. This will provide insights into environmental issues that impact children’s brain development from birth through early childhood and is unprecedented in its scope with important implications for policy, practice and early intervention.
Vanderbilt Institute for Surgery and Engineering

The Vanderbilt Institute for Surgery and Engineering, supported in part by $20 million in active NIH grants, many of which are R01, is an interdisciplinary, trans-institutional institute that supports interactions between the university’s Schools of Engineering and Medicine in order to develop methods, devices, algorithms, and systems to improve patient care. Clinical applications and research areas include image-guided brain, kidney, liver, pancreas or prostate surgery; guidance for transorbital therapy; minimally invasive cochlear implant surgery; assistance for deep brain stimulators placement and programming; robotic-assisted radical prostatectomies; and ophthalmic microsurgery. Researchers at VISE are also developing an intelligent and autonomous magnetic flexible endoscope to make colonoscopies safer, less painful, more widely available and less expensive. In addition, a $2 million NIH grant was awarded in 2021 to VISE faculty to further develop a needle-size robotic surgery system with real-time MRI guidance for drug resistant temporal lobe epilepsy. Sixty-seven students have earned their doctorates since the program’s start, and there are 90 current students engaged in research at VISE. In addition, 42 patents and 21 licenses have come out of this collaborative work.

Effort underway to increase diversity in Alzheimer’s research

A new $2.5 million R01 grant from the NIH is enabling an associate professor of chemistry to expand her research on racial disparities in Alzheimer’s and other diseases. The grant is designed to develop and test recruiting materials aimed at encouraging older African Americans to participate in Alzheimer’s research. Alzheimer’s disease affects African Americans at twice the rate it does white people, and preliminary research shows that more can be learned about Alzheimer’s disease by studying biospecimens from African Americans. African Americans face a number of barriers to participating in Alzheimer’s research. These findings will inform best practices for outreach to African Americans across the country—and, ultimately, help make Alzheimer’s research more inclusive.

Maternal health expert wins NIH grant to study disparity in cesarean births among Black and white women

An assistant professor of nursing has been awarded an R21 exploratory/development grant of more than $250,000 from the National Institute of Minority Health and Health Disparities to assess the differences in labor progress and care among Black and white women with low-risk pregnancies. According to the Centers for Disease Control and Prevention, 31.7 percent of all deliveries in the U.S. are by cesarean birth. The disparity in primary cesarean birth rates between Black and white women with low-risk pregnancies in the United States is greater than ever before. The study, which will focus on the frequency of cesarean births among the two groups, will be the first to describe obstetric care in this way at a high-volume, academic medical center, and its findings will inform how health care providers can improve standards of care to ultimately decrease the disparity in cesarean births.

New device addresses challenges with MRI systems, images

Vanderbilt engineers have received a $1.4 million NIH grant to work toward a compact, silent, less expensive and potentially portable MRI device. The team will develop new hardware, including low-field radio frequency transmission coils and amplifiers, and software that will together translate signals measured from the body into images of anatomy. With support from NIH, Vanderbilt and VUMC researchers have created a technique that corrects distortions in MRI images, which helps researchers and radiologists to better interpret brain scans. Distorted images most significantly affect stroke patients.

For more information, please contact Vanderbilt’s Office of Federal Relations: Christina West 202-216-4370 · Heather Bloemhard 202-216-4368 federalrelations@vanderbilt.edu FY 2021