
\$119.9 MILLION

NIH Funding at Vanderbilt in FY 2019

\$25.1 MILLION

National Institute of General Medical Sciences

\$19.5 MILLION

National Cancer Institute

\$11.5 MILLION

National Institute of Diabetes and Digestive and Kidney Disease

Vanderbilt signs licensing agreement to develop schizophrenia drug

Vanderbilt University signed separate licensing and research collaboration agreements with Lundbeck, a global pharmaceutical company based in Denmark, to develop a novel approach for treating schizophrenia. Under the terms of the licensing agreement, Lundbeck has exclusively licensed rights to compounds developed by the Vanderbilt Center for Neuroscience Drug Discovery that act on a receptor in the brain that has been implicated in schizophrenia to produce an anti-psychotic-like effect and improve cognitive performance with a low risk of side effects. The Vanderbilt compounds were developed with the support of the National Institute of Mental Health, part of the National Institutes of Health. The phase I human clinical trial has been completed, and, in a single ascending dose study, there were no side effects with the compound.

Non-addictive options for chronic pain

With \$3.6 million in NIH funding, researchers from Vanderbilt are developing a focused ultrasound neuromodulation (the process of stimulating nerve cell activity) device as a non-invasive and non-addictive method for treating chronic pain. The funding was awarded as part of the NIH Helping to End Addiction Long-term initiative which aims to improve treatments for chronic pain, curb the rates of opioid use disorder



VUSN researcher shows lymphedema patient how to measure extracellular fluid accumulation via bioimpedance spectroscopy. (Vanderbilt University)

and overdose, and achieve long-term recovery from opioid addiction. The device will allow researchers to simultaneously alter neuronal activity in brain regions associated with pain and monitor the response in real time using functional MRI. While other devices to treat pain exist, their efficacy is limited by inaccurate targeting of pain regions and circuits in the brain.

Noninvasive technology better than tape measure for identifying lymphedema risk

Supported by NIH, researchers from Vanderbilt University School of Nursing have discovered that bioimpedance spectroscopy is better than a tape measure for assessing a woman's risk for developing lymphedema after breast cancer surgery. BIS is a painless and noninvasive procedure that entails running an electronic signal through the body. The technology is similar to electronic monitors for body mass index but much more refined. The multisite international study compares the two methods for identifying women who should be prescribed compression sleeves and gauntlets to reduce lymphatic fluid in the arm and prevent progression to lymphedema. BIS surveillance reduced rates of progression by approximately 10 percent, a clinically meaningful improvement.

NICHD Learning Disabilities Innovation Hub

The NIH Eunice Kennedy Shriver National Institute for Child Health and Human Development awarded a Learning Disabilities Innovation Hub to researchers from Vanderbilt Peabody College of education and human development. The hub facilitates a transdisciplinary group of researchers who are working to advance scientific knowledge about learning disabilities and their treatment and prevention. The Vanderbilt Hub is investigating learning disabilities that occur across reading comprehension and mathematics problem-solving and studying how oral language comprehension may provide a common pathway for explaining difficulty across both academic domains and a common lever for improving performance.

Discovery science fuels hunt for new drugs to prevent resistance to antibiotics

A School of Medicine Basic Sciences faculty member, with support from the NIH, has been studying how bacteria evolve and recently discovered a protein that enables bacteria to develop drug resistance. She is now developing drugs that target this protein to prevent bacteria from evolving ways of resisting antimicrobial therapies. This discovery-inspired approach addresses the massive public health problem posed by the emergence of pathogen resistance to current medicines.

Cellular soldiers designed to kill cancer cells that get loose during surgery, stop metastasis

A Vanderbilt University biomedical engineer has discovered that cellular soldiers created using the body's own defenses can track down and kill escaping cancer cells during surgeries, preventing metastasis and saving lives, particularly in cases of triple negative breast cancer. With support from the NIH, the team found that the introduction of these cellular soldiers into the bloodstream before, during, and after tumor removal kills all cancer cells that get loose as a result of the removal. The method can work not only during surgeries, but also potentially with patients who already suffer metastatic cancer in multiple sites and who have no worthwhile treatment options.

Collaborators work to advance liver cancer surgical care

A multi-year collective effort between Vanderbilt engineers, surgeons, and scientists has resulted in a \$2.3 million, four-year grant awarded by the National Institute of Biomedical Imaging and Bioengineering to improve laparoscopic liver surgery and liver cancer ablation therapy. The grant supports a next-generation guidance system that embeds sophisticated 3D computer models within image navigation systems to more accurately guide physicians in the surgical removal or application of thermal energy to eliminate liver cancer tumors. While the main focus of this project is advancing surgical care for liver cancer patients, the science being developed shifts the paradigm for the way computer models are used in the delivery of surgical and interventional procedures.

Study of reading skills in children who are deaf or hard of hearing

Millions of children are hearing impaired, and these individuals tend to have below-average reading skills. Only about 10 percent attain age-appropriate reading levels by high school graduation. Existing models of reading do not adequately account for children who are deaf and hard of hearing. Researchers at Vanderbilt Peabody College received a \$3.2 million grant from the NIH to develop the first comprehensive brain-based model of the reading process in these individuals. They will use functional magnetic resonance imaging in children ages 10 to 15 to identify the brain mechanisms important for skilled reading. They will use "localizer" tasks to independently identify brain regions involved in signed language, speech reading, vocabulary knowledge, and phonology (awareness of the sound structure of language). The team will examine how brain regions are engaged in order to provide a deeper understanding of how some children attain high levels of reading skill. This work will have direct implications for improving literacy education for children who are deaf or hard of hearing.

