




Biomedical Research | Science Education





Van Andel Institute is an independent nonprofit biomedical research and science education organization committed to improving the health and enhancing the lives of current and future generations.

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Fact Sheet



Through biomedical research and science education, Van Andel Institute is committed to improving the health and enhancing the lives of current and future generations.

FOUNDED: 1996 by Jay and Betty Van Andel

LOCATION: Grand Rapids, Michigan

MISSION STATEMENT: Through biomedical research and science education, Van Andel Institute is committed to improving the health and enhancing the lives of current and future generations.

WHO ARE WE?

Van Andel Institute is an agile biomedical research and science education institute known for breaking down barriers that hold innovation captive.

Van Andel Research Institute (VARI) is a world leader in cancer epigenetics and Parkinson's disease research. Collaborating with academia, industry and philanthropy, the Institute orchestrates cutting-edge clinical trials to improve human health.

Van Andel Education Institute (VAEI) is leading a national revolution in science education by uniquely empowering teachers to engage students to think and act like scientists.

Van Andel Institute Graduate School (VAIGS) develops future leaders in biomedical research through an intense problem-focused Ph.D. degree in cell and molecular genetics.

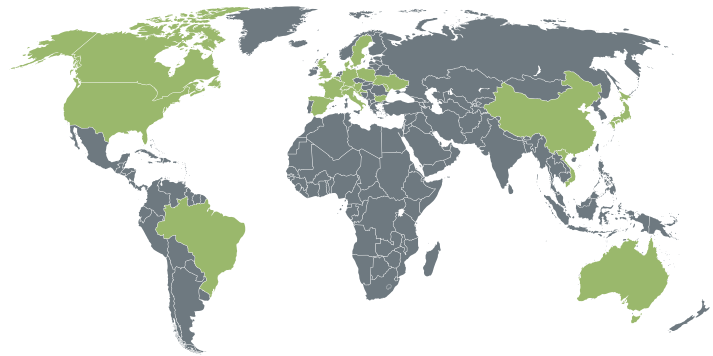
Purple Community is Van Andel Institute's grassroots community awareness and fundraising program that connects individuals, schools, teams and companies who want to join the fight against cancer and neurodegenerative diseases to the resources needed for action.

By the Numbers

WHAT WE STUDY

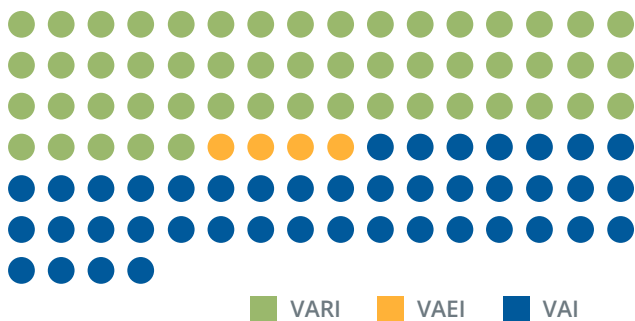
Neurofibromatosis type 1
Breast cancer Osteoporosis
 Blood cancer
 Depression Structural biology
Parkinson's disease **Bone cancers**
 Asthma **EPIGENETICS** Prion disease
Aging Ovarian Cancer **Cancer** Pancreatic cancer
 Heart disease **Osteoarthritis** Sarcoma
 Prostate cancer Tuberosclerosis Diabetes
Colorectal cancer

WHERE WE COLLABORATE



A DEDICATED TEAM

Van Andel Institute has more than 364 employees, with 234 of them working in research and graduate education.



VAN ANDEL INSTITUTE GRADUATE SCHOOL, FOSTERING TOMORROW'S LEADERS

- 32** VAIGS faculty members
- 5.4** year average time to Ph.D.
- 3** seven-week laboratory rotations during the first two semesters
- 3** years of doctoral candidate thesis research in a faculty mentor's lab

VAN ANDEL RESEARCH INSTITUTE

- 32** principal investigators
- 8** cores
- 3** fellows of the American Association for Cancer Research Academy
- 3** fellows of the American Association for the Advancement of Science
- 2** members of the National Academy of Sciences

SCIENTIFIC IMPACT

Van Andel Education Institute has worked with more than

3,600 students and **2,500 teachers** since its founding in 1996.

**All numbers current as of January 2017*

Leadership Biographies



David Van Andel

Chairman and
Chief Executive Officer

David Van Andel is Chairman and CEO of Van Andel Institute in Grand Rapids, Michigan. He is also an entrepreneur involved in several other business interests in the natural and life science products industries.

The son of Jay Van Andel, founder of Van Andel Institute and co-founder of Amway Corporation, he is currently a member of Amway's Board of Directors and serves on its Executive, Governance and Audit committees. Prior to leading Van Andel Institute, he had been in various positions at Amway since 1977, including chief operating officer of Amway's Pyxis Innovations Business Unit, and was senior vice president—Americas and Europe, overseeing Amway business activities in North America and in 22 European and 11 Latin American affiliates.

VAN ANDEL EDUCATION INSTITUTE



Terra Tarango

Van Andel Education Institute
Director and Education Officer

Terra Tarango is an accomplished executive in the education industry with more than 15 years of experience in educational publishing and services.

Prior to joining Van Andel Institute,

Tarango served as president of SDE, one of the largest providers of professional development for pre-K through 12th grade educators in the U.S. Before that, she developed award-winning print and digital curriculum with Houghton Mifflin Harcourt, the largest educational publisher in the nation. She is an expert in instructional climate and culture and has devoted her career to increasing curiosity, creativity and critical thinking in the classroom.

As Van Andel Education Institute's (VAEI) director and education officer, Tarango oversees VAEI and its efforts to improve science and inquiry-based instruction in K-12 education. She and her team provide innovative science programs for students and world-class professional development for educators. She also spearheads the global expansion of NexGen Inquiry®—VAEI's web-based, interactive teaching and learning platform designed to support professional development and engage students in self-directed, hands-on science investigations.

VAN ANDEL INSTITUTE GRADUATE SCHOOL



Steven J. Triezenberg, Ph.D.

Dean, Van Andel Institute
Graduate School; Professor,
Center for Epigenetics,
Van Andel Research Institute

Dr. Steven J. Triezenberg received his bachelor's degree in biology and education from Calvin College in Grand Rapids, Michigan. His Ph.D. training in cell

and molecular biology at the University of Michigan was followed by postdoctoral research at the Carnegie Institution of Washington. Before joining Van Andel Institute in 2006, Triezenberg was a faculty member of the Department of Biochemistry and Molecular Biology at Michigan State University for more than 18 years. He also served at MSU as associate director of the Graduate Program in Cell and Molecular Biology. He is currently dean of Van Andel Institute Graduate School and served as director of Van Andel Education Institute from 2009 to 2015. In addition to his education efforts, he also leads a laboratory in Van Andel Research Institute's Center for Epigenetics, where his research focuses on the regulation of gene expression during herpes simplex virus infections.

VAN ANDEL RESEARCH INSTITUTE



Peter Jones, Ph.D., D.Sc.

Chief Scientific Officer; Director, Center for Epigenetics

Dr. Peter Jones is a pioneer in the field of epigenetics, particularly its role in cancer. His laboratory discovered the effects of the epigenetic drug 5-azacytidine on cytosine methylation and he

first established the link between DNA methylation, gene expression and cell differentiation. His work has led to the development of novel cancer therapies that target the epigenome. His current research continues these efforts with a focus on finding additional new treatments to better combat, or even prevent, cancer.

Jones joined the University of Southern California (USC) in 1977, after earning a Ph.D. from the University of London. He served as director of the USC Norris Comprehensive Cancer Center between 1993 and 2011. In 2013, he was appointed to his current position as chief scientific officer of Van Andel Research Institute (VARI) in Grand Rapids, Michigan, where he also leads a lab and serves as director of the Institute's Center for Epigenetics. Dr. Jones is a past president of the American Association for Cancer Research (AACR), a Fellow of the AACR Academy, a Fellow of the American Association for the Advancement of Science and was elected to the National Academy of Sciences. He has published more than 300 scientific papers and received several honors, including the Outstanding Investigator Grant from the National Cancer Institute. He and his colleague Dr. Stephen Baylin shared the Kirk A. Landon Award for Basic Cancer Research from the AACR in 2009 and the Medal of Honor from the American Cancer Society in 2011. He and Baylin led the first Stand Up To Cancer (SU2C) Epigenetics Dream Team and currently lead the VARI-SU2C Epigenetics Dream Team.



Patrik Brundin, M.D., Ph.D.

Associate Director of Research; Director, Center for Neurodegenerative Science

Dr. Patrik Brundin is one of the top cited researchers in the field of neuroscience with more than 300 publications on Parkinson's

disease and related topics. He has 35 years of experience studying neurodegenerative diseases, Parkinson's disease pathogenesis and therapeutic neural transplantation into people with Parkinson's. His current research focuses on pathogenic mechanisms of Parkinson's disease, as well as the development of new therapies that slow or stop disease progression, or repair damaged brain circuits. He was among the first to articulate the "prion-like" hypothesis of Parkinson's, which describes how abnormal proteins related to the disease spread from cell to cell in the brain, causing the cellular damage that perpetuates Parkinson's.

In addition to managing his laboratory at Van Andel Research Institute and serving as director of the Institute's Center for Neurodegenerative Science, he is the co-editor-in-chief of the *Journal of Parkinson's Disease* and chair of the Linked Clinical Trials committee, which aims to repurpose already approved drugs to treat Parkinson's. Brundin also has coordinated multiple international research programs.



Bart Williams, Ph.D.

Director, Center for Cancer and Cell Biology

Dr. Bart Williams is an internationally recognized expert in bone biology, specifically in the area of Wnt signaling in health and disease states. His laboratory at Van Andel Research

Institute studies the role of the Wnt pathway in normal bone development and in cancers that commonly spread to the bone (such as prostate, breast and lung cancers). He is also an expert in the development of preclinical models of skeletal disease and cancer.

Williams received his Ph.D. in biology from Massachusetts Institute of Technology in 1996 where he trained with Tyler Jacks. For three years, he was a postdoctoral fellow at the National Institutes of Health (NIH) in the laboratory of Harold Varmus, former director of NIH. Dr. Williams joined Van Andel Research Institute as a scientific investigator in July 1999. He is now a professor and the director of the Institute's Center for Cancer and Cell Biology. He has served on more than two dozen NIH study sections and also serves on numerous additional grant and conference review committees. He is currently an editorial board member for several journals, including the *Journal of Biological Chemistry*, *Journal of Clinical Investigation*, *Bone Research* and *PLoS One*.



Scott Jewell, Ph.D.

Director, Core Technologies and Services

Dr. Scott Jewell earned his master's degree and Ph.D. in experimental pathology and immunology from The Ohio State University. He served at Ohio State as director for

the Human Tissue Resource Network and as associate director of the OSU Comprehensive Cancer Center's Biorepository and Biospecimen Resource, where his dedicated, creative efforts led to the development of a state-of-the-art tissue procurement and biorepository system. He was elected president of the International Society for Biological and Environmental Repositories (ISBER) for 2009-2010 and joined Van Andel Research Institute in 2010 as a professor and as director of the Program for Technologies and Cores and of the Program for Biospecimen Science. He is currently a member of the College of American Pathologists (CAP) Biorepository Accreditation Program and the editorial board of the journal *Biopreservation and Biobanking*.



Van Andel Research Institute's Center for Epigenetics is dedicated to the study of epigenetic and epigenomic mechanisms in cancer and neurodegenerative diseases, with the ultimate goal of developing new, more effective therapies that change the standard of care for patients. Extensive research in recent years has demonstrated the vital role epigenetic modifications play in a range of diseases, including cancer, which often has epigenetic abnormalities as well as genetic errors. The Center is led by VARI's Chief Scientific Officer Peter Jones, Ph.D., D.Sc., a world-renowned epigenetics expert and pioneer in the field. VARI also is home to the Van Andel Research Institute–Stand Up To Cancer Epigenetics Dream Team, a multi-institutional effort that focuses on moving promising epigenetic therapies into clinical trials, a crucial step to get much-needed treatments to patients.

Epigenetics control how DNA is used, switching particular genes “on” or “off” to determine cell type and function. Errors in epigenetic controls play significant roles in the development of cancer and have been linked to other conditions such as neurodegenerative diseases.

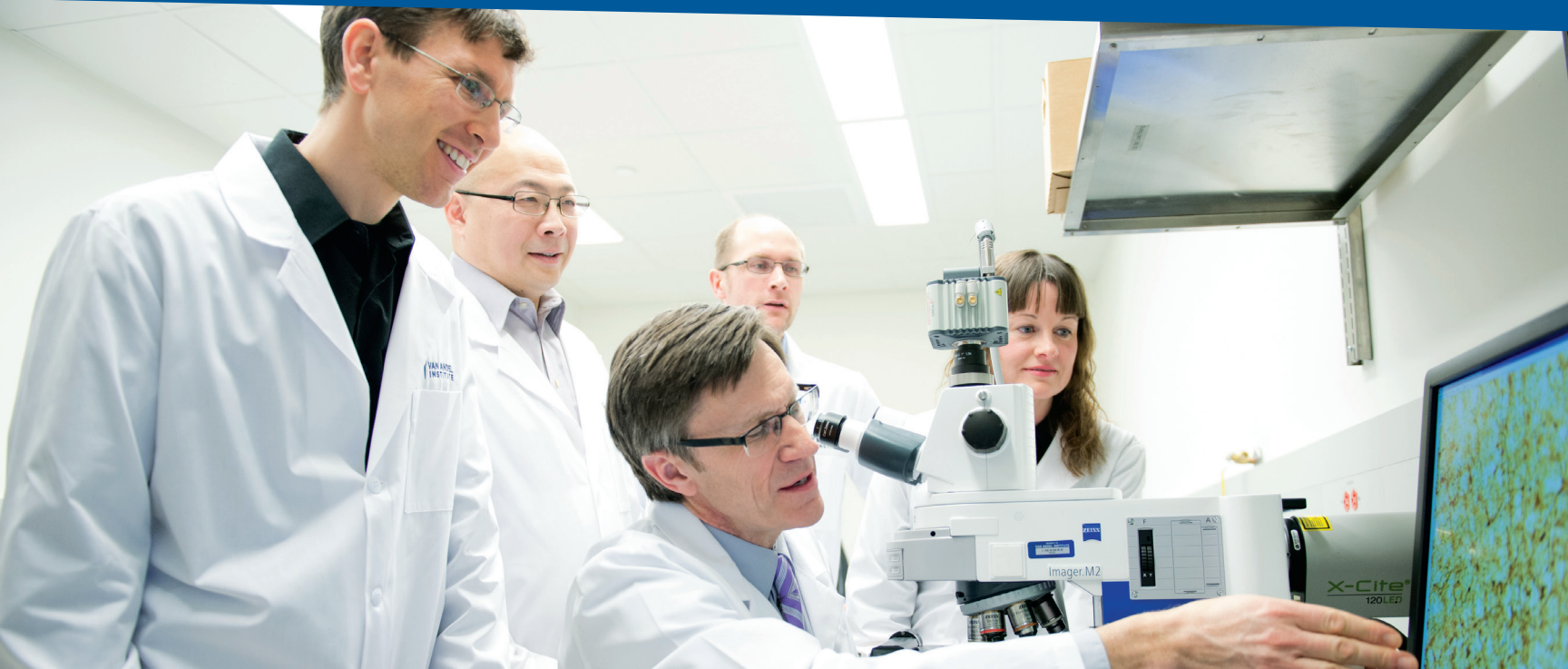
RESEARCH AREAS

- Epigenetics
- Cancer
- Heart disease
- Neuroepigenetics (in collaboration with the Center for Neurodegenerative Science)
- Structural biology

UNDERSTANDING BASIC MECHANISMS: The Center includes world leaders in epigenetics research who are dedicated to studying the intricate epigenetic mechanisms that play key roles in health and disease.

EPIGENETIC THERAPIES: Enhancing the understanding of epigenetic mechanisms gives scientists the tools to develop new targeted therapies that correct epigenetic errors in cancer, neurodegenerative diseases and other conditions.

FROM THE LAB TO THE CLINIC: By teaming up with other leaders in the field and breaking down barriers to innovation, VARI and its collaborators are harnessing their combined expertise to accelerate the translation of basic scientific discoveries to the clinic.



Van Andel Research Institute's Center for Neurodegenerative Science focuses on the development of novel therapies that slow or stop the progression of neurodegenerative diseases, in particular, Parkinson's disease. It is committed to establishing clinical trials to advance the next generation of therapies that change the course of Parkinson's and, ultimately, that repair damage and restore function. As part of these efforts, the Center collaborates with The Cure Parkinson's Trust on Linked Clinical Trials, an initiative to repurpose drugs used to treat other diseases as potential therapies for Parkinson's. The Center is led by Patrik Brundin, M.D., Ph.D., an internationally renowned Parkinson's disease expert and chair of the Linked Clinical Trials international scientific committee.

Seven to 10 million people globally have Parkinson's disease. There have been few major breakthroughs in therapeutic development for Parkinson's in the last 50 years, with the exception of the gold standard therapy, levodopa, and deep brain stimulation surgery. While these therapies mitigate symptoms, they do not correct the underlying cause of Parkinson's or repair damage.

RESEARCH AREAS

- Parkinson's disease (primary focus)
- Depression/suicide
- Aging
- Prion disease
- Alzheimer's disease
- Huntington's disease
- Neuroepigenetics

DISEASE MODIFICATION: Scientists in the Center are searching for ways to interfere with Parkinson's disease progression, allowing patients more symptom-free years.

BRAIN REPAIR: Cell transplantation and gene therapy are two innovative approaches to repairing the brain and restoring lost brain functions.

BIOMARKER DISCOVERY: Biomarkers can support earlier and more precise diagnosis; consequently, disease-modifying therapies can start earlier and their effects monitored objectively.



Cancer is one of the leading causes of death worldwide. In 2016, an estimated 1,685,210 new cancer cases were diagnosed in the U.S. according to the National Cancer Institute.

Led by Bart Williams, Ph.D., scientists in the Center for Cancer and Cell Biology study the basic mechanisms that underlie the development of cancer and other diseases such as diabetes, asthma, osteoporosis, osteoarthritis and pediatric disease syndromes. The ultimate goal of this work is to improve quality of life for patients through the development of better diagnostics and therapies. The Center is home to experts in a range of disciplines, including structural, functional, computational, chemical and systems biology approaches.

RESEARCH AREAS

- Asthma
- Blood cancer
- Bone cancer
- Breast cancer
- Colorectal cancer
- Diabetes
- Neurofibromatosis type 1
- Osteoarthritis
- Osteoporosis
- Pancreatic cancer
- Prostate cancer
- Sarcoma
- Tuberous sclerosis

SKELETAL DISEASE AND TUMOR MICROENVIRONMENT: One of the Center's key focus areas is understanding why some tumor types (such as breast, prostate and lung cancers) are highly predisposed to spread to and proliferate in bone. In parallel with these efforts, scientists work to develop improved treatments for other diseases that affect the musculoskeletal system, including neurofibromatosis type 1, osteosarcoma and soft-tissue sarcomas, osteoporosis, osteoarthritis and developmental disorders.

STRUCTURAL BIOLOGY: Using specialized methods to determine the specific shapes of key molecules at the microscopic level, VARI scientists are facilitating the design of the next generation of more targeted and more effective drug therapies with fewer side effects.

MOLECULAR BASIS OF CANCER AND OTHER DISEASES: Through a detailed understanding of cell signaling, cell structure, metabolism and genetic drivers of disease, scientists in the Center use a multidisciplinary approach to uncover the molecular underpinnings of cancer and other diseases to develop more precise and effective diagnostics and therapies.



Van Andel Research Institute's Core Technologies and Services, led by Scott Jewell, Ph.D., offer a comprehensive range of advanced technologies and expertise to support and enhance research at the Institute and at collaborating organizations. Staffed by highly qualified professionals with an acute understanding of their respective fields, the Core team is committed to providing superior service and conducting exceptional science to further the Institute's goal of improving human health through basic and translational research.

AREAS OF EXPERTISE

- Anatomic and bone histopathology/
histology/immunohistochemistry
- Bioinformatics/biostatistics
- Biorepository management
- Biospecimen science
- CRISPR/Cas9
- Confocal microscopy
- Cryo-electron microscopy (cryo-EM)
- Cytogenetics
- Flow cytometry
- Genomics
- Quantitative digital imaging
- Small-animal imaging
- Transgenics
- Vivarium management

VARI's Biorepository is accredited by the College of American Pathologists and provides biospecimen and biobanking services for several National Institutes of Health (NIH)-funded projects, including the Clinical Proteomic Tumor Analysis Consortium (CPTAC), the National Cancer Institute's Biorepository and Biospecimen Research Branch, and NIH's Genotype-Tissue Expression project; and for numerous premier research organizations and initiatives throughout the U.S., including the Tuberous Sclerosis Alliance and the Multiple Myeloma Research Foundation's CoMMpass study.



Van Andel Institute Graduate School earned accreditation from the Higher Learning Commission in 2013. This distinction represents affirmation by the higher education community that the Graduate School meets rigorous academic standards.

Van Andel Institute Graduate School develops future leaders in biomedical research through an intense, problem-focused Ph.D. degree in cell and molecular genetics. By combining rigorous, inquiry-based coursework with extensive hands-on experience in laboratories led by the Institute's expert faculty, the Graduate School prepares students for careers as independent investigators in biomedical research. The program thrives within the state-of-the-art facilities of Van Andel Institute, with access to extensive core technology support and the resources of collaborators in Grand Rapids, Michigan, and around the country.

FROM STUDENT TO SCIENTIST

Using an innovative, problem-based learning approach, graduate students are trained to conduct high-caliber science and to translate basic findings in cellular, molecular and epigenetic biology to clinical approaches, blending discovery with invention and insight with application.

FOSTERING TOMORROW'S LEADERS

The Graduate School is committed to developing tomorrow's scientific leaders, not only through rigorous scientific education, but also through the development of vital professional skills such as leadership, ethics, responsible and effective conduct of research, public speaking, and grant and technical writing.

MENTORSHIP AND NETWORKING

Thanks to a low student-faculty ratio, graduate students receive extensive and thoughtful mentorship from the Institute's distinguished faculty, who have made significant contributions to the scientific community. Students also meet with esteemed speakers from around the world as part of the Institute's seminar series and scientific symposia.



Van Andel Education Institute is leading a national revolution in science education by empowering teachers to engage students to think and act like scientists. Led by experienced and dedicated educators, VAEI provides hands-on, practice-based, inquiry learning opportunities for students from elementary through high school. VAEI's products and services are designed to improve instruction by creating classrooms where curiosity, creativity and critical thinking thrive.

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STUDENT PROGRAMS

VAEI programs offer unique learning experiences for K-12 students, designed to enhance science understanding and provoke enthusiasm in pursuing science learning and careers. VAEI offers Field Experience, High School Journal Club, Out-of-School Time Cohort and Science on Saturdays programs to help cultivate students' passion for science.

PROFESSIONAL DEVELOPMENT

VAEI's model for scientific inquiry and instruction—known as QPOE₂[®] (Question, Prediction, Observation, Explanation and Evaluation)—empowers teachers across the country with modern career-development programs, skills and new instructional techniques for delivering their curriculum. QPOE₂ is part of a broader Community of Scientific Practice model that includes creating a Socially and Language-Rich Environment for learning, and fostering the Scientific Habits of Mind.

NEXGEN INQUIRY[®]

NexGen Inquiry is a web-based platform providing interactive classroom tools to support teachers and students with implementation of VAEI's Community of Scientific Practice instructional model. The innovative program places students at the center of self-directed, hands-on scientific investigations that challenge them to come up with their own questions and design strategic ways to find answers. The platform supports existing science education curriculum and integrates teacher professional development, as well as a web-based teacher community and resource library.

Frequently Asked Questions



WHAT IS BASIC RESEARCH?

Basic research is systematic study directed toward obtaining greater knowledge or understanding. VARI scientists conduct basic research to better understand how normal biological processes occur and how diseases function.

WHAT IS TRANSLATIONAL RESEARCH?

Translational research aims to make findings from basic science useful for practical applications that enhance human health and well-being. Quite literally, it means translating lab findings into new therapies.

DOES VAN ANDEL INSTITUTE TREAT PATIENTS?

We do not treat patients at Van Andel Institute, although several of our scientists are also clinicians who practice at area hospitals.

Many discoveries made by VARI scientists do move to clinical trials in collaboration with clinical partners. You can find out more about clinical trials at clinicaltrials.gov.

DOES VAN ANDEL RESEARCH INSTITUTE CONDUCT CLINICAL TRIALS?

VARI does not conduct clinical trials onsite at its Grand Rapids facility. However, VARI scientists collaborate with clinical partners in the U.S. and abroad to conduct clinical trials. In fact, moving treatments into clinical trials is a key component in two of VARI's largest collaborations—the Van Andel Research Institute-Stand Up To Cancer Epigenetics Dream Team and the Linked Clinical Trials initiative. For more information on open trials, please visit clinicaltrials.gov.

WHAT MAKES VAN ANDEL INSTITUTE GRADUATE SCHOOL UNIQUE?

The Graduate School uses an inquiry-based method that allows students to spend the majority of their time conducting research in labs.

Thanks to a low student-faculty ratio, students receive extensive and thoughtful mentorship from the Institute's expert faculty.

Students in the Graduate School are supported by a generous financial stipend and benefits, lessening the financial burden and allowing students to focus on their research and academic work.

IS VAN ANDEL EDUCATION INSTITUTE A FULL-TIME SCHOOL?

No. VAEI provides science education programming to supplement traditional school coursework.

Enrollment in VAEI programs is determined by a lottery aimed at replicating the socio-demographic composition of the city of Grand Rapids.

WHY DOES THE EDUCATION INSTITUTE USE INQUIRY-BASED SCIENCE INSTRUCTION?

Inquiry-based science instruction requires students to think and act like scientists—posing hypotheses; deriving questions; designing and carrying out investigations; collecting data, and testing and communicating the results. This progressive approach to science instruction requires more critical thinking and scientific reasoning from students than traditional approaches to learning.

CONTACTS

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