**RESEARCH AT EVMS**

EVMS conducts biomedical research in programs that address community health needs, particularly in diabetes, reproductive medicine, women’s and infant health, cancer, and inflammation. Through this growing research base and partnerships with the EVMS Medical Group, Sentara Healthcare and its affiliated hospitals, and local community physician practice groups, the medical school presents opportunities for an array of unique pre-clinical, clinical and basic science research studies involving diverse subject populations. Support for research comes from the NIH, DOD, AHA, Bill and Melinda Gates Foundation and other public and private sponsors.

The information below is a representation of several broad areas of research at EVMS as well as available equipment and services.

**CENTERS AND PROGRAMS:**

**Community Health and Disparities** - EVMS provides a range of research on health disparities and illnesses including maternal and fetal health, child nutrition, diabetes prevention, hypertension, cancer, tobacco and drug use and healthy living environments. Key centers involved include: Center for Maternal and Child Health Equity and Advocacy, EVMS-Sentara Healthcare Analytics and Delivery Science Institute, Pediatrics Division of Community Health and Research and the M. Foscue Brock Institute for Community and Global Health.

**Obstetrics & Gynecology Research/CONRAD -** The Department of Obstetrics and Gynecology has a wide variety of studies in the areas of Maternal Fetal Medicine, General Obstetrics and Gynecology and Urogynecology. Along with departmental research, we have the Clinical Research Center (CRC) and Contraceptive Research and Development (CONRAD). The CRC focuses on products that impact women’s health while CONRAD’s focus is affordable products that provide contraception and/or prevent the spreading of HIV/AIDS and other diseases.

**Obstetrics & Gynecology Clinical Research Center (CRC) -** The CRC has performed more than 300 clinical trials for a total of more than 10,000 participants enrolled since the start of its operations in 1987. It has worked with over 60 different government and pharmaceutical industry sponsors, primarily in the area of reproduction and women’s health. Since its inception, it has been involved in testing every contraceptive method on the U.S. market, as well as some not yet available. These include barrier, oral, transdermal, vaginal, injectable and implantable biodegradable and non-biodegradable contraceptive methods.

**EVMS Center for Maternal and Child Health Equity and Advocacy -** This center conducts research to reduce health disparities for mothers and their children by focusing on clinical practice quality and safety using epidemiological and effectiveness data to drive guidelines and policy.

**Leroy T. Canoles Jr. Cancer Research Center -** EVMS established the Leroy T. Canoles Jr. Cancer Research Center (LTCCRC) as a focal point for cancer translational research. The center houses PhD and MD cancer researchers wprking on a broad range of cancers. Current collaborators include residents, clinicians and scientists from EVMS departments of Urology, Surgery, ENT and Internal Medicine as well as partner entities such as Sentara Medical Group and Virginia Oncology Associates.

***George L. Wright Jr. Center for Biomedical Proteomics***

The George L. Wright Jr. Center for Biomedical Proteomics is dedicated to excellence in biomedical proteomics. The center provides proteomics support to investigators in the cancer research center and the general scientific community. Located within the Leroy T. Canoles Jr. Cancer Research Center, the Center for Biomedical Proteomics houses a variety of mass spectrometers and other instruments for protein isolation, separation, identification, characterization and data analysis such as:

* Arcturus AutoPix Automated Laser Capture Microdissection System
* Agilent Bravo Liquid Handler
* CellenONE Single Cell Isolation and Dispensing System
* Miltenyi Biotec gentleMACS Octo dissociator
* ThermoFisher Countess 3 FL fluorescence cell counter
* Illumina NextSeq 1000 sequencing system
* 10X Genomics Chromium Controller
* Bio-Rad C1000 Touch Thermal Cycler
* Thermo Orbitrap Eclipse LC-MS/MS
* Thermo Orbitrap Fusion Lumos Mass Spectrometer
* Thermo Q-Exactive Mass Spectrometer
* Applied Biosystems 4000 Q TRAP LC/MS/MS hybrid
* Bruker Daltonics Ultraflex III MALDI-TOF/TOF with Smart Laser
* Thermo Electron LTQ Linear Ion Trap Mass Spectrometer
* HPLC, FPLC & UHPLC systems
* Fully Integrated Speed-Vac System for HPLC and Mass Spectrometry sample prep
* Bio-Rad Two-Dimensional Gel Electrophoresis-Criterion System
* Qualitative/Quantitative Proteome Analysis & De Novo sequencing and PTM characterization

**Strelitz Diabetes Research Center -** Through the integration of basic science and clinical research, the Strelitz Diabetes Center conducts numerous clinical trials designed to develop possible new treatments for diabetes and diabetic complications. The Strelitz Diabetes Center also conducts a variety of investigator-initiated research studies to explore better management strategies and reduce diabetic complications, including state of the art studies in diabetic neuropathy.

**EVMS-Sentara Healthcare Analytics and Delivery Science Institute (HADSI) - HADSI** is a collaborative institute focused on outcomes and population health research and health services research. It comprises teams of epidemiologists and biostatisticians that provide support to learners and faculty for research design and analysis. Investigators utilize diverse data sources that include hospital medical records and national data repositories. Services offered include:

* Research feasibility and hypotheses development
* Study design
* Sample size calculation and power analysis
* Electronic Health Record (HER) access
* Database design, data collection, management and biostatistical analysis
* Health policy and economic analysis
* Tables and figures for results presentations

**Glennan Center for Geriatrics and Gerontology** - The mission of the Glennan Center is to integrate, coordinate and disseminate age-related endeavors at Eastern Virginia Medical School in order to accomplish its ultimate goals: To promote the health, well-being, independence and quality of life of older adults as well as to enhance the knowledge base and standards of practice in geriatrics and gerontology, through clinical practice, education, research and advocacy on behalf of older adults and their caregivers.

**The Lawrence J. Goldrich Institute for Integrated NeuroHealth** - This institute is the first of its kind in Hampton Roads and is made possible through a $15 million gift from long-time Virginia Beach resident Lawrence J. Goldrich and his wife, Janice T. Goldrich. The Goldrich Institute is focused on providing comprehensive, multidisciplinary care for patients suffering from complex neurodegenerative diseases such as Parkinson’s Disease and other movement disorders, cognitive and memory disorders, such as Alzheimer’s Disease and patients in need of palliative care. It also provides support systems for patients and their families, improves access to new drug therapies and clinical trials and accelerates research that may lead to better treatment and possible cures.

**Pediatrics Division of Community Health and Research** - Investigators with the Community Health and Research division use community-engaged research methods to ensure the health and safety of children and teens. These efforts inform their development and application of initiatives that aim to promote community health and influence positive change. From substance abuse to childhood obesity, our faculty are searching for solutions to the broad range of health and safety issues that affect children today.

**The M. Foscue Brock Institute for Community and Global Health** - The Brock Institute integrates EVMS’ clinical, educational, and research programs to fulfill the institution's vision of becoming the most community-oriented school of medicine and health professions in the nation. The Brock Institute helps EVMS to expand and deepen its impact on both local and global health issues in several ways. It strives to develop future leaders by training the next generation of community-minded physicians and health professionals; engage EVMS students by offering meaningful learning, research, and scholarship experiences and set an example by becoming a model for other medical schools throughout the country.

**Otolaryngology Head and Neck Surgery** - The Department collaborates with local institutions, government agencies and biomedical companies to perform clinical research trials in allergy, hearing and head/neck tumors. We also have expertise in physician-initiated bench research projects, grant writing and resident research.

**National Center for Collaboration in Medical Modeling and Simulation (NCCMMS) -** A joint effort of Eastern Virginia Medical School (EVMS) and Old Dominion University (ODU) that was formally established by Congress in 2001. The NCCMMS aims to be a national leader in medical modeling and simulation collaboration and development.

***Sentara Center for Simulation and Immersive Learning***

Located in EVMS, this research center is dedicated to improving patient care by advancing the quality and quantity of medical modeling and simulation-based training and education available to students and practitioners by developing new standards and technologies through active collaboration with industry and academic partners.

**DEPARTMENTS:**

**Microbiology and Molecular Cell Biology** - Research in the Department of Microbiology and Molecular Cell Biology centers on three main themes - infectious disease, immunology and cancer biology. This structure facilitates the development of interrelated and collaborative projects amongst the faculty.

***Molecular Core***

The Molecular Core supports research and education at EVMS by housing technologically advanced equipment for analysis of DNA, RNA and protein. To aid in using the equipment within the Molecular Core, classes and training sessions are scheduled at various times during the year. Consultation with the Core Director is available by appointment. Equipment available within the core includes:

* + Nucleic Acid Analysis:
  + Nanodrop Spectrophotometers (1000 and 8000 models)
  + Agilent 2100 Electrophoresis Bioanalyzer
  + iSeq 100 Sequencing System
  + Bio-Rad Real Time PCR Systems (Connect and CFX-96 models)
  + Qubit 4 Fluorometer
  + Protein Analysis:
  + LI-COR Odyssey XF (near-infrared (NIR) and enhanced chemiluminescence)
  + Odyssey CLx System (NIR)
  + Spectra iD3 Max Multi-mode microplate reader
  + BioTek Synergy HTX Multi-mode microplate reader
  + BioTek EL808 plate reader
  + Nanodrop Spectrophotometers (1000 and 8000 models)
  + Qubit 4 Fluorometer
  + Gel Documentation Systems:
  + Axygen
  + Bio-Rad Gel Doc EZ
  + Other
  + Refrigerated centrifuges (micro and preparatory)
  + Heat blocks
  + Speedvac
  + Nucleofector
  + Ultrasonicator (water-bath and Covaris ultrasonicator)
  + Fee-for-Service
  + DNA sequencing (Sanger), until March 2023
  + Custom experimental service

***Flow Cytometry Core***

The EVMS Flow Cytometry Core Facility (Flow Core) provides access to flow cytometry instrumentation and expertise to support research at EVMS and the research community of Hampton Roads. Flow Cytometry is a technique for measurement of individual cells in a stream of fluid for cell phenotyping, cell cycle analysis, cell signaling, protein modification, etc. Training can be scheduled with the Flow Cytometry Core Facility staff as needed. The staff is available to provide technical support in designing experiments, preparing samples and setting up the instrument. Instruments include:

* Cytek Aurora Flow Cytometer Analyzer
* BD FACSAria Fusion cell sorter
* Bio-Rad MAGPIX Multiplex Reader
* Amnis ImageStreamX Mark II Imaging Flow Cytometer
* Meso Scale Discovery Meso Quick Plex multiplex reader
* Miltenyi Biotec gentleMACS Octo dissociator
* Nexcelom Cellometer Auto 1000 cell counter

**Physiological Sciences** - The Department has broad basic and applied research programs in diabetes and obesity, human reproduction, fetal-neonatal development, neurodegeneration and aging, heart disease and hypertension. We have established collaborative efforts with clinical colleagues that enhance translation of basic/applied research to the bedside and that address major health issues of citizens locally and nationally.

***Microscopy and Imaging Core***

The EVMS Microscopy and lmaging Facility provides technical assistance and training in microscopy and image analysis to all faculty, staff and students and is available for a fee to outside institutions.

* JEOL Transmission Electron Microscope 1200 EX II equipped with an 11 megapixel AMT digital camera.
* *In vivo and in vitro* Fluorescence, Brightfield*, DIC,* Polarized light Olympus upright and inverted microscopes with cameras
* *In vivo* and *in vitro* Zeiss 880 Laser Confocal microscope
* ONI Nanoimager Microscope

**Pathology and Anatomy -** **Center for Integrative Neuroscience and Inflammatory Diseases (CINID)**

The CINID strives to understand the complex interactions between the brain and body that maintain health. This understanding allows insight into the underlying causes for devastating diseases that dramatically impact quality of life and survival. The focus is on the role of inflammation and the interplay of the nervous and immune systems as the mediator of diseases such as addiction, Alzheimer’s Disease, atherosclerosis, Glioblastoma Multiforme, cognition and cancer, epilepsy, metabolic diseases, sleep, space neuroscience and stress.

**Department of Radiation Oncology and Biophysics** - The department uses the most advanced techniques of delivering therapeutic irradiation for the treatment of malignant disease and some benign conditions. It also has its own physics and radiobiology support for patient care and tumor biology research. The department is also involved in institutional multidisciplinary cancer research projects, as well as national projects, including effects of space radiation on cognitive function.

**EVMS Biorepository and Histology Core**. The College of American Pathologists (CAP) accredited biorepository provides for the procurement, identification, collection, storage and distribution of biospecimens for research purposes. The biorepository has dedicated personnel for specimen procurement and distribution, data entry, hardware and software management, reporting and regulatory tasks and histology services. The environmentally-controlled facility, which includes spaces for storage of specimens as well as lab work is part of the EVMS Pathology and Anatomy department. Immunohistochemistry, tissue micro array and laser capture microdissection services are available along with routine and specialized tissue processing, sectioning and staining in the histology core of the EVMS Biorepository. Services and equipment within the Biorepository include:

* Subject consenting and specimen procurement
* NanoString nCounter Multiplex Gene Expression System that allows for multiplex analysis of up to 800 RNA, DNA or target proteins in a sample
* Tissue microarray design & construction
* Tissue processing, sectioning (microtomy & cryotomy) and high-resolution imaging using a Leica Aperio AT2 Digital Slide Scanner
* Routine and specialized staining including immunohistochemistry

**ANIMAL RESEARCH RESOURCES:**

**Vivarium -** The AAALAC accredited animal research facility located on the EVMS campus covers a space of approximately 16,000 ft2. The facility is able to house multiple species. BSL-2 rooms are available for use, if needed, and the animals are cared for by a full-time veterinarian with trained support staff. The vivarium is set up to assist the investigators with breeding programs, diet studies, drug delivery and surgery.

The facility contains a modern surgical suite with 2 operating rooms, a scrub room, a prep room and is capable of housing and working with most species. Imaging via 3D and 4D ultrasound, X-ray, and an IVIS Lumina imaging system is available. There are separate rooms available for procedures in each area of the vivarium. A necropsy room with down draft table is available for use. There are 2 separate cage wash units, as well as multiple autoclaves for use.

**Management of animal facilities -** The Division of Comparative Medicine (CompMed) supports every aspect of the animal care and use program in its role as the institutional entity responsible for animal procurement, animal husbandry, veterinary care and health surveillance, preventative medicine programs, animal quarantine, oversight and maintenance of the animal facilities and related equipment, personnel training and specialized technical support. CompMed, along with the Institutional Animal Care and Use Committee (IACUC), is charged with guiding the animal care and use program in support of research and compliance with all federal, state, local, and EVMS policies and regulations. CompMed is managed by SoBran Bioscience, Inc., a nationally recognized provider of support services for biomedical research. The CompMed staff consists of the Attending Veterinarian (AV)/Clinical Veterinarian (CV), Project Manager (PM) and supporting technical and research specialist staff.