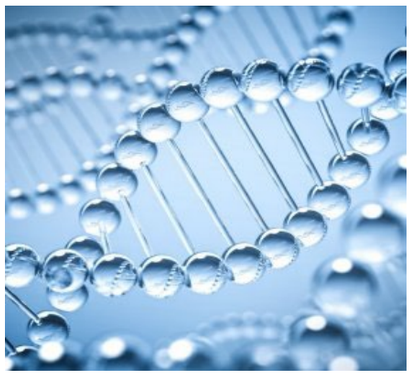
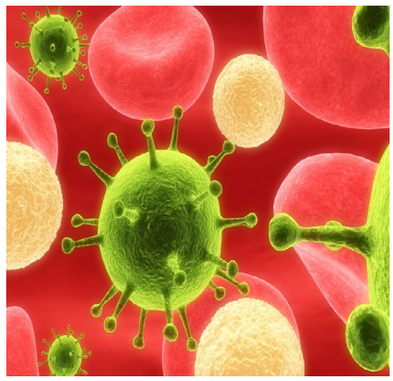
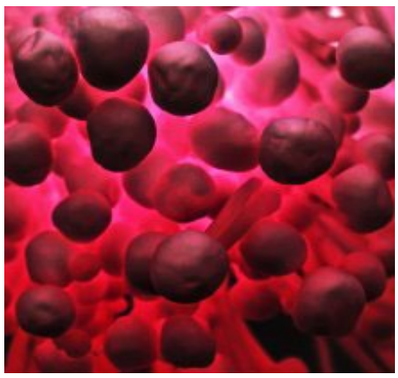
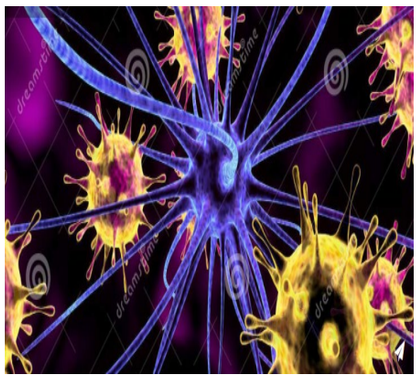
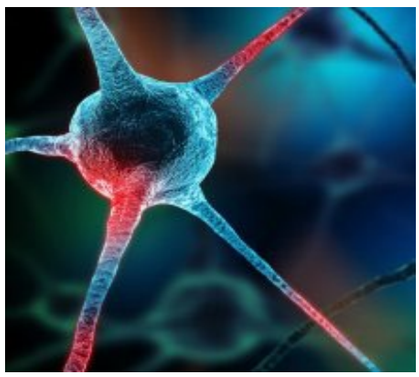
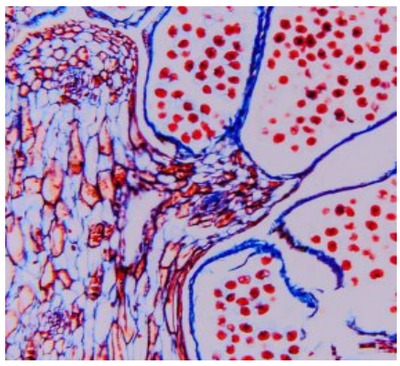
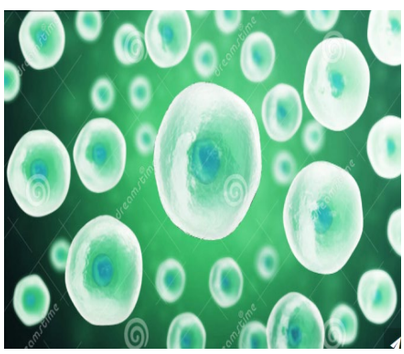







Commonwealth Health Research Board (CHRB)

2023/2024 Annual Report



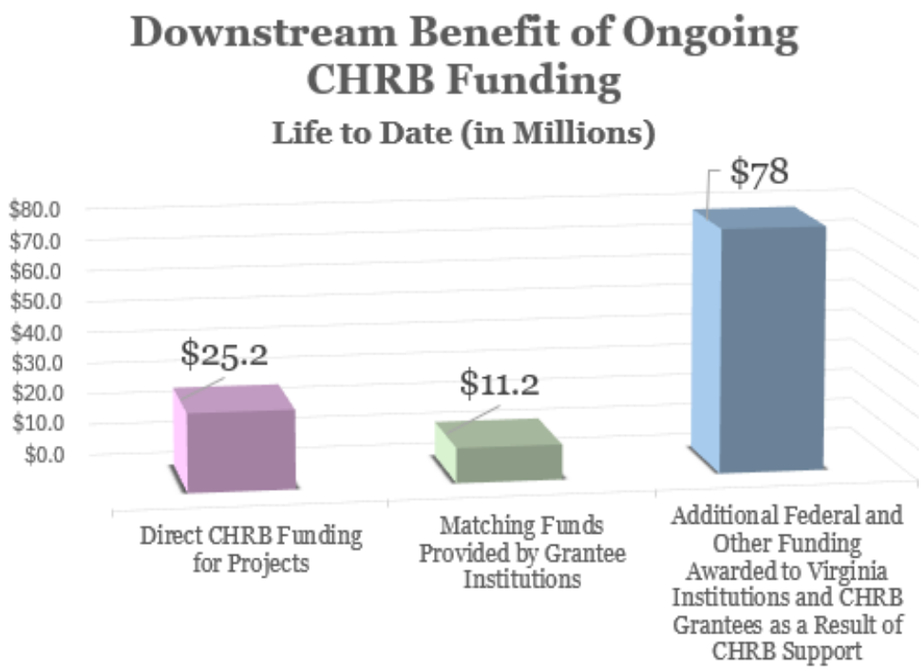

Commonwealth Health Research CHRB [CHRB]
FY 2023/2024 Annual Report

Goals, Purposes and Accomplishments of the Commonwealth Health Research Board (CHRB)

The Commonwealth Health Research Board (CHRB or Board) was created by ***Virginia Code* §32.1-162.23** to provide financial support—in the form of grants, donations, or other assistance— for research efforts having the potential of maximizing human health benefits for the citizens of the Commonwealth. Research efforts eligible for support by the Board may include traditional medical and biomedical research relating to the causes and cures of diseases, as well as research related to health services and the delivery of health care.

Downstream Benefits of Ongoing CHRB Funding:

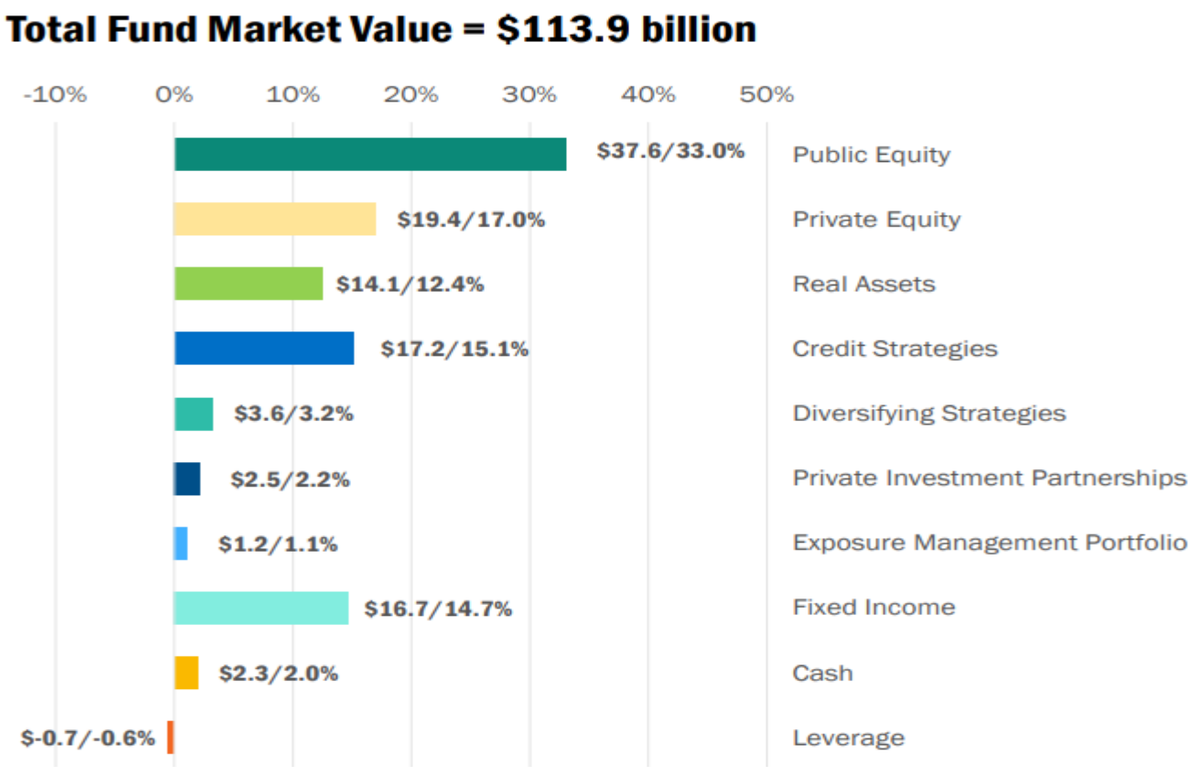
In accordance with ***Virginia Code* §32.1-162.24,** the Board encourages collaborative research efforts among two or more institutions or organizations, gives priority to those research efforts where Board support can be leveraged to foster contributions from federal agencies or other entities, and supports both new research efforts and the expansion or continuation of existing research efforts. CHRB grant recipients — for grant awards life-to-date — have leveraged over **$78** million in additional private and federal grant funds to further their research studies. CHRB funds provide a vital conduit for Virginia scientists with nascent innovations by providing seed grants to generate the early data necessary to provide proof of concept for new ideas and then be competitive for NIH and next level grants.



Commonwealth Health Research Fund [CHRF]

Virginia Code § 51.1-124.36 delegates the authority to invest and manage the assets of the Commonwealth Health Research Fund (CHRF) to the Virginia Retirement System (VRS). Assets of the CHRF are pooled with the **$113.9** billion VRS investment fund (as of June 30, 2024); however, the provision requires the VRS to maintain a separate accounting for the CHRF assets. The estimated value of the CHRF as of June 30, 2024, was almost **$50.3** million.

VRS current Asset allocation as of June 30, 2024:



Source: https://www.varetire.org/media/shared/pdf/publications/investments-quarterly-report-6-30-24.pdf

The Department of Accounts serves as the fiscal agent for the Commonwealth Health Research Board through a Memorandum of Understanding. Audits are conducted every two years by the Auditor of Public Accounts.

Commonwealth Health Research CHRB [CHRB]
FY 2023/2024 Annual Report

Executive Summary of FY 2023/2024 Grant Process:

Institution/ Organization Identification #	Institution/Organization	Concept Papers Received	Full Proposals Requested	Presentations to the Board	Grant Awards
204	The College of William and Mary	1	1	1	1
207	University of Virginia	5	1	1	0
208	Virginia Polytechnic Institute and State University	8	4	3	3
217	Radford University	1	0	0	0
221	Old Dominion University Research Foundation	5	2	1	0
236	Virginia Commonwealth University	12	6	4	3
247	George Mason University	2	0	0	0
274	Eastern Virginia Medical School	5	2	1	1
302	The Edward Via College of Osteopathic Medicine	3	2	0	0
307	University of Richmond	1	0	0	0
371	Liberty University	3	2	0	0
804	Carilion Clinic	1	1	1	0
811	McGuire Research Institute	1	0	0	0
	Total	**48**	**21**	**12**	**8**

Commonwealth Health Research CHRB [CHRB]
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CHRB Current and Historical Funding

Since its inception, the CHRB has made **291** grant awards totaling almost **$25.2 million** in grant funding to institutions of higher education and other not-for-profit or nonprofit organizations that conduct health, or health-related research in Virginia. When the required 33% matching funds are added to the CHRB funded amount, the cumulative funding totals approximately **$36.4 million** for health research in Virginia.

Grant Year	Total Grant Awards	# New Grant Awards	# Ongoing Grant Awards	CHRB Grant Awards	Grantee Matching Funds	Total Project Funds
1999	9	9	0	$597,377	$272,041	$869,418
2000	11	11	0	$717,442	$305,309	$1,022,751
2001	13	13	0	$825,590	$344,954	$1,170,544
2002	12	12	0	$718,382	$344,603	$1,062,985
2003	8	8	0	$509,806	$199,999	$709,805
2004	14	10	4	$868,514	$367,202	$1,235,716
2005	10	6	4	$755,436	$305,909	$1,061,345
2006	12	8	4	$954,058	$451,983	$1,406,041
2007	12	7	5	$1,105,585	$512,493	$1,618,078
2008	12	8	4	$1,102,030	$446,400	$1,548,430
2009	8	2	6	$727,615	$310,338	$1,037,953
2010	9	7	2	$775,105	$312,808	$1,087,913
2011	11	5	6	$1,061,644	$397,212	$1,458,856
2012	8	6	2	$799,746	$327,186	$1,126,932
2013	8	5	3	$746,688	$372,766	$1,119,454
2014	11	6	5	$1,017,500	$558,485	$1,575,985
2015	13	7	6	$1,213,983	$645,285	$1,859,268
2016	11	6	5	$1,077,444	$526,569	$1,604,013
2017	11	6	5	$1,019,696	$445,311	$1,465,007
2018	13	8	5	$1,251,185	$577,194	$1,828,379
2019	14	8	6	$1,399,997	$583,883	$1,983,880
2020	16	8	8	$1,517,067	$700,610	$2,217,677
2021	14	8	6	$1,400,000	$653,582	$2,053,582
2022	15	9	6	$1,500,000	$615,728	$2,115,728
2023	16	8	8	$1,541,750	$616,835	$2,158,585
Cumulative Total	**291**	**191**	**100**	**$25,203,640**	**$11,194,685**	**$36,398,325**

Commonwealth Health Research CHRB [CHRB]
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Comparison of Grant Award Success Rates (based upon a five-year average)

Step 1: Concept Paper to Step 2: Submission of a Full Proposal	**Step 2:** Submission of a Full Proposal to Step 3: Presentation of the Full Proposal to the Board	**Step 3:** Presentation of Full Proposal to the Board to receiving a CHRB Grant Award
35%	55%	66%

Success rate from the submission of a Concept Paper to CHRB Grant Award = 13%

Grants Cycle	Step 1: Concept Papers submitted	Step 2: Full Proposals submitted	% Success Full Proposals	Step 3: Full Proposals Presented	% Success Present	New Grant Awards	% Success Awards	From Step 1 to Awards
2023/2024	48	21	44%	12	57%	8	67%	17%
2022/2023	49	24	49%	12	50%	9	75%	18%
2021/2022	69	22	32%	14	64%	8	57%	12%
2020/2021	74	22	30%	11	50%	8	73%	11%
2019/2020	76	23	30%	13	57%	8	62%	11%
Cumulative 5-year Total	316	112	35%	62	55%	41	66%	13%
Cumulative 5-year Average	63	22	35%	12	55%	8	66%	13%

Please note:

[1] This chart excludes two-year grant awards that are approved for Year 2 funding.

[2] *Beginning with the FY2016/2017 CHRB Grant Process, the number of Concept Papers allowed for submission by any one institution or organization decreased from 15 to 10 submissions. Beginning with the FY 2018/2019 CHRB Grant Process, the number of Concept Papers allowed for submission increased from 10 to 12 per institution or organization.

Commonwealth Health Research CHRB [CHRB]
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CHRB Grant Awards and Funded Types or Categories of Research

The chart below provides statistics concerning the number of CHRB Grant Awards funded by type or category of research, from 1999 to 2023.

Key Codes	Disease/Research Area	1999 to 2023 Grant Awards	1999 to 2023 Grant Awards in CHRB Dollars
AG	Aging and Diseases of the Aging	6	$710,675
BD	Behavioral Disorders	7	$734,039
BV	Bacterial and Viral Diseases and Treatments	29	$4,599,281
CA	Cancer and Cancer Treatment	43	$5,656,520
CB	Cartilage and Bone	6	$776,078
CV	Cardiovascular Disease	15	$1,926,209
DI	Diabetes	12	$1,480,685
DM	Drug Metabolism	2	$125,900
DA	Drug Addiction and Alcoholism	1	$83,350
EE	Eye and Ear Diseases	5	$678,925
GI	Gastrointestinal Diseases	3	$248,274
GE	Genetics	0	$0
HS	Health Services Research	3	$181,126
HE	Hematology	5	$320,983
KD	Kidney Disease	3	$340,927
LD	Lung Disease	10	$1,484,083
ME	Metabolism	9	$916,082
ND	Neurological Disorders	16	$2,869,466
WH	Women's Health	9	$1,017,182
PD	Psychiatric Diseases	2	$278,382
WO	Wound Healing	1	$76,373
ZZ	Other	4	$699,100
	Total	**191**	**$25,203,640**

A one-year or two-year grant award is still considered one grant award for purposes of categorizing disease/research areas.

Commonwealth Health Research CHRB [CHRB]
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Commonwealth Health Research Board (CHRB) FY 2023/2024 Grant Awards

Planned Second-year funding for Two-Year Grant Awards

Principal Investigator	Submitting Institution/ Organization	Grant Award $	Recipient Matching $	Total Project $	Grant Title
Michael Brown, Ph.D.	University of Virginia	$ 100,000	$ 33,000	$ 133,000	Risky Variants in Human Cardiovascular Disease
Swadesh Das, Ph.D.	Virginia Commonwealth University	$ 100,000	$ 33,000	$ 133,000	Applications of Deep Learning to Predict Anti-Prostate Cancer Drug Synergy
Diane Duffy, Ph.D.	Eastern Virginia Medical School	$ 65,622	$ 32,811	$ 98,433	PCO or NO? Healthy Androgens and Ovulation
Todd Fox, Ph.D.	University of Virginia	$ 100,000	$ 33,000	$ 133,000	Nervonic acid and obesity
Robert Hinkle, Ph.D.	The College of William and Mary	$ 76,900	$ 25,633	$ 102,533	Synthesis and Biological Assessment of a Polyyne Library via Glaser-Hay Reactions
Bryan Hsu, Ph.D.	Virginia Polytechnic Institute & State University	$ 100,000	$ 33,000	$ 133,000	Self-assembling biomaterials for improved menstrual health and hygiene
Timothy Jarome, Ph.D.	Virginia Polytechnic Institute & State University	$ 100,000	$ 33,000	$ 133,000	The role of DNA 5-hydroxymethylation in the development of obesity
Andrew Lowell, Ph.D.	Virginia Polytechnic Institute & State University	$ 100,000	$ 33,000	$ 133,000	Pioneering new routes for antibiotic development: Using computational modeling and medicinal chemistry to reconfigure cytotoxins as bacteria-selective antibiotics
Michael McVoy, Ph.D.	Virginia Commonwealth University	$ 100,000	$ 33,000	$ 133,000	Substitution-inert charged coordination complexes: a novel class of broad spectrum antivirals
Peter Pidcoe, Ph.D.	Virginia Commonwealth University	$ 99,228	$ 32,745	$ 131,973	iTreat - Improved Treatment using Advanced Technologies
Masahiro Sakagami, Ph.D.	Virginia Commonwealth University	$ 100,000	$ 33,000	$ 133,000	Local dual-action treatment of lung fibrosis: inhibiting fibroblast activation and modulating collagenolytic activity
Michael Schulz, Ph.D.	Virginia Polytechnic Institute & State University	$ 100,000	$ 33,000	$ 133,000	Developing Enhanced Sealants for Neurosurgery
Julia Sharp, Ph.D.	Eastern Virginia Medical School	$ 100,000	$ 50,000	$ 150,000	Pathogenic Determinant Analysis of Community Associated *Staphylococcus aureus* in South Eastern Virginia
Lisa Shollenberger, Ph.D.	Old Dominion University Research Foundation	$ 100,000	$ 33,000	$ 133,000	Proof-of-concept study for the development of next-generation vaccines for tick-borne intracellular diseases
Amy Tang, Ph.D.	Eastern Virginia Medical School	$ 100,000	$ 85,646	$ 185,646	Developing a prognostic companion molecular test to quantify and guide immuno-oncology (IO) therapy for triple-negative breast cancer
Zhaomin Yang, Ph.D.	Virginia Polytechnic Institute & State University	$ 100,000	$ 60,000	$ 160,000	Antivirulence -- new weapon against old foe: targeting type IV pilus of antibiotic resistant bacteria
		$ 1,541,750	**$616,835**	**$ 2,158,585**	

FY 2023/2024 Grant Award Project Summaries

The Commonwealth Health Research Board (CHRB) has awarded **$1,541,750** in grants to 16 medical and health researchers in Virginia. Of this amount, **$741,750** represents grants to eight medical and health researchers for new 2023 Grant Awards and **$800,000** represents continued second-year funding for eight grant awards initially approved in July 2022.

Michael Brown, Ph.D., University of Virginia
Risky Variants in Human Cardiovascular Disease

Project Summary: Cardiovascular disease (CVD) is the leading cause of death globally.1 A primary contributor to CVD is atherosclerosis with coronary artery disease (CAD) being the main cause of heart attack and death. Known CVD risk factors poorly predict acute events in asymptomatic individuals.2 Clinical studies of anti-inflammatory agents establish that atherosclerosis is a chronic inflammatory disease.3,4 Arterial wall lipid deposition and immune infiltration contribute to large, unstable lesions.3 Immune checkpoint proteins (ICP) regulate immune interactions. The murine glucocorticoid-induced TNFR-related (GITR) ICP drives atherosclerosis, and human GITR+ cells have been identified in unstable atherosclerotic plaques.5 Herein, we found CD56bright NK cells associated with CAD severity, and GITR variation may regulate NK responses. Our multidisciplinary team with expertise in NK cells, CVD and bioinformatics will test the novel hypothesis that variant GITR expression corresponds with human CAD and alters GITR cytoplasmic tail signaling domain expression and function in NK cells (see Figure 3).

Swadesh Das, Ph.D., Virginia Commonwealth University
Applications of Deep Learning to Predict Anti-Prostate Cancer Drug Synergy

Project Summary: Clinically localized prostate cancer (PC) when diagnosed early can be effectively treated, whereas advanced PC is resistant to current therapies. However, responses to standards of care are not always durable, and most patients eventually progress to a hormone-refractory stage, which emphasizes the mandate to develop innovative, more efficacious treatments. Drug combinations are a mainstay of modern cancer therapy, potentially reducing side effects associated with high doses of a single drug, presenting opportunities for more precise disease control. Our proposal embodies screening data from 1971 FDA-approved drugs, with documented biological activities, which are merged with a multidisciplinary machine learning process to predict drug-synergisms leading to the development of novel approaches to treat men with lethal PC. Beyond its primary predictions in identifying drugs that synergize with IL-24 and its modified enhanced version IL-24S, our approach will also provide potential new drugs that can be repurposed to treat PC.

Diane Duffy, Ph.D., Eastern Virginia Medical School
PCO or No? Healthy Androgens and Ovulation

Project Summary: Polycystic ovary syndrome (PCOS) is the most common female endocrine disorder. Over 300,000 Virginia women live with negative health impacts of PCOS, including type 2 diabetes and failure to ovulate (infertility). Elevated androgens are implicated in PCOS, but no one understands how androgens affect ovulation. Our pilot data show that 1) androgens are needed to produce oocytes capable of fertilization, and 2) the “classical” androgen receptor (AR) and a novel androgen receptor (SLC39A9) are present in cells of primate ovulatory follicles. We hypothesize that androgens act through AR, SLC39A9, or both to promote follicle maturation and healthy oocyte release. In this CHRB-funded project, we will use single-cell RNA-sequencing to identify actions of androgens via AR and SLC39A9 in the ovulatory follicle. These studies, leveraged by pilot studies funded by EVMS and others, will likely identify one or both receptors as druggable targets to improve fertility for women, especially PCOS women.

Todd Fox, Ph.D., University of Virginia
Nervonic acid and obesity

Project Summary: Obesity in Virginian adults is currently 32% of the population. As higher fat mass is associated with dramatically increased morbidity and mortality, such as in response to COVID-19, there is an urgent need for new strategies to help people control body weight. The premise of this proposal is based on our recently published work demonstrating; 1) the fatty acid, nervonic acid, is dramatically reduced in models of obesity, and 2) dietary nervonic acid diminished weight gain with improved glucose and insulin parameters. The central hypothesis is that reduced nervonic acid plays a critical role in the development of obesity and related complications. This proposal will elucidate the underlying mechanism for reduced nervonic acid in obesity and assess nervonic acid specificity and the need to be acylated into sphingolipids for a therapeutic effect. These results will facilitate the design of new strategies to address the current need for improved weight control.

Robert Hinkle, Ph.D., The College of William and Mary
Synthesis and Biological Assessment of a Polyyne Library via Glaser-Hay Reactions
Project Summary: The polyyne (multiple C≡C bonds) core of linear, electron-rich, highly conjugated alkynes has been demonstrated to be selectively potent in a wide range of biological systems; however, its true potential has yet to be realized due to challenges with their synthetic preparation. As a result, the polyyne scaffold represents a prime opportunity for the fusion of organic synthesis and biochemical application. This collaborative, symbiotic approach integrates the expertise of the co-PIs to facilitate rapid preparation of diverse, targeted, polyynes for systematic biological screening to identify how structural alterations impact biological potential and molecular stability. Additionally, the rapid and efficient nature of the project is optimal for utilization with undergraduate researchers as a training platform. Ultimately, this research aims to develop novel, simple polyynes that have been thoughtfully designed to maximize their potential biological activity and exploit the unexplored potential of the polyyne core.

Bryan Hsu, Ph.D., Virginia Polytechnic Institute and State University
Self-assembling biomaterials for improved menstrual health and hygiene
Project Summary: We propose to use nondescript self-assembling biomaterials to coagulate menstrual fluid into a semi-solid, mitigating many challenges associated with traditional liquid absorption or collection strategies. We will test the efficacy of these hydrogels using in vitro models that simulate various menstrual conditions including light to heavy bleeding, frequent to infrequent hydrogel replacement, and mechanical deformation due to physical activities. In addition to coagulating menstrual fluid, these biocompatible and biodegradable hydrogels will be loaded with compounds that reduce pain, and inhibit bacterial growth, each with unique release kinetics that maximize their efficacy.

Timothy Jarome, Ph.D., Virginia Polytechnic Institute and State University
The role of DNA 5-hydroxymethylation in the development of obesity
Project Summary: Obesity affects 40% of the U.S. population and is responsible for an estimate 300,000 deaths per year. In Virginia alone, the obesity rate in adults is around 30%, with an annual cost of over $4 billion. However, therapeutic interventions which can reverse the progression of obesity remain equivocal. The goal of this project is to identify the role of a robust, highly persistent genetic-molecular mechanism in the brain to the development of obesity. Specifically, we will test if blocking the weight gain-induced reductions in DNA 5-hydroxymethylation (5-hmC) in the hypothalamus in a cell-type specific manner prevents the development of obesity over time. Additionally, we will determine if increasing DNA 5-hmC at the major satiety gene, Pomc, in the hypothalamus can prevent obesity development. Results from this study could provide critical information needed for the development of therapeutic strategies to treat the underlying pathophysiology of obesity.

Andrew Lowell, Ph.D., Virginia Polytechnic Institute and State University
Pioneering new routes for antibiotic development: Using computational modeling and medicinal chemistry to reconfigure cytotoxins as selective antibiotics
Project Summary: Our work develops treatments for antimicrobial resistant (AMR) pathogens by creating new antibiotics from existing, potent drugs. To achieve this goal, we use a combination of cutting-edge molecular modeling and medicinal chemistry techniques to convert broadly cytotoxic agents into bacteria-specific antibiotics. Comparisons of general cytotoxicity to antibacterial activity were used previously to identify antibiotic candidates, but no attempts were made using medicinal chemistry to perturb this continuum. Aiding in the development of this novel area is our innovative application of large-scale biochemical modeling to the ribosome, providing atom-level binding and interaction details not previously achievable for this target. Our work will result in new classes of potent antibiotics and first-in-field software applications for the analysis of large organelles, both being commercialize for ribosome drug targeting and computational analysis of other complex biological systems. Comprehensively, this work will mitigate the growing impact of AMR infections in the Commonwealth and nationwide.

Michael McVoy, Ph.D., Virginia Commonwealth University
Substitution-inert charged coordination complexes: a novel class of broad spectrum antivirals
Project Summary: The majority of pathogenic viruses initiate infection by binding to cell surface glycosaminoglycans (GAGs). Inhibitors that disrupt virion-GAG interactions are therefore anticipated to have broad spectrum antiviral activity. This proposal seeks to develop a novel class of broad-spectrum antivirals based on substitution-inert charged coordination complexes (CCCs) that target GAGs to inhibit viral attachment and entry. The proposed studies, focused on SARS-CoV-2, are designed to establish proof-of-concept that CCCs can serve as bona fide antivirals worthy of further development. Two Specific Aims will (1) use in vitro cell culture models to identify CCCs with minimal toxicity and maximal antiviral activity against SARS-CoV-2; and (2) use in vivo (mouse) models to define toxicity, pharmacokinetics, and antiviral therapeutic efficacy of lead CCCs for treatment of SARSCoV-2 infection. Completion of these studies will establish CCCs as a novel class of antivirals and will leverage support for future preclinical and clinical development of lead candidates.

Peter Pidcoe, PT, DPT, Ph.D., Virginia Commonwealth University
iTreat – Improved Treatment using Advanced Technologies

Project Summary: The purpose of this proposal is to implement a non-intrusive, easily deployed, scalable system that uses wireless sensing to produce an accurate measure of therapeutic rehabilitation dose for patients who have suffered a Cerebrovascular Accident (CVA or stroke). Since structured intensity plays a key role in recovery, the accurate assessment of rehabilitation dose is needed to infer its relationship to outcome and drive future practice patterns. This system will be deployed in three Richmond clinical sites to assess efficacy and validity.

Masahiro Sakagami, Ph.D., Virginia Commonwealth University
Local dual-action treatment of lung fibrosis: inhibiting fibroblast activation and modulating collagenolytic activity

Project Summary: Lung fibrosis causes thickened, scarred fibrotic airspaces due to aberrant extracellular matrix (ECM; collagen) accumulation. It is progressive and idiopathic, but irreversible and incurable with any drugs, resulting in respiratory failure and death in 2-5 years. AM24 is our proprietary curcumin-like derivative of melatonin. As excessive ECM accumulation in fibrotic lungs can be recognized as a net result of induced synthesis and insufficient removal of collagen, we hypothesize that AM24 uniquely possesses dual-actions of inhibiting collagen-generating fibroblast activation; and modulating collagenase and anti-collagenase imbalance, via multi-hybrid mechanisms originating from its structure origins. Hence, this 2-year project will examine AM24 for potent, mechanistically-hybrid, dual-action anti-fibrotic activities using in vitro cell-based systems (Aim 1) and an in vivo rat model of lung fibrosis (Aim 2). Successful completion will prove this dual-action strategy against “collagen dysregulation” in fibrotic lungs and offer AM24 as a novel inhaled drug for lung fibrosis treatment.

Michael Schulz, Ph.D., Virginia Polytechnic Institute and State University
Developing Enhanced Sealants for Neurosurgery

Project Summary: Dural tears are one of the most challenging complications during neurosurgery, resulting in cerebral spinal fluid leakage and increased risk of infections and complications. To mitigate these issues, numerous dural sealants have been developed, but their efficacy is limited. Consequently, a highly effective dural sealant remains an unmet medical need. Partnering with practicing neurosurgeons, the goal of this work is to design and synthesize improved materials for sealing dural tears. By tuning the molecular structure of polyester/polyurethane adhesives, we will produce materials that balance resistance to cerebral spinal fluid leakage with strong adhesion to dura, while maintaining ease of use, biocompatibility, and biodegradability. Candidate materials will be evaluated to determine water uptake (swelling), tensile strength, modulus, curing kinetics, and degradability, as well as their adhesive properties (adhesion strength and mode of failure) and biocompatibility. Ultimately, this project will produce enhanced surgical sealants for neurosurgery applications.

Julia Sharp, Ph.D., Eastern Virginia Medical School
Pathogenic Determinant Analysis of Community Associated Staphylococcus aureus in South Eastern Virginia

Project Summary: Staphylococcus aureus is a major cause of community and healthcare-associated infections resulting in significant illness and death worldwide. With increasing antibiotic resistance and no effective vaccine, novel anti-staphylococcal therapies are critically needed. To address this need, we propose an innovative, multifaceted approach to determine S. aureus pathogenic (disease-causing) characteristics using community associated S. aureus isolates from patients who reside in South Eastern Virginia. We will assess the potential of isolates to cause harm (virulence-factor potential) by examining bacterial DNA (genetic content) and activity (expression) of several clinically relevant virulence factors. Additionally, to further examine the host-pathogen relationship, the capacity of S. aureus isolates to bind human serum proteins (both quantity and complexity) will be evaluated. These data will permit the generation of pathogenicity profiles, cross referenced with infection type (skin/soft-tissue or blood infection) and patient locale, to benefit direct therapy interventions and highlight potential therapeutic targets.

Lisa Shollenberger, Ph.D., Old Dominion University Research Foundation
Proof-of-concept study for the development of next-generation vaccines for tick-borne intracellular diseases

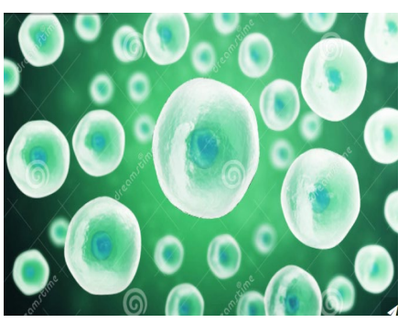
Project Summary: Tick-borne diseases (TBD) are a worldwide threat to human and animal health. In the USA, Lyme disease is the most common, not the only, TBD. Other tick-borne pathogens (TBP) include Rickettsia, Ehrlichia, Anaplasma, and Francisella; Babesia, and viruses. Virginia had 8,895 reportable TBD cases from 2015-2019, one of the highest statewide incidences in the country, and tick-borne viral infection are not reportable. Development of effective vaccines for TBP is crucial, as there are currently no licensed human vaccines with most, if not all, being a humoral (antibody-based) response. Since many TBP are intracellular pathogens, a cell-mediated immunity (CMI) seems more appropriate. We hypothesize intracellular proteins, which may be conserved between multiple organisms, are appropriate candidate vaccine antigens for intracellular pathogens. Using rickettsial antigens as proof-of-concept, we will test this hypothesis through successful completion of the following aims: (1) development of the necessary immunological tools and (2) evaluation of CMI.

Amy Tang, Ph.D., Eastern Virginia Medical School
Developing a prognostic companion molecular test to quantify and guide immuno-oncology (IO) therapy for triple-negative breast cancer

Project Summary: Triple-negative breast cancer (TNBC) is an aggressive subtype with high relapse rate. Recently, the FDA approved immune checkpoint blockade (ICB) therapy for high-risk early-stage; and PD-L1- positive locally recurrent, unresectable, or metastatic TNBC. The challenge is how to predict the treatment benefit of immuno-oncology (IO) therapy. To address this unmet need, we propose to evaluate SIAH as a predictive biomarker to augment PD-L1 status and pathologic response to optimize the use of IO-therapy for TNBC. • SIAHHigh/ON in TNBC tumors reflects that the EGFR/K-RAS/SIAH pathway is ON and may indicate immuno-suppression, ICB-resistance, and/or the need for additional therapies to control TNBC malignancy. • SIAHLow/OFF in TNBC tumors reflects that the EGFR/K-RAS/SIAH pathway is OFF and may indicate immuno-responsiveness, ICB-sensitivity, and good prognosis after surgery. We aim to demonstrate the clinical utility of SIAHON/OFF expression as a new prognostic biomarker to stratify patients, predict the need for and/or efficacy of neoadjuvant and/or adjuvant immunotherapy.

Zhaomin Yang, Ph.D., Virginia Polytechnic Institute and State University
Antivirulence – new weapon against old foe: targeting type IV pilus of antibiotic resistant bacteria

Project Summary: Antivirulence is a promising new strategy for fighting the global antibiotic resistance pandemic. Bacterial pathogens have armors and weapons that allow them to defeat our immune system and do harm. Antivirulence is to strip them of their menacing arsenals. Once disarmed, they are no more than the normal human microflora that generally provides health benefits. Unlike antibiotics, antivirulence measures do not apply a life-death selection on bacteria. As such, their resistance is not expected to develop and spread, making antivirulence an attractive approach for combating antibiotic resistance. In this proposal, we focus on developing small molecules targeting the bacterial type IV pilus, one of the most potent weapons of bacterial pathogens. The success of our work will lead to novel therapeutics that will impact not only the citizens of Virginia, but also human health worldwide.



Commonwealth Health Research CHRB [CHRB]
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Commonwealth Health Research Funds available for FY 2023/2024 Grant Awards

Pursuant to *Virginia Code* §32.1-162.28(E), (CHRF) Grant funding is calculated by an amount not to exceed six percent of the moving average of the market value of the CHRF calculated over the previous five years on a one-year delayed basis, net of any administrative fee assessed pursuant to subsection E of § 51.1-124.36.

Commonwealth Health Research Board [CHRB] Financials

Supporting documentation for CHRB Annual Report and ACFR Reporting

Funds available for 2023 Grant Awards

Calendar Year		Market Value as of 12/31/xx	
January 1 - December 31, 2017	Year 1	$38,776,234.09	Source: VRS Finance Division Activity Report through December 31, 2017
January 1 - December 31, 2018	Year 2	$36,998,370.93	Source: VRS Finance Division Activity Report through December 31, 2018
January 1 -December 31, 2019	Year 3	$40,977,689.88	Source: VRS Finance Division Activity Report through December 31, 2019
January 1 - December 31, 2020	Year 4	$43,250,731.05	Source: VRS Finance Division Activity Report through December 31, 2020
January 1 - December 31, 2021	Year 5	$49,523,068.01	Source: VRS Finance Division Activity Report through December 31, 2021
	Total	$209,526,093.96	
	Average Market Value	$41,905,218.79	
Funds available for 2023 grants based on 5% of the average market value	5.00%	$2,095,261	

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Neelam Azad, Ph.D.
Thomas W. Eppes, Jr., M.D.
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