Commonwealth Health Research Board

2009 Annual Report

"To promote and protect the health of the citizens of the Commonwealth through human health research."

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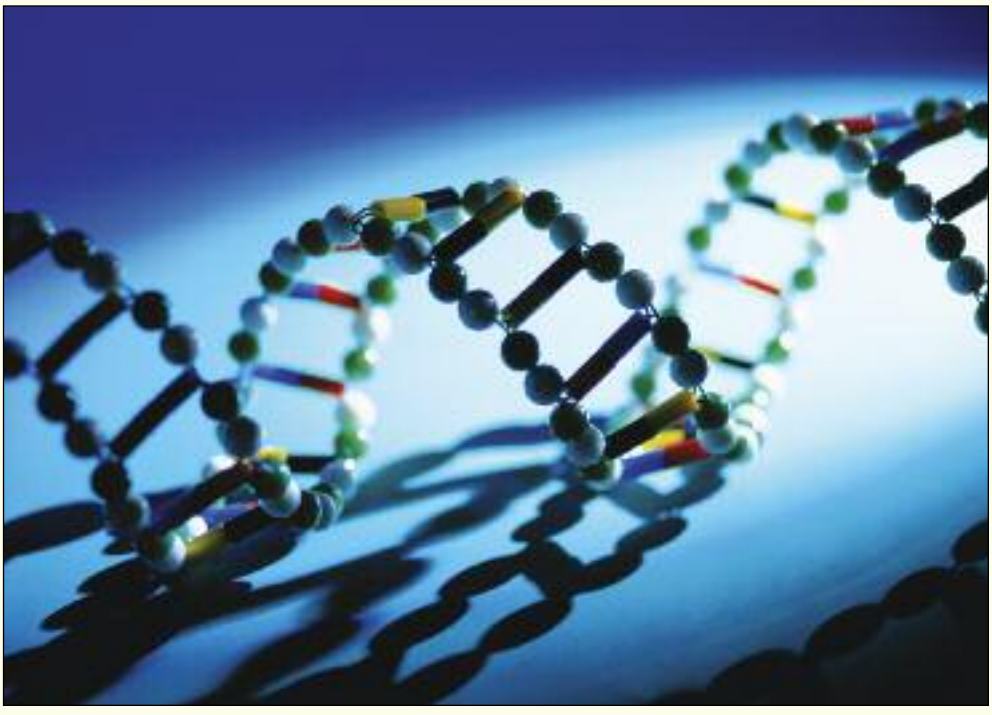


Message From The Chairman

The Commonwealth Health Research Board (CHRB) provides grant funding for creative and innovative research projects that have scientific merit and hold promise for maximizing human health benefits for citizens of the Commonwealth of Virginia. The CHRB supports both new research efforts and the expansion or continuation of existing research efforts.

Since its inception, the CHRB has made 121 grant awards totaling almost $9 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 total project funds amount to almost $12.9 million for health research in Virginia.

Grants have been awarded to institutions of higher education and other organizations across the Commonwealth to include: College of William and Mary, Eastern Virginia Medical School, George Mason University, James Madison University, Longwood University, Lynchburg College, Norfolk State University, Riverside Health System, Shenandoah University, Sweet Briar College, University of Richmond, University of Virginia, Virginia Commonwealth University, Virginia Military Institute, and Virginia Polytechnic Institute and State University.

Grants have been awarded for research on a wide variety of important health conditions effecting thousands of Virginias, including: diseases of the eye, antibiotic resistance, cardiovascular disease, cancer, diabetes and obesity, protection against bacterial biothreat agents, sports injuries, and AIDS, to mention a few.

The CHRB encourages collaborative research efforts and gives priority to those research efforts where Board support can be leveraged to foster contributions from other entities. CHRB grant recipients, for grant awards made in 1999 through 2004, have leveraged almost $14.2 million in additional private and federal grant funds to further their research studies. In addition, numerous publications in peer-reviewed scientific journals and periodicals as well as presentations of the data at regional and national scientific meetings have resulted from CHRB grant funded research projects.

We are proud of the accomplishments of the CHRB and our grant recipients as we work towards a healthier future for all Virginians. As Chairman, I am pleased to present the 2009 Annual Report.

Robert S. Call, M.D., Chairman
Commonwealth Health Research Board

Commonwealth Health Research Board Evaluation Highlights

Comments from Principal Investigators concerning their research and their success in obtaining additional grant funds from federal or private foundation organizations as a result of initial CHRB grant support.

Margaret Saha, Ph.D.
The College of William and Mary: 2000 CHRB grant recipient for a project entitled, *Imaging the aging brain: In vivo detection of key aging molecules in small animals.*

"The CHRB is an extremely valuable source of funding because it not only allows, but encourages, innovative and risky interdisciplinary projects that could not have received funding elsewhere. This allows investigators to obtain the preliminary data and be successful in future funding endeavors.

Certainly, in part, funding from the CHRB, and the preliminary data obtained from that funding, has allowed me to obtain a grant from the Department of Defense Breast Cancer Research Program (BCRP) of the Office of the Congressionally Directed Medical Research Programs, "In Vivo Molecular Imaging of Mammary Tumorigenesis in Murine Model Systems" (2005-2006), $107,015."

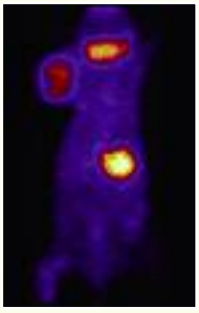
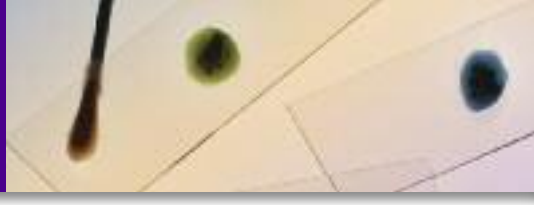


Image of a live mouse showing expected iodide accumulation in stomach and thyroid and accumulation of signal as a marker of a developing breast tumor (left side of photo).



Geoffrey Krystal, M.D., Ph.D. Virginia Commonwealth University: 1999 CHRB grant recipient for a project entitled, *Inhibition of P13K as a Novel Therapeutic Strategy for the Treatment of Small cell lung cancer (SCLC).*

Preliminary data generated as a result of the CHRB award was used to obtain a Merit Review Award from the Department of Veteran's Affairs Research Service of $689,800 over the period of 2001-2006. The complete set of data also served as a cornerstone for the renewal of the Merit Review Award that will run from 2006-2010 at total direct cost of $535,200.

Jennifer Wayne, Ph.D. Virginia Commonwealth University: 2000 CHRB grant recipient for a project entitled, *Mechanical function predicted by MRI parameters in cartilage.*

"I am truly grateful for the award from the CHRB which allowed me to explore a new avenue of research and establish collaborations with additional colleagues. The CHRB clearly has foresight in advancing science and technology by supporting research within the Commonwealth for the benefit of Virginians and society as a whole."

Dr. Wayne's continuing work was funded by The National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) of NIH, 9/2002-2005, for $326,500.

CHRB Introduction

The Goals of the Commonwealth Health Research Board (CHRB) are to provide grant funding for research to advance the understanding of biological systems, to improve the treatment and control of human disease, and to improve human health services and the delivery of human health care.

The CHRB provides grant funding for research efforts that have the potential of maximizing the health of Virginia's citizens. Research efforts eligible for support include traditional medical and biomedical research related to the causes and cures of human diseases, as well as research related to human health services and the delivery of human health care.

More specifically, in accordance with § 23-279 of the Code of Virginia, 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 of continuation of existing research.

Background

Legislation in 1997 created the Commonwealth Health Research Fund to provide financial support for research projects that have the potential of maximizing health benefits for the citizens of the Commonwealth. This initiative of the General Assembly and the Governor used the proceeds from the sale of Trigon stock to create the framework and fiscal resources for a research grant program. The funds result from the stock and cash distributed to the Commonwealth of Virginia pursuant to the conversion of Blue Cross and Blue Shield from a mutual insurance company to a stock corporation. Income from the funds is used to make grants. The estimated value of the Fund as of June 30, 2009 was $23.5 million.

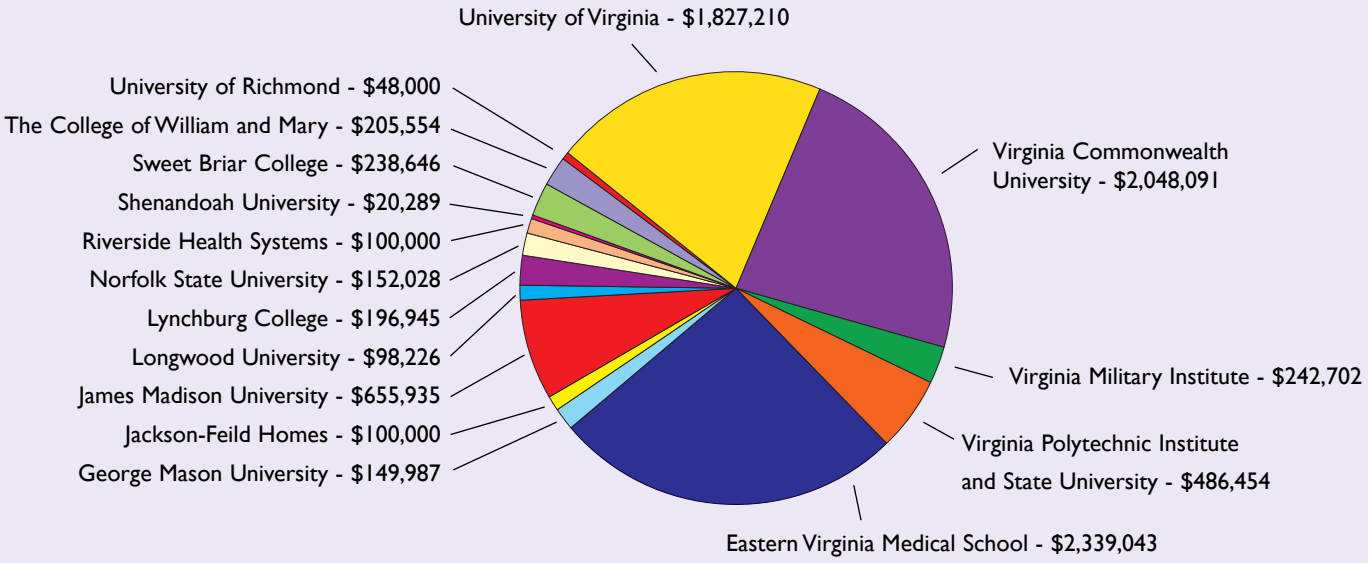
The Commonwealth established the CHRB to develop and implement the grant program. The following chart shows the number and amount of grant funds awarded along with amount of matching funds provided by the grantee institution.

Commonwealth Health Research Board Grant Awards Life to Date *updated July 2009*

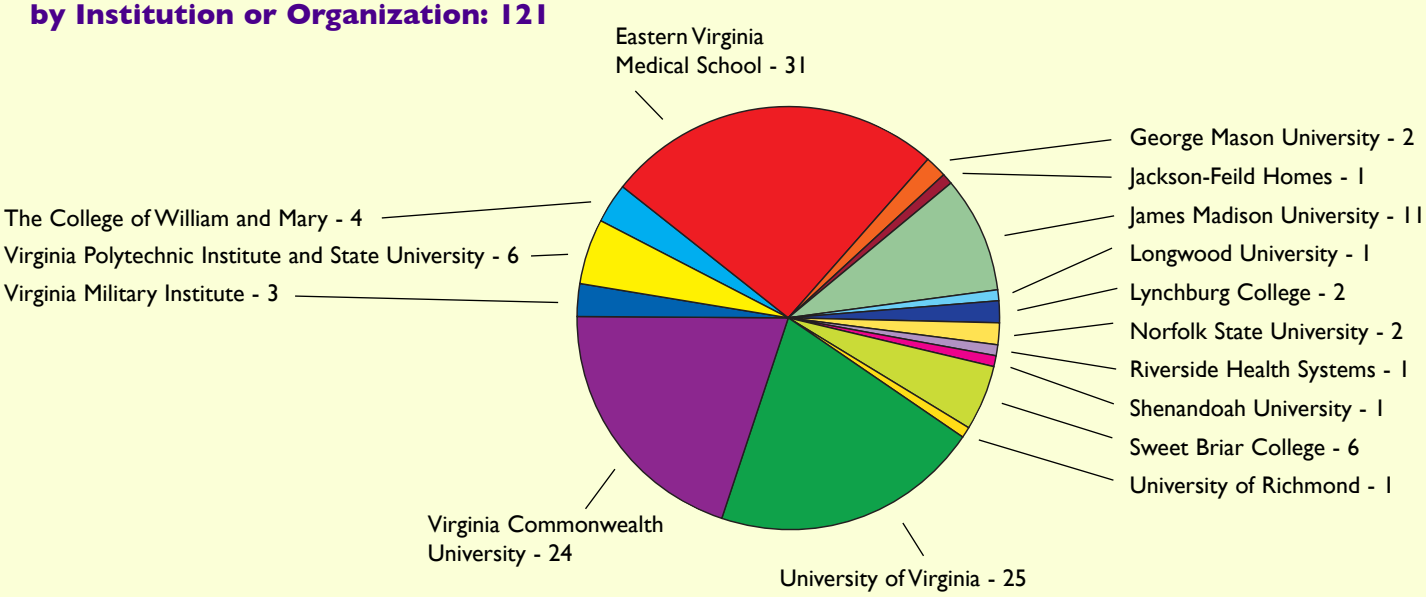
Grant Year	Number of Grant Awards	CHRB Grant Awards	Grantee Matching Funds	Total Project Funds
1999	9	$ 597,377	$ 278,808	$ 856,185
2000	11	$ 718,542	$ 430,738	$ 1,149,280
2001	13	$ 825,590	$ 341,680	$ 1,167,270
2002	12	$ 718,382	$ 344,603	$ 1,062,985
2003	8	$ 509,806	$ 199,999	$ 709,805
2004	14	$ 887,914	$ 376,735	$ 1,264,649
2005	10	$ 755,436	$ 304,403	$ 1,059,839
2006	12	$ 954,058	$ 452,613	$ 1,406,671
2007	12	$ 1,105,585	$ 512,493	$ 1,618,078
2008	12	$ 1,102,030	$ 446,400	$ 1,548,430
2009	8	$734,390	$310,338	$ $1,044,728
Cumulative Total	**121**	**$8,909,110**	**$3,978,810**	**$12,907,920**

Grant Statistics

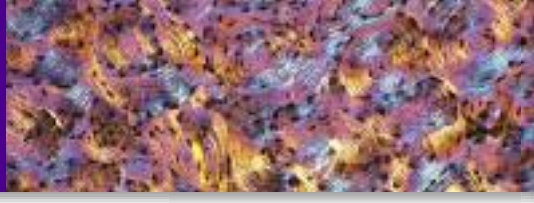
CHRB Grant Funding to Date by Institution or Organization: $8,909,110



Number of CHRB Grant Awards to Date by Institution or Organization: 121



Grant Awards FY 2009/2010



Jeffrey Dupree, Ph.D., Virginia Commonwealth University: 2004 CHRB grant recipient for a project entitled, *The role of Oligodendrocytes in neuronal survival*

"My experience with the CHRB was extremely positive. When I received funding, I was a junior faculty member attempting to establish a research program. As any new investigator will confirm, it is very difficult to get started in this career. Most federal agencies require substantial preliminary data to support a good idea. For an investigator just getting started, good ideas are more abundant than data. The CHRB provided me with the opportunity to test hypotheses that federal agencies were leery of funding without substantial data indicating that the hypothesis was correct. As evidenced by both the subsequent funding and publication records, some of the ideas have panned out but without the support of the CHRB, these hypotheses would have never been tested. I am extremely indebted to the CHRB and greatly appreciate the willingness of the members of the Board to support my early research efforts and I am convinced that their willingness to support my research played a pivot role in the establishment and continued growth of my laboratory."

As a result of the CHRB award, Dr. Dupree leveraged additional grant support from the following: Virginia Center on Aging [$30,000]; Jeffress Memorial Trust Fund [$45,000]; National Institute of Health [$398,000]; and the European Leukodystrophy Association [$35,000].

Commonwealth Health Research Board

Total Funding for all grant awards in FY 2009/2010 including second year grant funding for six 2008/2009 Grant Awards

Submitting Institution/ Organization	Principal Investigator	Grant Title	CHRB Grant Award	Matching Funds	Total Project Funds
James Madison University	Mark L. Gabriele, Ph.D.	Establishing complex auditory circuits: Molecular mechanisms and functional implications for treating the hearing impaired	$68,484	$36,826	$105,310
University of Virginia	John A. Hossack, Ph.D.	Ultrasound-triggered release of rapamycin from microbubbles to treat in-stent restenosis	$100,000	$38,466	$138,466
University of Virginia	Molly A. Hughes, M.D., Ph.D.	Interaction of Host Chemokines with Pathogenic Bacteria: A Novel Antimicrobial Strategy	$100,000	$33,000	$133,000
Eastern Virginia Medical School	Woong-Ki Kim, Ph.D.	Targeting of CD16+ Monocytes in HIV NeuroAIDS	$100,000	$43,500	$143,500
James Madison University	Robert L. McKown, Ph.D.	Development of Novel Diagnostics and Treatments for Ocular Diseases	$79,776	$62,235	$142,011
University of Virginia	Ke Sheng, Ph.D.	Radiosensitization by Quantum Dot/Photofrin Conjugates	$100,000	$33,000	$133,000
Virginia Military Institute	James E. Turner, Ph.D.	Estrogen's Role in Protecting the Nervous and Cardiovascular Systems from Damage and Degenerative Diseases	$99,001	$32,500	$131,501
James Madison University	Roshna Wunderlich, Ph.D.	Etiology of Gender Differences in overuse injuries: The Interaction Among Hormones, Ligament Laxity and Footwear	$87,129	$30,811	$117,940
Total 2009/2010 CHRB Grant Awards			**$734,390**	**$310,338**	**$1,044,728**

Abstracts for 2009/2010 Grant Awards

Mark L. Gabriele, Ph.D.
James Madison University
Establishing complex auditory circuits: Molecular mechanisms and functional implications for treating the hearing impaired

Project Summary: Hearing, performed by the auditory system, is one of our two most important senses and is critical for speech and language acquisition. Despite the significant incidence of hearing loss and new treatment strategies (e.g. cochlear and auditory brainstem implants), fundamental questions concerning the development, organization, and maintenance of auditory connections persist unaddressed and therefore unanswered. We hypothesize that a family of signaling molecules (Eph receptors and ephrins) are partly responsible for establishing functional circuits in the developing auditory system. In collaboration with the Department of Communication Sciences and Disorders at JMU and the Center for Developmental Biology at The University of Texas Southwestern Medical Center, we propose to determine the role of Eph/ephrin interactions in constructing frequency-mapped auditory circuits. An understanding of early auditory system circuit formation mechanisms will necessarily guide new design paradigms for treating the hearing impaired and their most appropriate means for intervention.

John A. Hossack, Ph.D.
University of Virginia
Ultrasound-Triggered Release of Rapamycin from Microbubbles to Treat In-Stent Restenosis
(second year of a two-year grant awarded in FY 2008/2009)

Project Summary: Atherosclerosis, or closure of a blood vessel, leads to heart attack and accounts for more than 50% of deaths in Virginia. Current treatment of a diseased vessel is performed by deploying a metal stent to reopen the vessel. Unfortunately, due to complex cellular processes, sustaining a vessel's increased internal diameter for >6 months proves challenging. Even when the most advanced stents are used, the cells in the vessel proliferate resulting in vessel re-closure, and subsequent cardiac events. We address this critical problem by developing a new method to deliver a drug to suppress cellular proliferation. We will integrate ultrasound imaging with means of delivering antiproliferation drugs loaded into FDA-approved microbubbles. Following deployment of the metal stent, the drug-loaded microbubbles are perfused through the artery and focused ultrasound is used to rupture the bubbles and deliver the drug through the otherwise unbreachable cell membrane, increasing dose and thus preventing vessel reclosure.

Birgit Winther, M.D.
University of Virginia: 1999 CHRB grant recipient for a project entitled, *Effects of common colds caused by viruses on middle-ear pressure in children.*

"I am so grateful for the CHRB award. It had major impact on my research career. In addition, it provided new information on the effect of cold virus on the ears in children. The new information was used as a stepping stone for a NIH award which I have now had for two years."

Dr. Winther received a 5-year grant award from the National Institutes of Health (NIH) in the amount of $980,000 as a result of the initial CHRB grant award.

Nasal mucus is obtained for laboratory testing of cold viruses by PCR.

Middle ear pressure is obtained with a digital tympanometer.

Abdelali Haoudi, Ph.D.
Eastern Virginia Medical School: 2002 CHRB grant recipient for a project entitled, *Novel Cancer Gene Therapy for Prostate Cancer*.

"Funding from the CHRB was instrumental for establishing the grounds for a novel scientific finding in the area of cancer gene therapy. Further investigations are needed to clearly establish this exciting finding and further clarify its mechanism of action and control therefore opening a new avenue for a potential cancer gene therapy."

As a result of the CHRB award, Dr. Haoudi leveraged additional grant support from the Elsa U. Pardee Foundation for the period of Sept 2004-Sept 2006 for the amount of $125,000.

Cynthia S. Kelly, M.D.
Eastern Virginia Medical School: 2000 CHRB grant recipient for a project entitled, EZ Breathers: Partnership for Asthma Awareness and Prevention in Head Start children.

"Funding provided by the Commonwealth Health Research Board not only helped us to improve care for preschool-aged children with asthma in our community but it provided us with the outcome data necessary to successfully compete for national funding from the Robert Wood Johnson Foundation so that we could expand our program to asthmatic children of all ages in Hampton Roads."

As a result of work funded by the CHRB, Dr. Kelly was successful in obtaining one of eight awards for an "Allies Against Asthma" program funded by the Robert Wood Johnson Foundation, in a competition of 250 investigators. The grant is in an amount of $1,500,000 over four years.

Molly A. Hughes, M.D., Ph.D.
University of Virginia
Interaction of Host Chemokines with Pathogenic Bacteria: A Novel Antimicrobial Strategy
(second year of a two-year grant awarded in FY 2008/2009)

Project Summary: Chemokines are small proteins that are produced in response to a variety of infections and are involved in the host inflammatory response. We have found that three related chemokines called MIG, IP-10, and ITAC, exhibit antimicrobial effects on the spores and vegetative cells of the bacterium, *Bacillus anthracis*. Thus, these naturally occurring immune mediators may function as host antimicrobial agents in addition to their known function of recruiting white blood cells and other inflammatory cells to the site of infection to fight an invading pathogen. This would represent a novel mechanism by which the host combats pathogenic bacteria. By understanding the mechanisms by which chemokines inhibit *B. anthracis*, and given the increasing incidence of antibiotic-resistance amongst bacteria globally with the relative scarcity of new classes of antibiotics to counter the emergence of resistance, this project may open up new therapeutic strategies for use against a broad range of pathogens.

Woong-Ki Kim, Ph.D.
Eastern Virginia Medical School
Targeting of CD16+ Monocytes in HIV NeuroAIDS

Project Summary: The HIV epidemic is still raging in the United States, and the State of Virginia is not immune to this threat. Virginia State ranks 12th in number of reported AIDS cases in the country, and currently 18,425 persons are estimated to be living with HIV and AIDS in Virginia. While deaths associated with HIV infection have decreased thanks to effective antiretroviral treatment, dementia developed in HIV-infected patients continues to increase because individuals are living longer. Recent reports provide evidence that CD16+ monocytes, a type of white blood cells, emerge during HIV infection and that these cells correlate with cognitive impairment and HIV-associated dementia. To directly assess a pathogenic role of these cells, we propose the selective depletion of CD16+ monocytes with anti-CD16 antibody treatment in our well-characterized monkey model of HIV CNS disease. Our novel approach to selectively target CD16+ monocytes could lead to an effective immunotherapy for HAD.

Abstracts for 2009/2010 Grant Awards

Robert L. McKown, Ph.D.
James Madison University
Development of Novel Diagnostics and Treatments for Ocular Diseases
(second year of a two-year grant awarded in FY 2008/2009)

Project Summary: Lacritin is a human tear protein that stimulates tear secretion and promotes new cell growth. Recombinant lacritin is currently in preclinical animal studies as a new therapeutic to treat dry eye. It was recently discovered that recombinant variants of lacritin exhibit a potent antibacterial activity offering a new line of defense for the prevention and treatment of bacterial keratitis. We hypothesize that lacritin is a natural protector of the ocular surface and that topical application of human recombinant lacritin may promote wound healing and be an effective treatment for dry eye and bacterial ocular diseases. In collaboration with the University of Virginia, Eastern Virginia Medical School, and Walter Reed Army Medical Center Washington D.C., we propose to develop the first clinical immunoassay for human tear lacritin and pursue the development of recombinant lacritin as a novel therapeutic for wound healing and the treatment of ocular diseases.

Ke Sheng, Ph.D.
University of Virginia
Radiosensitization by Quantum Dot/Photofrin Conjugates
(second year of a two-year grant awarded in FY 2008/2009)

Project Summary: Cancers beginning or spreading to the liver or lungs are frequently lethal. Tumors too large for surgical removal are treated with radiation, however, killing these large tumors with radiation alone is limited by radiation damage to normal liver and lung tissue. Drugs that increase radiation cell killing are called radiosensitizers. We developed a novel radiosensitizer by chemically combining or conjugating a nanoparticle called a Quantum Dot, which creates light when exposed to radiation, to a drug called Photofrin, which is a photosensitizer that uses light energy to make oxygen chemically reactive resulting in cell death. This radiosensitizer kills 34% more tumor cells in cell culture studies than radiation alone. We propose to purify the conjugate, determine the optimal dose for radiosensitization in cell culture, and then determine the biodistribution, metabolism, toxicity, and efficacy of killing tumors in mice as a necessary step towards clinical development for human use.

George Kulik, Ph.D.
University of Virginia: 2001 CHRB grant recipient for a project entitled, *Molecular Targets for Cancer Therapy by Proteomic Analysis of Antiapoptotic Signaling Pathways.*

As a result of the CHRB grant award, Dr. Kulik leveraged grant funds from the Department of Defense Prostate Cancer Research Program *Anti-apoptotic signaling in prostate cancer cells* in the amount of $330,000 for the period January 1 2002 – December 31, 2005.

John J. Beck, Ph.D.
Sweet Briar College: 2002 CHRB grant recipient for a project entitled, *Syntheses and Structure-Activity Relationship Studies of Aromatic Side-Chain (z)-Ligustilide Derivatives: A Natural Product from Ligusticum Species.*

"Funds from the CHRB supported research that provided positive results of an initial investigation into a line of antibacterial compounds. These positive results provided evidence for a new line of antibacterial compounds. These new compounds will be the subject of a grant proposal to the NSF."

As a result of the CHRB grant award: Dr. Beck was awarded a National Science Foundation (NSF) grant award in the amount of $254,066 for the period September 2002 to September 2005.

Abstracts for 2009/2010 Grant Awards

George Kunos, M.D., Ph.D.
Virginia Commonwealth University: 1999 CHRB grant recipient for a project entitled, *Development of Novel Drugs for the Treatment of High Blood Pressure Disease.*

"I am grateful for the CHRB for the support I received. There is considerable foresight on the part of CHRB in supporting research with potential practical implications, such as the development of novel therapeutic agents."

Paul H. Ratz, Ph.D.
Eastern Virginia Medical School: 2000 CHRB grant recipient for a project entitled, Regulation of detrusor smooth muscle contraction by CA2+ and CA2- sensitization.

"Funds provided by the Commonwealth Health Research Board of Virginia enabled my laboratory to acquire a substantial amount of high-quality data that was included in an NIH RO1 grant application. Our goal with this research is to provide a cellular mechanistic approach for the design of new therapeutic agents that will reduce the incidence of urinary incontinence, a chronic disorder that is more prevalent than diabetes. Organizations exist to support research on specific life-threatening disorders such as hypertension, cancer and diabetes, but research on many non-life-threatening disorders is under funded. Support by the CHRB addresses this issue by providing funds of sufficient magnitude and duration for investigators with diverse interest to pursue their medical research problems in a meaningful and significant way."

As a result of work funded by the CHRB, Dr. Ratz was funded for 4 years at $730,000 by the National Institute of Diabetes and Digestive and Kidney Diseases at the National Institutes of Health.

James E. Turner, Ph.D.
Virginia Military Institute

Estrogen's Role in Protecting the Cardiovascular System from Damage and Degenerative Diseases

(second year of a two-year grant awarded in FY 2008/2009)

Project Summary: There is an abundance of molecular, cellular, biochemical, animal model and human patient literature to support the concept that estrogen impacts the cardiovascular system in significant ways. Yet, in the face of all this evidence investigators and clinicians alike were puzzled by the fact that the recent Women's Health Initiative (WHI) trials involving hormone replacement therapy (HRT) were halted before they were completed due to complications involving an increased risk of stroke and lack of cardiovascular protection. More recent studies state that additional basic and mechanistic estrogen research has to be pursued to better understand how to best target estrogen for optimal cardiovascular effects. To help address this staggering cardiovascular health challenge, we propose to investigate the mechanisms by which estrogen enhances the health and development of heart muscle and blood vessel function after the trauma of estrogen loss, using the zebrafish 'listless' model of congestive heart failure.

Roshna Wunderlich, Ph.D.
James Madison University

Etiology of Gender Differences in Overuse Injuries: The Interaction of Hormones, Ligament Laxity and Footwear

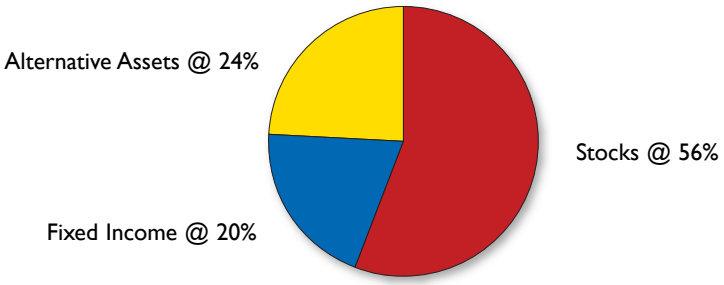
(second year of a two-year grant awarded in FY 2008/2009)

Project Summary: Overuse injuries constitute a considerable portion of injuries in athletes and military recruits and cause extensive occupation-specific problems. Overuse/stress injuries are more frequently observed in women. As the number of girls and women in high-level sport and the military continues to increase, it is essential to address the roles of anatomy, physiology and biomechanics in presenting a different suite of injuries in males and females. This study takes advantage of a multidisciplinary team from 2 Virginia universities to examine this gender imbalance in overuse injuries. We use biomechanical and immunological techniques to examine specific hypotheses relating hormone levels, ligament laxity, foot shape and footwear to shock attenuation and plantar pressure distribution in a group of male and female collegiate athletes. Insight into the etiology of overuse injuries through a multidisciplinary examination of the relationships among hormonal fluctuations, anatomy and biomechanics is fundamental to the prevention of this complex problem.

Investment of Funds

Assets of the Commonwealth Health Research Fund [CHRF] are pooled with the $55.1 billion Virginia Retirement System [VRS] investment fund. The estimated value of the CHRF as of June 30, 2009 was $23.5 million. The current asset allocation for the VRS investment fund reflects 56% stocks, 20% fixed income, and 24% alternative assets.

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 or since inception, whichever is shorter, on a one-year delayed basis, net of any administrative fee assessed pursuant to subsection E of Section 51.1-124.36, may be expended in a calendar year for any purpose permitted by this chapter.



Commonwealth Health Research Board Fiscal Year 2009 budget for the period January 1, 2009 to December 31, 2009

Calendar Year		***Market Value @ 12/31/XX***
January 1 - December 31, 2003	Year 1	$26,449,255
January 1 - December 31, 2004	Year 2	$28,010,649
January 1 - December 31, 2005	Year 3	$28,637,870
January 1 - December 31, 2006	Year 4	$31,189,661
January 1 - December 31, 2007	Year 5	$32,807,479
Average Market Value		$29,418,983
Funds available for 2009 grants based on 3.3% of the average market value		$970,826
Less Estimated Administrative Expenses:		
Estimated CHRB Operating Expenses		$100,000
Estimated VRS Administrative Fees		$2,600
Total Estimated Administrative Expenses		$102,600
Funds Available for 2009 grants less estimated administrative expenses:		$868,226

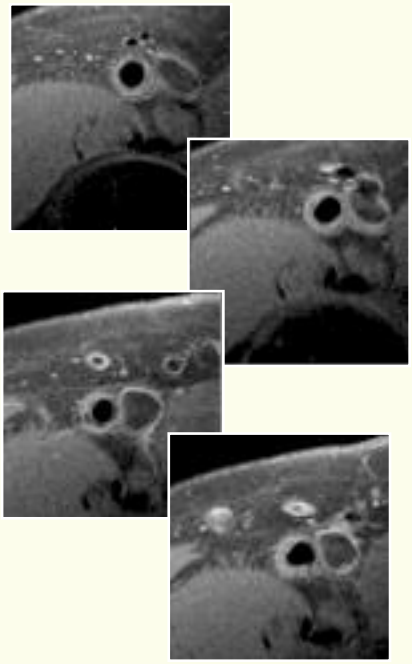
Methodology:
The valuation date for market values will be 12/31/XX of each year.
Each annual calculation will be made based on the previous five calendar years, with a one year delay.

Source: CHRF Market Values and VRS Administrative Fees: VRS

Christopher Kramer, M.D.
University of Virginia: 2001 CHRB grant recipient for a project entitled, *Imaging Inflammation within Atherosclerotic Plaque with magnetic resonance.*

"The CHRB grant was instrumental in completing the project, publishing a manuscript, and the data accrued served as preliminary data for an NIH R01 application that was subsequently funded."

As a result of the CHRB grant award, Dr. Kramer was awarded a National Institutes of Health (NIH) National Heart, Lung and Blood Institute (NHLBI) R01 grant, *Comprehensive Magnetic Resonance in Peripheral Arterial Disease* for the period 9/22/03-8/30/08, in the amount of $3.7 million total costs including $2.6 million direct costs.



Representative sequential black blood magnetic resonance images (upper left to lower right) obtained with the use of a surface coil from the femoral artery of a subject with mild to moderate peripheral arterial disease with both the luminal and adventitial border clearly delineated. Note the slice to slice variation in plaque morphology. This technique can be used to reduce sample sizes for clinical trials of novel approaches to reducing atherosclerotic plaque burden.

Yuping Deng, Ph.D., Eastern Virginia Medical School: 2003 CHRB grant recipient for a project entitled, *Improving the immune response to influenza vaccination in older adults by modulating the innate immunity.*

"The CHRB grant has been critical for my career development to transition to an independent research scientist, and for my graduate student Yu Jing who successfully completed her Ph.D. study while working on this project. Data generated from this grant has helped us secure the NIH funding."

As a result of the CHRB grant award, Dr. Deng was awarded a three-year grant from the National Institute of Allergy and Infectious Diseases NIH in the amount of $487,292 (including indirect cost) for the period August 1, 2004 to August 31, 2007.

Daniel Gioeli, Ph.D., University of Virginia: 2003 CHRB grant recipient for a project entitled, *Development of a novel prostate cancer therapy.*

"I would like to thank the CHRB for the funding opportunity. The CHRB funding was instrumental to this work which would not have begun without the early support of the CHRB."

As a result of the CHRB grant award, Dr. Gioeli was awarded a three-year grant from the Department of Defense in the amount of $333,000 for the period January 1, 2004 to December 31, 2006.

Eligibility for CHRB Grant Funding

The following Virginia-based entities may apply for a grant:

- State-supported institutions of higher education,
- Private, not-for-profit institutions of higher education established in Virginia,
- Agencies of the Commonwealth of Virginia, whose mission is to conduct health or health related research, and
- Nonprofit organizations exempt from income taxation under Section 501 c (3) of the Internal Revenue Code and with their principal offices and programs in the Commonwealth of Virginia whose mission is to conduct health or health related research.

CHRB Grant Application Process

Commonwealth Health Research Board (CHRB) grant guidelines are updated annually and posted to the CHRB website at www.chrb.org by July 1st of each year. The grant guidelines are designed to help individuals determine if the research project or initiative for which financial support is sought is a good match with the CHRB purposes and criteria. The guidelines also describe the kinds of research projects and activities the CHRB funds – and does not fund, and tells how and when to apply for a grant. The CHRB website also provides a description of past and current CHRB grant awards and grant abstracts.

As part of the CHRB grants application process, there are three steps that take place in the review process. More details regarding the required information as part of the submission of a concept paper or a full proposal to the CHRB can be found at www.chrb.org under the heading of CHRB Grant Guidelines.

Step One: Submission of concept paper. Concept papers are normally due October 1st. Concept papers [excluding the cover page] must be no longer than five typewritten, double spaced pages. In general, concept papers will provide information on the problem, need or opportunity that the project will address and the anticipated results or impact of the project. The concept papers will include an estimate of total project costs and the amount of funding the applicant is seeking from the CHRB as well as a timeframe for conducting the research. Each concept paper undergoes scientific and technical merit review.

Step Two: Submission of a full proposal. The Board requests those applicants, whose concept papers have been judged, in Step One, to have potential for successful research outcomes, to submit full proposals. Only applicants whom the Board has invited to develop a full proposal may submit a full proposal to the Board. Full proposals are normally due February 1st. The full proposal [excluding the cover page] must be no longer than 12 typewritten, double-spaced pages. In general, full proposals will provide similar information as provided in the concept paper except in greater detail. As in Step One, each full proposal receives in-depth review.

Step Three: Presentation to the Board. The Board invites finalists from Step Two to make a presentation in-person to the Board. Presentations to the Board are normally scheduled for the May meeting. Presentations, including questions and responses, should take no longer than 15 minutes. The presentation should elaborate on the information contained in the concept paper and full proposal.

Grant Award: After the presentations to the CHRB are completed, the Board will make decisions

regarding grant awards. Conditions for grant acceptance include a grant agreement between the Principal Investigator and the grantee institution and the CHRB. Each grantee must sign a Grant Agreement with the CHRB that delineates the terms and specific objectives of the project. Specific grant reporting requirements and distribution of grant funds are specified in the individualized grant agreement.

CHRB Grant Guidelines

- Applicants may request funding to support projects over either a one-year or two-year period. The maximum amount of a one-year award is $100,000. The maximum amount for a two-year award is $200,000; however, no more than $100,000 will be provided in the either the first or second year. The number of one-year and two-year grant awards that the CHRB anticipates it will make, is dependent upon the amount of funds available and the number of requests received for each category.

- The Grantee Institution must provide a minimum cash match from internal funds in the amount of 33% of the amount of CHRB funds requested. The grantee institution or organization can use indirect costs as part of or all of their matching funds.

- The starting date for all CHRB-funded projects is July 1. The CHRB will not entertain a request for a later start date. If the applicant cannot initiate the project by July 1, the award will not be made.

- The CHRB will accept no more than 15 applications from any one non-profit organization or institution of higher education per funding cycle. Individuals applying for funding may submit no more than one application per funding cycle.

- Grantees are responsible for meeting federal, state, and local health and safety standards and for establishing and implementing necessary measures to minimize their employees' risk of injury or illness in activities related to CHRB grants. Grantees are further responsible for meeting all applicable federal, state, and local regulations, requirements, and standards related to the involvement of human subjects and vertebrate animals.

- Applicants who are notified that they will present their full proposal to the Board, and who plan to conduct human subjects research or projects using animals, are strongly encouraged to begin the process of seeking Institutional Review Board (IRB) or Institutional Animal Care and Use Committee (IACUC) approval in advance of a formal presentation to the CHRB in order to ensure that required approvals are received by June 15th of the first year. If required IRB or IACUC approvals have not been received and transmitted to CHRB by June 15th no award will be issued by CHRB.

Talissa Altes, M.D.
University of Virginia: 2001 CHRB grant recipient for a project entitled, *Hyperpolarized Helium-3 Diffusion Weighted MR of the Lung: An New Technology to Assess the Lung Microstructure.*

"Thank you very much for your support! It was integral to our getting started in what has turned out to be a very productive and interesting area of research."

As a result of the CHRB award, Dr. Altes was able to leverage additional grant support from the following sources: (1) *Assessment of the variability of hyperpolarized helium-3 gas magnetic resonance imaging in patients with chronic obstructive pulmonary disease*, GlaxoSmithKline (GSK), 11/1/03-10/31/04, $363,069; and (2) *A New Method to Detect Early Changes of Emphysema in Persons Exposed to Second Hand Cigarette Smoke*, Flight Attendant Medical Research Institute (FAMRI), 7/1/04- 6/31/07, $317,000.

Grant Criteria

Michael McVoy, Ph.D. Virginia Commonwealth University: 2001 CHRB grant recipient for a project entitled, *Antiviral mechanisms of herpes virus DNA packaging inhibitors.*

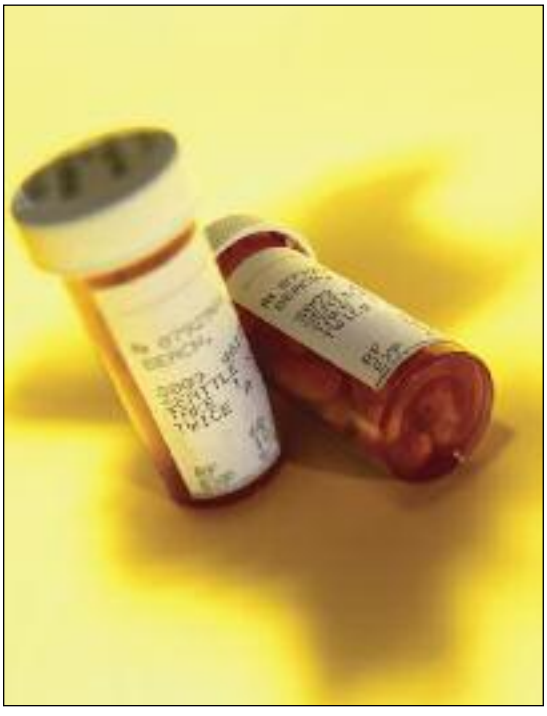
"It takes substantial preliminary data and a proven track record in the form of publications for a new investigator to obtain federal research grants. For scientists engaged in research at institutions within the Commonwealth of Virginia, the opportunities to obtain sufficient funds with which to generate this preliminary data and a solid publication record (i.e., > $50,000) are extremely limited (I know of only two - Jeffress and CHRB). I am therefore very grateful for the CHRB grant that my lab received. It came at a critical time in my career in which I very much needed those funds to move my research to a point where I could be competitive for NIH grants. It also engendered an important and fruitful collaboration with my partner in this grant, Jay Brown at the University of Virginia. I only wish that more funds were available for small grants of this type."

As a result of the CHRB grant award, Dr. McVoy was awarded a grant from the National Institute of Allergy and Infectious Diseases (NIH/NIAID) R21 AIO53768: *Analysis of cytomegalovirus DNA cleavage/packaging genes*, in the amount of $347,500 for the period 10-01-03 to 09-30-05. Dr. McVoy also has a grant renewal pending: NIH/NIAID R01 AI46668, Human cytomegalovirus DNA cleavage and packaging in the amount of $1,489,575 for the period 07-01-06 to 06-30-11.

CHRB Grant Criteria

Concept papers and full proposals will be reviewed in accordance with the following criteria:

- Significance: Does the research address an important problem? If the aims of the application are achieved, how will scientific or other knowledge be advanced? What will be the effect of this research on the concepts, methods, or practices in this field?
- Collaboration: Will the initiative employ useful collaborative arrangements among two or more institutions of higher education or organizations either within or outside the Commonwealth of Virginia?
- Leverage: How will funding provided by the CHRB be used to leverage additional support from other federal or private organizations? The Board gives priority to those research efforts where support can be leveraged to foster contributions from federal agencies or other entities.
- Approach: Are the conceptual framework, design, methods and analyses adequately developed, well integrated, and appropriate to the aims of the project?
- Innovation: Does the project employ novel concepts, approaches or methods? Are the aims original and innovative? Does the project challenge existing paradigms or develop new methodologies or technologies?
- Experience and Qualifications of Research Team: Does the Principal Investigator have the proper training and experience to direct and manage the project? What percentage of time will the Principal Investigator contribute to the project? Has the Principal Investigator conducted research related to this project? Through training and experience, is the research team qualified to conduct this research? Is the research team experienced with research evaluation processes?
- Unique Virginia Considerations: Are there unique Virginia research resources or facilities that will be utilized?

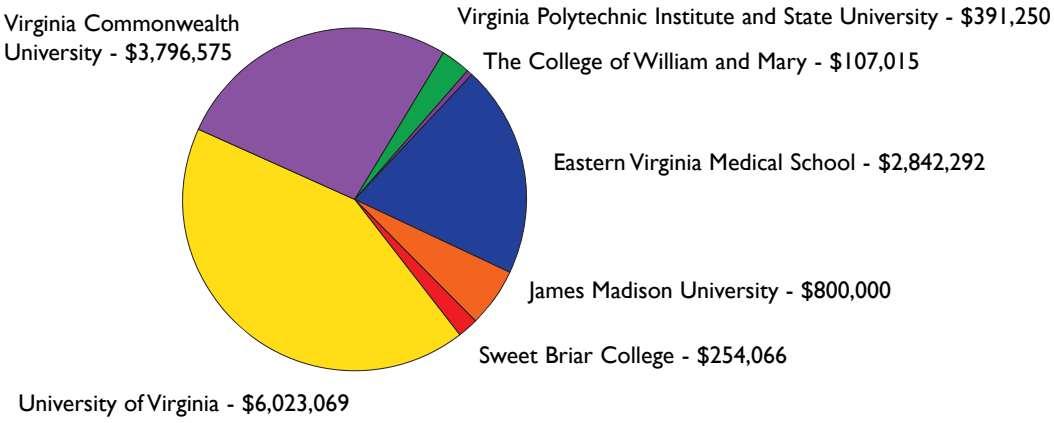


Post Award Reporting Requirements

For a period up to five years, the recipient organization agrees to notify the CHRB of any future grant awards that are received as a result of research funded with grant funds from the Commonwealth Health Research Board

The CHRB submits an annual report to the Governor and the General Assembly on the Board activities to include an executive summary of the grant process. It also provides information on grants funded in prior years and their success in leveraging additional grant funding from federal or private foundation funding sources.

Additional Funds Leveraged Total $14.2 million (based upon evaluation responses received)



Frank Castora, Ph.D. Eastern Virginia Medical School: 2001 CHRB grant recipient for a project entitled, *Alzheimer Disease linked to a mutation in mitochondrial DNA.*

"The CHRB award can be instrumental in allowing exciting research projects that may lack the preliminary data to warrant national funding to begin to obtain the data necessary for successful application for NIH or similar national funding."

Glenda E. Gillaspy, Ph.D. Virginia Polytechnic Institute and State University: 2001 CHRB grant recipient for a project entitled, *Isolation of Genes for Transgenic Production of a Diabetes Treatment.*

"The CHRB funding I received was critical in starting a new research project in my laboratory in 2002. I really appreciate this opportunity, and hope the CHRB can continue to fund "seed" projects of Virginia scientists. Although we did not accomplish our intended goal of cloning a chiro inositol epimerase gene from plants, we did find a really exciting connection between inositol and Vitamin C. This finding allowed us to pursue studies currently funded by the National Science Foundation."

Based on preliminary data funded by the CHRB, Dr. Gillaspy was awarded the following grants from the NSF:

National Science Foundation, Sole Principal Investigator, *Inositol Synthesis and Catabolism in Plants*, for the period 9/01/03- 8/31/06 in the amount of $380,000; and, National Science Foundation, Sole Principal Investigator, *REU: Inositol Synthesis and Catabolism in Plants*, for the period 9/01/03- 8/31/05 in the amount of $11,250.

Commonwealth Health Research Board

2009 Annual Report

Commonwealth Health Research Board
c/o Department of Accounts
P.O. Box 1971 [Mailing]
101 N. 14th Street, 2nd Floor [Delivery]
Richmond, Virginia 23218-1971
804.371.7799 Telephone
804.371.8587 Fax
www.chrb.org