Biomedical Research
Annual Report 2012-2013

Bankhead-Coley Cancer Research Program

James and Esther King Biomedical Research Program

Biomedical Research Advisory Council
Florida Biomedical Research Program Overview

Since 2001, the Florida legislature has recognized the need to support vital research conducted in both academic and private institutions throughout the state through the James and Esther King Biomedical Research Program (Section 381.922, Florida Statutes) and the Bankhead-Coley Cancer Research Program (Section 215.5602, Florida Statutes). In 2012-2013 this funding improved the health of Florida’s families, expanded the research infrastructure of the state, and advanced efforts to bring external research funding to the state. Research grants are issued based on a competitive peer-review process. Awards are based on scientific merit, as determined by independent peer review involving experts located outside Florida who are free from all conflicts of interest. Researchers at any university or established research institute in the state are eligible to apply for state funding. In 2012-2013 the Legislature appropriated $14.75 million, which funded a total of 38 grants. The Legislature also appropriated funds directly to certain research institutes in the state. Shands Hospital at the University of Florida and Sylvester Cancer Center at the University of Miami each received $7.5 million, and the H. Lee Moffitt Cancer Center received $5 million. The Sanford-Burnham Medical Research Institute received $3 million.

Annually the Department submits a fiscal-year progress report, including the following information as required by statute:

- a list of recipients of program grants or fellowships.
- a list of publications in peer reviewed journals involving research supported by grants or fellowships awarded under the program.
- the state ranking and total amount of biomedical research funding currently flowing into the state from the National Institutes of Health.
- new grants for biomedical research which were funded based on research supported by grants or fellowships awarded under the program.
- progress towards programmatic goals, particularly in the prevention, diagnosis, treatment, and cure of diseases related to tobacco use, including cancer, cardiovascular disease, stroke, and pulmonary disease.
- recommendations to further the mission of the programs.
William G. "Bill" Bankhead, Jr., and David Coley Cancer Research Program

The Bankhead-Coley Cancer Research Program advances progress toward cures for cancer. Cancer is now the leading cause of death for Floridians, surpassing heart disease. Florida has the second highest cancer burden in the nation. In the three year period from 2009-2011 (the latest time period data are available), the total number of cancer deaths was 122,921. On average, 100,000 new cancers are diagnosed in Florida every year. Funding through the Bankhead-Coley program significantly improves cancer research and treatment in the state by

- attracting new research talent and grant-producing researchers;
- funding proposals that demonstrate the greatest ability to attract federal research grants;
- encouraging the development of bioinformatics to allow researchers to exchange information;
- facilitating technical collaboration, business development and support for intellectual property related to research; and
- aiding multi-disciplinary research through greater participation in clinical trials networks and reducing the impact of cancer on disparate groups.

The James and Esther King Biomedical Research Program

The purpose of the James and Esther King Biomedical Research Program is to advance cures in tobacco-related diseases. Heart disease is the second leading cause of death in Florida. Diseases related to tobacco, such as emphysema, chronic obstructive pulmonary disease, and other chronic lower respiratory diseases, were the fourth leading cause of death in 2011. The King program funds research initiatives that seek new insights and innovative solutions in the prevention, diagnosis, treatment, and cure of Floridians afflicted by tobacco-related diseases including cardiovascular disease, stroke, lung disease and tobacco-related cancers.

Florida funds research that impacts the health of Floridians

As of 2012-2013, over 3300 Floridians were enrolled in ongoing research studies funded by these two biomedical research programs. People throughout the state volunteered their time to improve the lives of all Floridians, and received health benefits from participation in the research. Benefits to the current participants included screening and genetic counseling for breast cancer; screening for colon cancer; improved diagnosis of cancer of the throat and esophagus; and improved management of the side effects of bladder cancer treatment. A study involving healthy weight and breast cancer provided dietary counseling. A small number of patients were enrolled in the initial phase of a clinical study testing new drugs to cure cancer, including an innovative cancer vaccine study. More than 800 participants were enrolled in studies of heart disease. These participants received direct benefits such as smoking cessation counseling, which included counseling and education for pregnant women who smoke. In 2012-2013, the Surgeon General charged the Biomedical Research Advisory Council with developing a research agenda with specific milestones and results to focus grant funding on health impacts and issues that matter most to Florida's families.

Florida funds research infrastructure

Studies funded by these programs improved the research infrastructure of the state. Peer-reviewed research expanded the Florida Cancer Registry Data System, the largest cancer registry in the nation, to begin to create a nationally representative cancer research database.
State funding for the Florida Translational Research Program Collaborative Drug Discovery Initiative at the Sanford-Burnham Medical Research Institute supported researchers funded through the King and Bankhead-Coley programs working to discover new drugs to cure cancer and tobacco-related diseases.

**Florida funds research projects that help the state attract external research funding.**

Florida’s biomedical research programs have the distinction of being recognized by the National Cancer Institute. When Florida’s funding is awarded through the rigorous peer-review mechanisms in the biomedical research programs, researchers are able to cite those grants when applying for federal funding. The National Cancer Institute accepts Florida’s grant programs as evidence when conducting peer review, which is particularly important for new researchers, who do not yet have a history of federal funding. However, even with this advantage, reductions in National Institutes of Health (NIH) funding resulted in lower state funding in 2012-2013. Florida’s funding from the NIH declined by $64 million compared with 2011-2012, and Florida’s state ranking dropped from 13 to 14 in NIH funding. These numbers must be seen in the context of an overall drop in federal funding for research. NIH funding declined over $377 million from its high in 2011, which impacts the ability of Florida researchers to obtain external funding. Since 2003 the budget of the NIH has grown minimally, with buying power shrinking by about 20 percent due to inflation. The outlook for 2013-2014 continues in this direction. Total NIH funding was reduced by 5%, or more than $1.7 billion, in the 2013-2014 federal fiscal year. This is expected to result in approximately 700 fewer NIH grants.

**Biomedical Research Advisory Council**

The Biomedical Research Advisory Council (Section 215.5602, Florida Statutes) advises the State Surgeon General regarding the direction and scope of the biomedical research program. The responsibilities of the council include, but are not limited to:

- Providing advice on program priorities and emphases; providing advice on the overall program budget;
- Participating in periodic program evaluation;
- Assisting in the development of guidelines to ensure fairness, neutrality, and adherence to the principles of merit and quality in the conduct of the program;
- Assisting in the development of appropriate linkages to nonacademic entities, such as voluntary organizations, health care delivery institutions, industry, government agencies, and public officials;
- Developing criteria and standards for the award of research grants;
- Developing guidelines relating to solicitation, review, and award of research grants and fellowships, to ensure an impartial, high-quality peer review system; and
- Reviewing reports of peer review panels and making recommendations for research grants and fellowships.
Biomedical Research Advisory Council Membership

Daniel Armstrong, Ph.D., Chair, Professor and Associate Chair, Pediatrics, Director, Mailman Center for Child Development, University of Miami Miller School of Medicine. Seat: American Cancer Society Representative.

Mark Brantly, M.D., Co-Chair, Chief, Division of Pulmonary and Critical Care Medicine University of Florida, College of Medicine. Seat: American Lung Association Representative.

Charles Wood, Ph.D., Professor and Chair, Department of Physiology and Functional Genomics, University of Florida College of Medicine. Seat: American Heart Association Representative.

Barbara Centeno, M.D., Director of Cytopathology and Anatomic Pathology Quality Assurance/Moffitt Cancer Center, Professor of Oncologic Sciences and Pathology and Cell Biology/University of South Florida. Seat: House.

Randal H. Henderson, M.D., MBA, Associate Medical Director, Proton Therapy Institute Professor of Radiation Oncology, University of Florida, Jacksonville. Seat: House.


Edith Perez, M.D., Deputy Director at Large, Mayo Clinic Cancer Center; Director, Breast Cancer Translational Genomics Program, Serene M. and Frances C. Durling Professor of Medicine, Mayo Clinic, Jacksonville. Seat: Senate.

Penny Ralston, Ph.D., Director, Dean Emeritus and Professor, Center on Better Health & Life for Underserved Populations, Institute of Science & Public Affairs, Florida State University. Seat: Senate.

Claes Wahlestedt, M.D., Ph.D., Professor and Vice Chair (Research), Dep. of Psychiatry and Behavioral Sciences, Associate Dean for Therapeutic Innovation, Director, Center for Therapeutic Innovation, Hussman Institute for Human Genomics, University of Miami Miller School of Medicine. Seat: Governor.
<table>
<thead>
<tr>
<th>Grant Recipients</th>
<th>Research projects</th>
<th>Institution</th>
<th>Award Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jianfeng Cai</td>
<td>Design, synthesis, and evaluation of gamma- AApeptide-based protein tyrosine phosphatase inhibitors as novel anticancer agents</td>
<td>University of South Florida</td>
<td>$374,000.00</td>
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<tr>
<td>Alicja Copik</td>
<td>Generation of highly cytotoxic natural killer cells for cellular therapy of cancers using novel microparticle approach</td>
<td>University of Central Florida</td>
<td>$374,000.00</td>
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<td>John Copland</td>
<td>Stearoyl CoA as novel molecular target for treatment of kidney cancer</td>
<td>Mayo Clinic</td>
<td>$100,000.00</td>
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<td>William Dunn</td>
<td>Inhibiting a core autophagy protein to treat prostate cancer</td>
<td>University of Florida</td>
<td>$116,875.00</td>
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<tr>
<td>Pearlie Epling-Burnette</td>
<td>Verification of TERT assay for MDS diagnosis</td>
<td>Moffitt Cancer Center</td>
<td>$ 99,993.00</td>
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<td>Dmitry Gabrilovich</td>
<td>Lipids and Myeloid Cell Function in Cancer</td>
<td>Moffitt Cancer Center</td>
<td>$180,185.00</td>
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<td>Scott Gilbert</td>
<td>Bladder Cancer Outcomes and Impact Study (BCOIS)</td>
<td>University of Florida</td>
<td>$374,000.00</td>
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<td>John Heine</td>
<td>Automated Quantitative Measures of Breast Density</td>
<td>Moffitt Cancer Center</td>
<td>$187,000.00</td>
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<td>Chen Ling</td>
<td>Treatment for human hepatocellular carcinoma based on genome- and capsid-optimized recombinant adeno-associated virus serotype 3 vectors</td>
<td>University of Florida</td>
<td>$374,000.00</td>
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<tr>
<td>Hendrik Luesch</td>
<td>Development of scale-up synthetic method for apratoxin S4, a novel drug for the treatment of colorectal cancer</td>
<td>University of Florida</td>
<td>$100,000.00</td>
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<td>Enrique Mesri</td>
<td>Endothelial progenitor cells in viral oncogenesis of AIDS-Kaposis sarcoma</td>
<td>University of Miami</td>
<td>$134,406.00</td>
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<td>Priyamvada Rai</td>
<td>Implications of Cellular Senescence as a Treatment Response in Prostate Cancer</td>
<td>University of Miami</td>
<td>$374,000.00</td>
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<td>Edward Seto</td>
<td>Functions, Mechanisms of Action, and Regulations of SIRT1</td>
<td>Moffitt Cancer Center</td>
<td>$187,000.00</td>
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<td>Ravi Shridhar</td>
<td>Validation of a Radiation Response Signature in Borderline Resectable Pancreatic Cancer Patients Treated with Induction Chemotherapy followed by Stere</td>
<td>Moffitt Cancer Center</td>
<td>$374,000.00</td>
</tr>
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<tr>
<td>Dmitry Ivanov</td>
<td>The Role of Danger Signals in Retinal Ischemia</td>
<td>University of Miami</td>
<td>$200,000.00</td>
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<td>Hans Peter Larsson</td>
<td>Voltage Sensor Roles in the Physiology and Pathophysiology of a Heart K+ Channel</td>
<td>University of Miami</td>
<td>$179,493.00</td>
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<td>Stephen Coombes</td>
<td>Cortical and Subcortical Brain Function in Chronic Stroke</td>
<td>University of Florida</td>
<td>$384,205.00</td>
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<td>Jia Fang</td>
<td>Functions of MPP8 in Tumor Suppressor Gene Silencing and Lung Cancer Progression</td>
<td>Moffitt Cancer Center</td>
<td>$400,000.00</td>
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<tr>
<td>Brian Lally</td>
<td>Genomic Prediction Models of Lung Cancer Survival and Treatment Response</td>
<td>University of Miami</td>
<td>$400,000.00</td>
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<td>Lirong Peng</td>
<td>Regulations and functions of Tip60 and hMOF</td>
<td>Moffitt Cancer Center</td>
<td>$400,000.00</td>
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<td>Lina Shehadeh</td>
<td>Modulation of miR-30e in Nicotine-Enhanced Atherogenic and Osteogenic Pathways</td>
<td>University of Miami</td>
<td>$400,000.00</td>
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<td>Jose Silva</td>
<td>Involvement of hypothalamic non-protein coding RNAs in the metabolic response to prenatal nicotine exposure in offspring</td>
<td>University of Miami</td>
<td>$392,327.00</td>
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<td>Hoshang Unwalla</td>
<td>Restoring the Mucociliary clearance enhancing properties of inhaled beta-2-agonist bronchodilators in chronic bronchitis.</td>
<td>University of Miami</td>
<td>$400,000.00</td>
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<td>Gaofeng Wang</td>
<td>Determine smoking susceptibility loci in age-related macular degeneration.</td>
<td>University of Miami</td>
<td>$400,000.00</td>
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<tr>
<td>Name</td>
<td>Project Description</td>
<td>Institution</td>
<td>Funding</td>
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<tr>
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<tr>
<td>Sion Williams</td>
<td>High resolution mapping and quantitation of somatic mitochondrial DNA variants in heart failure.</td>
<td>University of Miami</td>
<td>$ 389,964.00</td>
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<tr>
<td>Naohiro Terada</td>
<td>T3SS-Mediated Cardiomyocyte Engineering</td>
<td>University of Florida</td>
<td>$ 172,500.00</td>
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<td>Omaida Velazquez</td>
<td>Role of the Notch Signaling in Atherosclerosis &amp; Stem Cell-Mediated Arterial Repair</td>
<td>University of Miami</td>
<td>$ 200,000.00</td>
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<td>Jie Wu</td>
<td>Protein Tyrosine Kinase-Phosphatase Interaction in Tumorigenesis</td>
<td>Moffitt Cancer Center</td>
<td>$ 200,000.00</td>
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<td>Danuta Szczesna-Cordary</td>
<td>Functional and Structural Consequences of FHC-linked RLC Mutations</td>
<td>University of Miami</td>
<td>$ 200,000.00</td>
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<td>Alexander Agoulnik</td>
<td>Vascular effects of relaxin receptor agonists</td>
<td>Florida International University</td>
<td>$ 100,000.00</td>
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<td>Teng Ma</td>
<td>Development of a Bioreactor Strategy for Scalable Expansion of Human Mesenchymal Stem Cell Aggregates for Heart Diseases</td>
<td>Florida State University</td>
<td>$ 100,000.00</td>
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<td>Miroslav Gantar</td>
<td>Enhancing the Activity of Anticancer Drugs by a Natural Product - Phycocyanin</td>
<td>Florida International University</td>
<td>$ 99,765.00</td>
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<tr>
<td>Hendrik Luesch</td>
<td>Development of a scalable synthetic method for lyngbyastatin 7 as a new treatment of pulmonary diseases</td>
<td>University of Florida</td>
<td>$ 100,000.00</td>
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<td>Robert Henning</td>
<td>Umbilical Cord Cells in Hydrogels Mend Smokers Broken Hearts/Umbilical Cord Progenitor Cells in the Treatment of Acute Myocardial Infarction</td>
<td>Haley VA Hospital</td>
<td>$ 100,000.00</td>
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</tbody>
</table>

**Total National Institutes of Health Funding and State Ranking 2012-2013**

<table>
<thead>
<tr>
<th>Federal Fiscal Year</th>
<th>Funding</th>
<th>State Rank</th>
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<tr>
<td>2013</td>
<td>$429,327,288</td>
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<tr>
<td>2012</td>
<td>$502,112,696</td>
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<td>2011</td>
<td>$492,555,720</td>
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</tbody>
</table>
Total Follow-on Funding Awards Reported by Grantees: $5,832,709.00

3. Ning, Shunbin, BC, (2012) Targeting an oncogenic miRNA by IRFs promotes survival of tumor virus-transformed cells, American Society of Hematology, $150,000
5. Borlongan, Cesar, King, (2013) Reinforcing Repair Response to Traumatic Brain Injury, Veterans Affairs, $1,000,000

Total $5,832,709.00

Publications in peer reviewed journals

1. Researchers reported 77 new publications in peer-reviewed journals between July 1, 2012 and June 30, 2013 based on Florida’s research funding from the King and Bankhead Coley research programs
10. Damas O, Sussman DA, Jahann DA, Reznick R, Tamariz L, Deshpande AR, Abreu MT, Phenotypic Manifestations of Inflammatory Bowel Disease Differ between Hispanics and Non-


36. Manipulation of mtDNA heteroplasmy in all striated muscles of newborn mice by AAV9-mediated delivery of a mitochondria-targeted restriction endonuclease. Bacman SR, Williams SL, Duan D, Moraes CT.


47. Niu, Youhong; Wu, Haifan; Huang, Rongfu; Qiao, Qiao; Costanza, Frankie; Wang, Xi-Sen; Hu, Yaogang; Amin, Mohammad Nassir; Nguyen, Anh-My; Zhang, James; Edward Haller; Shengqin Ma; Xiao Li and Jianfeng Cai Nanorods Formed from a New Class of Peptidomimetics Macromolecules (2012), 45(18), 7350-7355


57. Pedersen, S.W.; Armishaw, C.J.; Strømgaard, K. Synthesis of Peptides Using Tert-Butyloxy carbonyl (Boc) as the α-Amino Protection Group, Methods Mol. Biol. 2013, 1047, 65-80


84. Yue, X.; Yanez, C. O.; Yao, S.; Belfield, K. D. Journal of the American Chemical Society 2013, 135, 2112-2115


86. Zhibin Wang, Peipei Zhang, Brett Kirkland, Yingru Liu, Jingjiao Guan, Microcontact printing of polyelectrolytes on PEG using an unmodified PDMS stamp for micropatterning nanoparticles, DNA, proteins and cells, Soft Matter (2012) 8: 7630-7637