



## **Biomedical Research Advisory Council**

Bankhead-Coley Cancer Research Program

James and Esther King Biomedical Research Program

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### **Annual Report 2014-2015**

Rick Scott  
Governor

John H. Armstrong, MD, FACS  
Surgeon General and Secretary of Health

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## **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 2014-2015, this funding continued to improve 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 from the King and Bankhead-Coley Programs are based on scientific merit, as determined by independent peer review involving experts located outside Florida who are free from conflicts of interest. Researchers at any university or established research institute in the state are eligible to apply for state funding. In 2014-2015 the Legislature appropriated \$18,755,414.00, which funded a total of 14 grants.

The Department of Health (Department) is required by statute to submit an annual, fiscal-year progress report that includes the following information:

- 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 the second leading cause of death for Floridians, second to heart disease. Florida continues to have the second highest cancer burden in the nation. 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 disparate impact of cancer on certain 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. 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, the leading causes of death in Florida and nationally.

### **Strategic Goals**

In 2014, the Biomedical Research Advisory Council (BRAC) created a strategic plan for Florida's biomedical research funding to specify defined objectives to be accomplished in specific timeframes. The strategic plan focuses on the health impact of research and making Florida a destination for cancer care and research. This strategic plan also demonstrates our commitment to transparency in communicating program priorities, defines the Biomedical Research Advisory Council's substantive areas of focus, and specific timeframes for evaluating success, and guides funding opportunities issued by the Department of Health. The Biomedical Research Advisory Council recommended that the following strategic goals be included in the funding opportunity announcement.

- Conduct research with a focus on prevention and improved treatment or care delivery that contributes to decreased deaths due to lung cancer by 15%, breast cancer by 15%, prostate cancer by 20%, colon cancer by 25%, and melanoma by 15% within 10 years.
- Develop research that contributes to reductions in deaths due to lung cancer by 30%, breast cancer by 30%, prostate cancer by 30%, colon cancer by 30%, and melanoma by 30% resulting from health disparities due to race, ethnicity, or income within 10 years.
- Improve screening accuracy, detection of high risk subgroups, and/or improved implementation of cancer screening programs that result in a 20% increase in early detection of cancer or preventable cancer within 10 years.
- Establish at least five Investigational New Drug(IND)/Investigational Device Exemption (IDE)s based on Florida investigator drug discovery, biologic, or other therapeutics that result in at least two multi-center collaborative clinical trials within 10 years.
- Develop innovative basic and clinical research studies focused on lower incidence of high mortality/high morbidity cancers (e.g., sarcomas, pancreatic tumors, CNS tumors, myeloma, leukemia/myelodysplastic syndrome) that result in significant improvement in survival/quality of survival in adults and children in at least two of these cancers.
- Design research protocols that lead to academic-industry development of five new biotechnology products/companies that subsequently obtain incremental commercial funding (beyond Florida funding) within 10 years.
- Reduce tobacco use in children and adolescents to less than 4% and adults to less than 15% within 10 years.
- Enhanced understanding of the relationship between obesity, healthy weight, and cancer.
- Expand upon research that improves scientific understanding of causes and subsequent impact of cancer/cancer-treatment related morbidities in other systems (e.g., cardiovascular, pulmonary, endocrine, lymphatic, CNS, reproductive, developmental).

FY 14/15 funding cycle awards were made to support the following research priorities:

5 Awards - Prevention and Treatment

3 Awards - Technology Transfer Feasibility (TTF)

2 Awards – Health Disparities

2 Awards – Tobacco Use

1 Award – Screening

### **Florida Biomedical Research grant awards builds research infrastructure**

Studies funded by these programs improved the research infrastructure of the state. 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'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.

Recommendations are made to the State Surgeon General by the Biomedical Research Advisory Council and are found in the BRAC Strategic Goals and Tactics, 2014, which is in Appendix I. This document impacts Florida's research agenda.

### **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.
- Reviewing reports of peer review panels and making recommendations for research grants and fellowships.

### **Biomedical Research Advisory Council Membership as of June 30, 2015**

Daniel Armstrong, Ph.D., Chair, Professor and Executive Vice Chair, Pediatrics, Director, Mailman Center for Child Development, and Senior Associate Dean for Faculty Affairs(Interim) University of Miami Miller School of Medicine. Seat: American Cancer Society Representative.

Abubakr A. Bajwa, MD, FCCP, Associate Professor of Medicine; Division Chief, Pulmonary Hypertension and Interstitial Lung Disease Clinic, University of Florida College of Medicine/Jacksonville. 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 of Representatives.

Stephen Gardell, Ph.D., Senior Director, Scientific Resources & Associate Professor, Sanford-Burnham Medical Research Institute at Lake Nona. Seat: House of Representatives

John R. Wingard, M.D., Price Eminent Scholar and Professor of Medicine Deputy Director of Research, University of Florida Health Cancer Center. 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.

David Decker, MD, Executive Director, Florida Hospital Cancer Institute. Seat: Governor.

Paul Jacobsen, Ph.D., Professor, Division of Population Science, H. Lee Moffitt Cancer Center and Research Institute. Seat: Governor

**New Members After July 1, 2015**

Allison Eng-Perez, Principle, Deloitte & Touche, LLP. Seat: Governor

Richard Nowakowski, Ph.D., Professor and Department Chair of Biomedical Sciences at Florida State University's College of Medicine. Seat: Governor

<b>Bankhead-Coley Cancer Research Program Fiscal Year 2014-2015</b>			
<b>Grant Recipients</b>	<b>Research Projects</b>	<b>Institution</b>	<b>Award Amount</b>
Haura, Erica	Signaling-associated protein complexes for the molecular annotation of therapeutic vulnerabilities, resistance-associated signaling & tumor heterogeneity in lung cancer	H. Lee Moffitt Cancer Center and Research Institute	\$ 1,686,887
Hu, Jennifer J.	Impact of Etiology-Driven Precision Medicine on Reducing Breast Cancer Disparities	University of Miami	\$ 1,290,000
Lynch, Conor	An integrated computational and biological approach to curing prostate to bone metastases	H. Lee Moffitt Cancer Center and Research Institute	\$ 1,290,000
Perera, Ranjan J.	The Expansion and Upgrade of the Analytical Genomics Core Infrastructure at Sanford-Burnham Medical Research Institute	Sanford-Burnham Medical Research Institute	\$ 1,289,948
Radisky, Derek C.	Development of assays for individualized breast cancer risk prediction	Mayo Clinic	\$ 1,200,953
Law, Brian	Novel Agents that simultaneously target HER2, EGFR, and HER3 for treating breast cancer and overcoming therapeutic resistance	University of Florida	\$ 1,107,000
Kim, Minjung	Elucidating the role of R-Ras activation in melanoma tumorigenesis	H. Lee Moffitt Cancer Center and Research Institute	\$ 970,758
Wu, Lizi	Molecular Regulation of CNS Leukemia Development	University of Florida	\$ 86,000

<b>James and Esther King Biomedical Research Program Fiscal Year 2014-2015</b>			
<b>Grant Recipients</b>	<b>Research Projects</b>	<b>Institution</b>	<b>Award Amount</b>
Hooper, Monica Webb	Addressing Racial/Ethnic Tobacco Health Disparities via Group Intervention	University of Miami	\$ 1,953,000
Salathe, Mattias	Adverse airway effects of inhaled nicotine from tobacco and e-cigarettes	University of Miami	\$ 1,951,531
Simmons, Vani	Expanding the reach of a validated smoking-cessation intervention: A Spanish-language clinical trial	H. Lee Moffitt Cancer Center and Research Institute	\$ 1,904,351
Liu, Chen	Novel small molecules for alpha-1 antitrypsin deficiency	University of Florida	\$ 1,464,750
Kaye, Frederic J.	First-of-its-Kind Intralesional Delivery of Oncolytic therapy for Limited Stage Small Cell Lung Cancer	University of Florida	\$ 1,414,858
Cress, Doug	Proliferative signatures to predict the benefit of Adjuvant Chemotherapy in Early-Stage non-small cell lung cancer	H. Lee Moffitt Cancer Center and Research Institute	\$ 1,145,378



**Federal Research Funding 2014**

State	NIH Funding	Rank	Total (NIH, CDC, NSF, AHRQ)*	Rank
California	3,410,496,236	1	3,785,519,397	1
Massachusetts	2,364,750,629	2	2,519,340,720	3
New York	2,069,300,604	3	2,667,579,462	2
Pennsylvania	1,496,869,899	4	1,621,491,499	4
Maryland	1,010,931,562	5	1,219,997,494	5
North Carolina	991,876,570	6	1,115,762,540	7
Texas	972,156,544	7	1,149,072,673	6
Washington	876,933,041	8	995,839,449	8
Illinois	710,197,186	9	860,727,544	9
Ohio	633,220,134	10	722,795,387	10
Michigan	570,661,279	11	684,649,598	11
Minnesota	496,534,123	12	572,226,044	14
Florida	472,980,811	13	629,812,193	12
Missouri	467,769,290	14	520,579,742	15
Georgia	466,527,650	15	625,030,177	13
Connecticut	464,422,776	16	512,141,722	17
Tennessee	444,845,210	17	513,935,064	16
Wisconsin	383,027,428	18	445,295,108	18
Colorado	310,947,915	19	374,975,967	19
Oregon	301,075,374	20	355,554,759	20

\*[www.report.nih.gov](http://www.report.nih.gov)

\*<https://taggs.hhs.gov/2014AnnualReport/Portfolios/ahrq>

\*<http://dellweb.bfa.nsf.gov/AwdLst2/default.asp>

\*<https://taggs.hhs.gov/2014AnnualReport/Portfolios/cdc>

**Total Follow-on Funding Awards Reported by Grantees: \$3,689,901.67**

1. Reisman, D, Bankhead-Coley (2012), Establishing that BRM polymorphisms are predictive of lung cancer risk. NCI \$141,000.00
2. Brown, K, Bankhead-Coley (2012), Florida Minority Cancer Research & Training (MiCaRT) Center Federal, NIH/NCI \$1,023,456.00
3. Agoulnik, Alexander, Irina, James and Esther King (2013), Small molecule agonists of relaxin receptor. NIH and Bristol-Myers Squibb \$290,000.00
4. Rosen, Barry P., Bankhead-Coley (2014), the human arsenic methylation pathway. NIH \$1,610,447.00
5. Law and Castellano, Bankhead-Coley (2014), Novel Agents that Simultaneously Downregulate HER2, EGFR, and HER3. Dept. of Defense Breast Cancer Research Program (25% effort) \$700,000.00
6. Law, Castellano, and Helderman, Bankhead-Coley (2014), A new class of drugs targeting HER2- and EGFR-dependent breast cancer. UFHCC Pilot Grant (1%) \$60,000.00
7. Law, B., Bankhead-Coley (2014), CDCP1 as a therapeutic target in the dissemination of Triple-Negative Breast cancer. UF Health Cancer Center Triple Negative Breast Cancer Grant (1% effort)/Funds provided by the Collaboration of Scientists for Critical Research in Biomedicine (CSCR, Inc.) \$60,000.00
8. Law, B., Bankhead-Coley (2014), Synthesis and validation of the mechanism of action of novel oncoproteins anti-cancer compounds that downregulate the EGFR, HER2, and HER3 oncoproteins in parallel. UF Office of Technology and Licensing (1% effort) \$5,000.00
9. Smith, Layton, James and Esther King (2014). A chemical biology strategy to validate the apelin receptor as a therapeutic target for diabetic retinopathy. Juvenile Diabetes Research Foundation \$499,998.67

**Publications in peer reviewed journals**

Researchers reported 54 new publications in peer-reviewed journals between July 1, 2014 and June 30, 2015 based on Florida's research funding from the King and Bankhead Coley research programs.

1. McLaughlin, Sarah A. "The link between lymphedema, breast reconstruction and microsurgery." *Breast Cancer Management* 3.4 (2014): 335-343.
2. Ai, Lingbao, et al. "TRIM29 Suppresses TWIST1 and Invasive Breast Cancer Behavior." *Cancer research* 74.17 (2014): 4875-4887.
3. Nabils, Nancy H., et al. "Multiplex mapping of chromatin accessibility and DNA methylation within targeted single molecules identifies epigenetic heterogeneity in neural stem cells and glioblastoma." *Genome research* 24.2 (2014): 329-339.
4. Pardo, Carolina E., et al. "Integrated DNA Methylation and Chromatin Structural Analysis at Single-Molecule Resolution." *Chromatin Protocols* (2015): 123-141.
5. Khin ZP, Ribeiro ML, Jacobson T, Hazlehurst L, Perez L, Baz R, Shain K, Silva AS. A preclinical assay for chemosensitivity in multiple myeloma. *Cancer Res.* 2014; 74(1):56-67.
6. Overcoming Drug Resistance in Multiple Myeloma by XP01/CRM1 Inhibitor Combinatorial Therapy with Bortezomib, Carfilzomib and Pegylated Liposome

- Doxorubicin. Turner JG, Dawson J, Grant S, Shain K, Dai Y, Kauffman M, Shacham S, and Sullivan DM. *Cancer Research*, Submitted December 2015.
7. Oyer, Jeremiah L., et al. "Generation of Highly Cytotoxic Natural Killer Cells for Treatment of Acute Myelogenous Leukemia Using a Feeder-Free, Particle-Based Approach." *Biology of Blood and Marrow Transplantation* 21.4 (2015): 632-639.
  8. Ling, Chen, et al. "Enhanced Transgene Expression from Recombinant Single-Stranded D-Sequence-Substituted Adeno-Associated Virus Vectors in Human Cell Lines In Vitro and in Murine Hepatocytes In Vivo." *Journal of virology* 89.2 (2015): 952-961.
  9. Ling, Chen, et al. "Selective in vivo targeting of human liver tumors by optimized AAV3 vectors in a murine xenograft model." *Human gene therapy* 25.12 (2014): 1023-1034.
  10. Zhang, Yuan-hui, et al. "Cytotoxic genes from traditional Chinese medicine inhibit tumor growth both in vitro and in vivo." *Journal of integrative medicine* 12.6 (2014): 483-494.
  11. Wilson, James N., et al. "Binding-Induced Fluorescence of Serotonin Transporter Ligands: A Spectroscopic and Structural Study of 4-(4-(Dimethylamino) phenyl)-1-methylpyridinium (APP+) and APP+ Analogues." *ACS chemical neuroscience* 5.4 (2014): 296-304.
  12. Jia, Jingyue, et al. "Bacterial delivery of TALEN proteins for human genome editing." *PloS one* 9.3 (2014).
  13. Neeld, Dennis, et al. "Pseudomonas aeruginosa injects NDK into host cells through a type III secretion system." *Microbiology* 160.Pt 7 (2014): 1417-1426.
  14. Schneeberger, Valentina E., et al. "SHP2E76K mutant promotes lung tumorigenesis in transgenic mice." *Carcinogenesis* 35.8 (2014): 1717-1725.
  15. Schneeberger, Valentina E., et al. "Inhibition of Shp2 suppresses mutant EGFR-induced lung tumors in transgenic mouse model of lung adenocarcinoma." *Oncotarget* 6.8 (2015): 6191-6202.
  16. Huang, Wenrui, et al. "Hypertrophic cardiomyopathy associated Lys104Glu mutation in the myosin regulatory light chain causes diastolic disturbance in mice." *Journal of molecular and cellular cardiology* 74 (2014): 318-329.
  17. Muthu, Priya, et al. "In vitro rescue study of a malignant familial hypertrophic cardiomyopathy phenotype by pseudo-phosphorylation of myosin regulatory light chain." *Archives of biochemistry and biophysics* 552 (2014): 29-39.
  18. Ma, Teng. "Acellular biomaterials in mesenchymal stem cell-mediated endogenous tissue regeneration." *J. Mater. Chem. B* 2.1 (2013): 31-35.
  19. Sart, Sébastien, Teng Ma, and Yan Li. "Preconditioning stem cells for in vivo delivery." *BioResearch open access* 3.4 (2014): 137-149.
  20. Sart, Sébastien, et al. "Microenvironment regulation of pluripotent stem cell-derived neural progenitor aggregates by human mesenchymal stem cell secretome." *Tissue Engineering Part A* 20.19-20 (2014): 2666-2679.
  21. Sart, Sébastien, et al. "Intracellular labeling of mouse embryonic stem cell-derived neural progenitor aggregates with micron-sized particles of iron oxide." *Cytotherapy* 17.1 (2015): 98-111.
  22. Unwalla, Hoshang J., et al. "Transforming Growth Factor- $\beta$ 1 and Cigarette Smoke Inhibit the Ability of  $\beta$ 2-Agonists to Enhance Epithelial Permeability." *American journal of respiratory cell and molecular biology* 52.1 (2015): 65-74.
  23. Young, Juan I., Stephan Züchner, and Gaofeng Wang. "Regulation of the Epigenome by Vitamin C." *Annual review of nutrition* 0 (2015).

24. Gustafson CB, Dickson KM, Shao H, Yang C, Van Booven D, Harbour JW, Liu Z, Wang G. Vitamin C epigenetically reprograms melanoma cells: a potential treatment for melanoma. *Clinical Epigenetics* (Accepted on April 19, 2015).
25. Schneeberger, Valentina E., et al. "Inhibition of Shp2 suppresses mutant EGFR-induced lung tumors in transgenic mouse model of lung adenocarcinoma." *Oncotarget* 6.8 (2015): 6191-6202.
26. Williamson, Elizabeth A., et al. "The DNA repair component Metnase regulates Chk1 stability." *Cell division* 9.1 (2014): 1-4.
27. Lechner, Suzanne C., et al. "Acceptability of a Rinse Screening Test for Diagnosing Head and Neck Squamous Cell Carcinoma Among Black Americans." *Journal of Racial and Ethnic Health Disparities* 2.1 (2015): 62-67.
28. Parasher, Arjun K., et al. "Ethnicity and Clinical Outcomes in Head and Neck Cancer: an Analysis of the SEER Database." *Journal of Racial and Ethnic Health Disparities* 1.4 (2014): 267-274.
29. Dong, Hui, et al. "High-throughput screening-compatible assays of As (III) S-adenosylmethionine methyltransferase activity." *Analytical biochemistry* 480 (2015): 67-73.
30. Liao, Daiqing. "Identification and Characterization of Small-Molecule Inhibitors of Lysine Acetyltransferases." *Cancer Epigenetics*. Springer New York, 2015. 539-548.
31. Wang, Yunfei, et al. "Identification of Histone Deacetylase Inhibitors with Benzoylhydrazide Scaffold that Selectively Inhibit Class I Histone Deacetylases." *Chemistry & biology* 22.2 (2015): 273-284.
32. Ferreira, Renan Barroso, et al. "Novel agents that downregulate EGFR, HER2, and HER3 in parallel." *Oncotarget* 6.12 (2015): 10445-10459.
33. Jahn, Stephan C., et al. "Signaling Mechanisms that Suppress the Cytostatic Actions of Rapamycin." (2014): e99927.
34. Jaiswal, Aruna S., et al. "NSC666715 and Its Analogs Inhibit Strand-Displacement Activity of DNA Polymerase  $\beta$  and Potentiate Temozolomide-Induced DNA Damage, Senescence and Apoptosis in Colorectal Cancer Cells." (2015): e0123808.
35. Pham, K., Luo, D., Siemann, D., Law, B., Reynolds, B., Hothi, B., Foltz, G., and Harrison, J., 2015, VEGFR Inhibitors Upregulate CXCR4 VEGF receptor-expressing glioblastoma in a TGFI3R Signaling-Dependent Manner, *PLoS ONE* (in press)
36. Simone, Tessa M., et al. "Targeted inhibition of PAI-1 activity impairs epithelial migration and wound closure following cutaneous injury." *Advances in Wound Care* 4.6 (2015): 321-328.
37. Qi, Li, et al. "The Basic Helix-Loop-Helix/Leucine Zipper Transcription Factor USF2 Integrates Serum-Induced PAI-1 Expression and Keratinocyte Growth." *Journal of cellular biochemistry* 115.10 (2014): 1840-1847.
38. Akin, Debra, et al. "A novel ATG4B antagonist inhibits autophagy and has a negative impact on osteosarcoma tumors." *Autophagy* 10.11 (2014): 2021-2035.
39. Salihu, Hamisu M., et al. "Association between maternal symptoms of sleep disordered breathing and fetal telomere length." *Sleep* 38.4 (2015): 559.
40. Salihu, Hamisu M., et al. "Impact of intrauterine tobacco exposure on fetal telomere length." *American journal of obstetrics and gynecology* 212.2 (2015): 205-e1.
41. Salihu HM, Wilson R, King LM, Marty P, Whiteman V (2015). Overcoming barriers in a socio-behavioral and genetic-epigenetic clinical trial among pregnant smokers: utility of the socio-ecological model (SEM). *International Journal of MCH and AIDS*. 3(1): 1-11.

42. Shenoy, Anitha K., and Jianrong Lu. "Cancer cells remodel themselves and vasculature to overcome the endothelial barrier." *Cancer letters* (2014).
43. Jin, Yue, et al. "FBXO11 promotes ubiquitination of the Snail family of transcription factors in cancer progression and epidermal development." *Cancer letters* 362.1 (2015): 70-82.
44. Passariello, C.L., Li, J., Dodge-Kafka, K.L., and Kapiloff, M.S. mAKAP - A Master Scaffold for Cardiac Remodeling. *Journal of Cardiovascular Pharmacology*, in press.
45. Ma, Teng. "Acellular biomaterials in mesenchymal stem cell-mediated endogenous tissue regeneration." *J. Mater. Chem. B* 2.1 (2013): 31-35.
46. Munoz, Nathalie, et al. "Gas chromatography–mass spectrometry analysis of human mesenchymal stem cell metabolism during proliferation and osteogenic differentiation under different oxygen tensions." *Journal of biotechnology* 169 (2014): 95-102.
47. Sart, Sébastien, et al. "Microenvironment regulation of pluripotent stem cell-derived neural progenitor aggregates by human mesenchymal stem cell secretome." *Tissue Engineering Part A* 20.19-20 (2014): 2666-2679.
48. Sart, Sébastien, Teng Ma, and Yan Li. "Extracellular matrices decellularized from embryonic stem cells maintained their structure and signaling specificity." *Tissue Engineering Part A* 20.1-2 (2013): 54-66.
49. Li, Yan, Chunhui Xu, and Teng Ma. "In vitro organogenesis from pluripotent stem cells." *organogenesis* 10.2 (2014): 159-163.
50. Sart, Sébastien, Teng Ma, and Yan Li. "Preconditioning stem cells for in vivo delivery." *BioResearch open access* 3.4 (2014): 137-149.
51. Sart, Sébastien, et al. "Three-dimensional aggregates of mesenchymal stem cells: cellular mechanisms, biological properties, and applications." *Tissue Engineering Part B: Reviews* 20.5 (2013): 365-380.
52. Liu, Yijun, and Teng Ma. "Metabolic regulation of mesenchymal stem cell in expansion and therapeutic application." *Biotechnology progress* 31.2 (2015): 468-481.
53. Sellgren, Katelyn L., and Teng Ma. "Effects of flow configuration on bone tissue engineering using human mesenchymal stem cells in 3D chitosan composite scaffolds." *Journal of Biomedical Materials Research Part A* (2014).
54. Wang, Zhibin, et al. "Facile functionalization and assembly of live cells with microcontact-printed polymeric biomaterials." *Acta biomaterialia* 11 (2015): 80-87.

# Appendix I



## **Biomedical Research Advisory Council Strategic Goals and Tactics 2014**

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<http://www.floridahealth.gov/provider-and-partner-resources/research/FINAL-BRAC-Strategic-Goals-and-Tactics.pdf>



# Biomedical Research Advisory Council

## Strategic Research Goals and Tactics 2014

### Background

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). This funding has improved the health of Florida's families, expanded the research infrastructure of the state, and bolstered efforts to bring external research funding to the state.

The purpose of the James and Esther King Biomedical Research Program is to seek 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 third leading cause of death in 2012. The King program funds research initiatives that seek new insights and innovative solutions in the prevention, diagnosis, treatment, and cure of Floridians afflicted by cardiovascular disease, stroke, lung disease and tobacco-related cancers.

The William G. "Bill" Bankhead, Jr., and David 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 that national 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.

The Biomedical Research Advisory Council (BRAC) (Section 215.5602, Florida Statutes) advises the State Surgeon General as to the direction and scope of the biomedical research program.

### **BRAC Membership:**

Daniel Armstrong, Ph.D., Chair, Professor and Executive Vice 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 of Representatives.

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

Albert Latimer, B.B.A., Senior Vice President, External Affairs & Investor Relations Enterprise Florida, Inc. Seat: Governor.

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), Dept. 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.

## **Introduction**

The purpose of this strategic plan for Florida's biomedical research funding is to specify defined objectives to be accomplished in specific time frames. This will allow the people of Florida to evaluate the health impacts of the research funded through the James and Esther King Program and the Bankhead-Coley Cancer Research Program.

This strategic plan defines the Biomedical Research Advisory Council's substantive areas of focus, and specifies timeframes for evaluating success at one year, three years, five years, and ten years to guide funding opportunities issued by the Department of Health. The strategic plan focuses on the health impact of research and making Florida a destination for cancer care and research. Although this research agenda articulates substantive areas of focus, decisions about fund awards are always made through a competitive, peer-reviewed process. Because cancer and tobacco-related diseases have disparate impacts on Floridians, health equity and opportunity are addressed throughout, including efforts to foster collaborations among institutions, researchers, and community practitioners. This strategic plan demonstrates our commitment to transparency in communicating program priorities. One priority is to increase collaboration by enhancing the ability of Florida researchers to participate in existing alliances and groups, and prevent duplication of studies.

Some substantive goals will take years to realize because the answers we seek require fundamental discoveries in basic science, translation to clinical studies, and then implementation in clinical practice. The time from basic science to implementation in clinical practice can take ten years or more. To achieve the longer-term goals we have identified intermediate goals that can be used to evaluate progress.

During the first year, we recommend issuing a funding opportunity for incidence/prevalence



measurement targets so we can improve our ability to measure the health impact of the strategic plan. Within three years we recommend issuing a funding opportunity for descriptive studies of barriers, intervention targets, and treatment/intervention trials. Within five years we recommend funding to conduct interim measurement of strategic outcomes, including:

- 20% of Florida-funded investigator studies (between 2008-2016) leading to follow-on extramural (NCI Comprehensive qualifying grants excluding State of Florida funded grants)
- Improvements in health outcomes based on funded projects
- Progress on collaborative research efforts
- Florida's progress on becoming a destination site for cancer care and cancer research

### **Strategic Goals**

- Conduct research with a focus on prevention and improved treatment or care delivery that contributes to decreased deaths in lung cancer by 15%, breast cancer by 15%, prostate cancer by 20%, colon cancer by 25%, and melanoma by 15% within 10 years.
- Develop research that contributes to reductions in deaths due to lung cancer by 30%, breast cancer by 30%, prostate cancer by 30%, colon cancer by 30%, and melanoma by 30% resulting from health disparities due to race, ethnicity, or income within 10 years.
- Improve screening accuracy, detection of high risk subgroups, and/or improved implementation of cancer screening program that result in a 20% increase in early detection of cancer or preventable cancer within 10 years.
- Establish at least five Investigational New Drug(IND)/Investigational Device Exemption (IDE)s based on Florida investigator drug discovery, biologic, or other therapeutics that result in at least two multi-center collaborative clinical trials within 10 years.
- Develop innovative basic and clinical research studies focused on lower incidence of high mortality/high morbidity cancers (e.g., sarcomas, pancreatic tumors, CNS tumors, myeloma, leukemia/myelodysplastic syndrome) that result in significant improvement in survival/quality of survival in adults and children in at least two of these cancers.
- Design research protocols that lead to academic-industry development of five new biotechnology products/companies that subsequently obtain incremental commercial funding (beyond Florida funding) within 10 years.
- Reduce tobacco use in children and adolescents to less than 4% and adults to less than 15% within 10 years.
- Enhanced understanding of the relationship between obesity, healthy weight, and cancer.
- Expand upon research that improves scientific understanding of causes and subsequent impact of cancer/cancer-treatment related morbidities in other systems (e.g., cardiovascular, pulmonary, endocrine, lymphatic, CNS, reproductive, developmental).

### **Tactics**

- Fund peer-reviewed grants for shared research infrastructure
  - Existing: genetics/genomics, imaging & and imaging bank, radiation oncology, organize existing tissue banks, drug development, pathology cores

- New: develop statewide genomics bank (full sequencing of cancer patients) with linkages to trial treatment and outcomes- pharmacogenomics and epigenomics (part of clinical trials infrastructure)- also applies to health disparities
  - New: Statewide bioinformatics for cancer
  - Utilize and expand existing clinical trials infrastructure for: Phase I/Phase II, Phase III/IV trials in the state
  - New: develop and expand investigator/community research network infrastructure to support health disparities research with high-risk populations that have multiple barriers to engagement.
  - Integrated planning grants for strategic goals and outcome reporting
  - Common quality indicator data system
  - Improve regulatory process (e.g., State institutional review board or multi-center)
- Fund recruitments in areas that are not existent or inadequate for those goals (shared resource for the state)
    - Program recruitments that target strategic objectives
    - Recruitment/training of research support staff, research for core shared resources: augment currently existing programs, outcome goal for entire program
- Fund investigator initiated projects prioritized by potential impact:
    - Discovery science
    - New drug development
    - Prevention and Cancer Control
    - Screening and Detection
    - Health Services Outcomes and Access To Care
    - Clinical Trials
    - Comparative Effectiveness Research
    - Population Science
    - Health Disparities
    - Obesity
- Funds for different research model
    - New Investigators
    - Bridge funding
    - Investigator-initiated
    - Team Science
    - Technology Transfer
    - Comparative Effectiveness Research
    - Targeted Request for Applications
- Fund research that optimizes public-private partnerships in discovery science and health services research
    - Tech transfer
    - Health system, insurer
- Funding for conferences, cancer strategic plan summit
- Transdisciplinary interactions