



# BREAST CANCER RESEARCH STAMP PROGRAM



Accelerating Progress Toward Ending Breast Cancer

For more information, please visit  
<https://cdmrp.health.mil/bcrp>

# Congressionally Directed Medical Research Programs

## HISTORY

The Congressionally Directed Medical Research Programs was created in 1992 from a powerful grassroots effort led by the breast cancer advocacy community that resulted in a congressional appropriation of funds for breast cancer research. This initiated a unique partnership among the public, Congress, and the military. Since then, the CDMRP has grown to encompass multiple targeted programs and has managed over \$22.3 billion in Congressional Special Interest funds from its inception through FY23. Congress provides overarching intent for each individual CDMRP program and specifies the funding amount as part of the annual DOD appropriations bill.

## APPLICATION REVIEW PROCESS

The CDMRP uses a two-tier review process for evaluating applications that involves dynamic interaction between scientists, clinicians, consumers from advocacy communities, members of the military, and other specialists as applicable. The first tier of evaluation is a scientific peer review of applications measured against established criteria determining scientific merit. The second tier is a programmatic review conducted by the programmatic panel. At programmatic review, the programmatic panel compares the applications and makes recommendations for funding

based on scientific merit, potential impact, adherence to the intent of the award mechanism, relevance to program goals and portfolio composition.

# Breast Cancer Research Stamp Program

## About the Program

As a result of breast cancer advocacy efforts, the Stamp Out Breast Cancer Act (Public Law 105-41)<sup>1</sup> led to the U.S. Postal Service's issuance of a new first-class stamp, the Breast Cancer Research Stamp, or BCRS, in 1998. The BCRS became the first semipostal stamp in U.S. history.

The U.S. Postal Service provides the net revenues from sales of the BCRS, which currently costs 85 cents, to two designated funding agencies, the DOD and NIH, to support breast cancer research. By law, the U.S. Postal Service allocates 30% of the total amount raised to the DOD and 70% to the NIH. The Breast Cancer Research Stamp Reauthorization Act of 2019 reauthorized the stamp through 2027.

The CDMRP Breast Cancer Research Program received BCRS funding between FY99-22 and used the two-tier review process to review and recommend applications for BCRS program funding. BCRS facts for FY99 through FY22 are depicted in the illustration below.

Total Breast Cancer Research Stamp proceeds received (FY99-FY22)

**\$27,933,391**

- Research, \$26,650,653 (95%)
- CDMRP Management Costs, \$1,282,738 (5%)



Breast Cancer Research Stamp proceeds used to fully or partially fund

**75 Awards** through FY22



**Breast Cancer Research Stamp Facts**

Funded awards encompass a diversity of research areas:

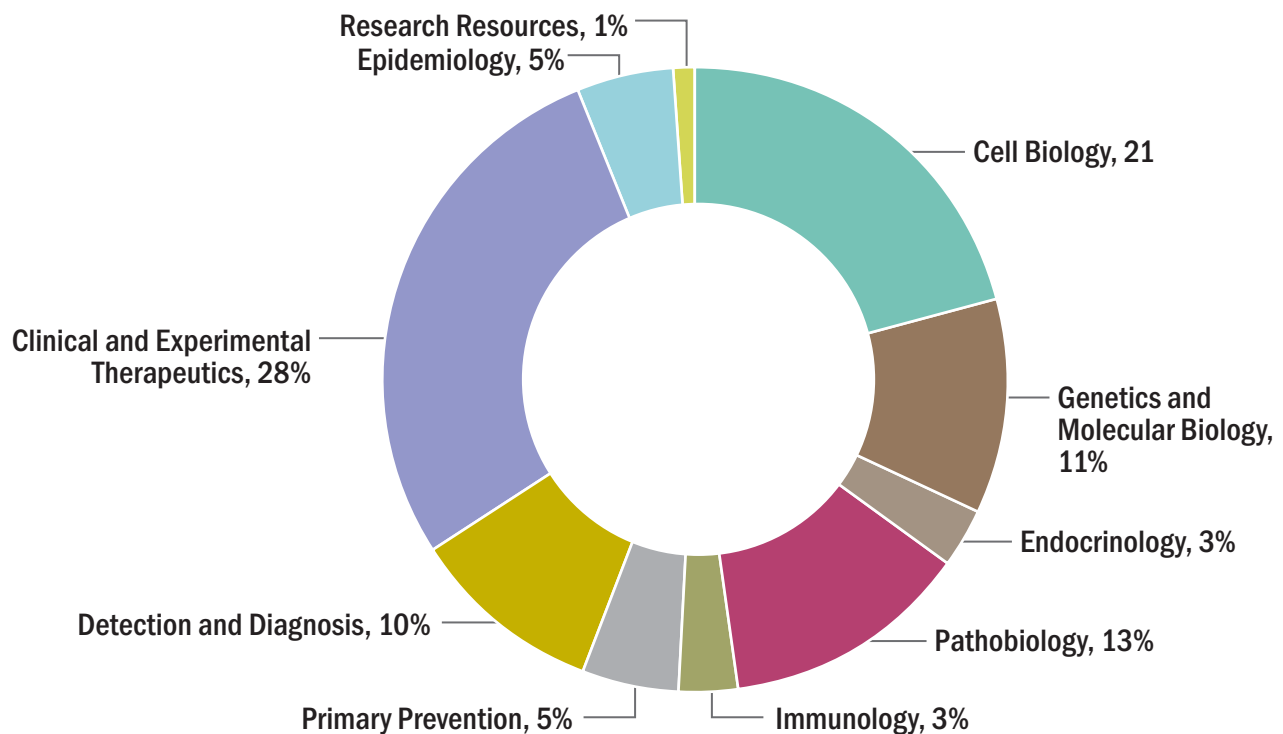


- Detection and Diagnosis
- Clinical and Experimental Therapeutics
- Epidemiology
- Research Resources
- Genetics and Molecular Biology
- Cell Biology
- Endocrinology
- Pathobiology
- Immunology
- Primary Prevention

<sup>1</sup> <https://www.congress.gov/105/plaws/publ41/PLAW-105publ41.pdf>



## FY99-22 BCRS Award Portfolio Composition by Percentage of Funding Invested



## Recently Funded FY22 Awards



Photo provided by PI

### Turning Breast Cancer Cells Against Themselves as the Next-Generation Immunotherapy

Ming-Ru Wu, M.D., Ph.D., The Dana-Farber Cancer Institute  
Breakthrough Award – Funding Level 1

Triple-Negative Breast Cancer, also referred to as TNBC, is associated with poor prognosis and frequent relapse post-treatment. Current treatments for TNBC are limited primarily to cytotoxic chemotherapy. Dr. Ming-Ru Wu seeks to develop an artificial gene circuit therapy, a new class of immune therapy that can target cells like those specific to TNBC. Previously, Wu developed and demonstrated the therapeutic effects of a Synthetic Tumor Recruited Immuno-Cellular Therapy, or STRICT, in solid tumors. When the gene circuit enters a cancerous cell, it induces the cell to secrete immune modulators. These immune modulators then generate an immune response that destroys the cell and induces long-term immune memory. With BCRS support, Wu's team will develop and test the STRICT circuit for robust immune responses using TNBC cell lines and animal models of TNBC. This research has the potential to lead to a novel immune therapy to treat patients with TNBC.



Photo provided by PI

### A Direct RAS Pan-Inhibitor as a Novel Strategy for Luminal B Breast Cancer

Geoffrey Clark, Ph.D., University of Louisville Research Foundation, Inc.  
Breakthrough Award – Funding Level 1

Luminal B breast cancer is driven by the loss of function of negative regulators of the RAS oncoprotein, which is involved in cell signaling pathways. This loss of function increases RAS activity and promotes tumor growth, making inhibition of RAS a potential therapeutic strategy for Luminal B breast cancer. Using advanced computer modeling, Geoffrey Clark, Ph.D., and his team previously identified a specific binding groove in RAS and developed a unique class of compounds that bind directly to RAS, inhibiting its function. With BCRS support, Clark's team will evaluate the effectiveness of their RAS inhibitors in Luminal B breast cancer cell lines and animal models, both alone and in combination with standard-of-care drugs. The team will then utilize model systems, such as patient-derived xenograft models and transgenic mice, to evaluate their RAS inhibitors with additional targeted therapies and immune checkpoint inhibitors. This research has the potential to lead to a novel therapy for Luminal B breast cancer and other breast cancers that are driven by RAS.

# High-impact Research and Accomplishments Supported by the Breast Cancer Research Stamp

176  
Publications



26  
Patents



## **Environmental Exposures:**

Demonstrated a relationship between breast cancer incidence and outdoor concentrations of hazardous air pollutants, strongly suggesting that environmental exposure could contribute to an increased risk of breast cancer.<sup>2</sup>

## **Pregnancy-Associated Breast Cancer:**

Advanced understanding of the immune-modulated microenvironment of postpartum breast involution that promotes pregnancy-associated breast cancer, revealing new therapeutic strategies to target immunosuppression and enhance the anti-tumor immune response.<sup>3</sup>

<sup>2</sup> [Public and Technical Abstracts: Hazardous Air Pollutants and Breast Cancer: An Unexplored Area of Risk](#)

<sup>3</sup> [Public and Technical Abstracts: The Immune Modulatory Program of Post-Partum Involution Promotes Pregnancy-Associated Breast Cancer](#)

## **Predicting Metastatic Disease:**

Developed a high-resolution imaging technique to measure the direction that second harmonic generation is emitted to analyze tumor structural changes and predict metastasis of breast cancer.<sup>4</sup>

## **Biomarkers to Predict Therapeutic Response:**

Identified predictive biomarkers for response of triple-negative breast tumors to current therapies, providing the opportunity for new targeted therapeutics.<sup>5</sup>

<sup>4</sup> [Public and Technical Abstracts: Prediction of Metastasis Using Second Harmonic Generation](#)

<sup>5</sup> [Public and Technical Abstracts: Stabilization of 53BP1 in Triple-Negative and BRCA-Deficient Breast Tumors: A Novel Therapeutic Strategy](#)

## Recent Publications Resulting from Breast Cancer Research Stamp Funded Research

Sprenger A, Carr HS, Ulu A, et al. 2023. Src Stimulates Abl-Dependent Phosphorylation of the Guanine Exchange Factor Net1A to Promote Its Cytosolic Localization and Cell Motility. *Journal of Biological Chemistry* Jun 2:104887. doi: 10.1016/j.jbc.2023.104887. Epub ahead of print. PMID: 37271338.

Krishnakumar A, Kadian S, Heredia Rivera U, et al. 2023. Organ-on-a-Chip Platform with an Integrated Screen-Printed Electrode Array for Real-Time Monitoring Trans-Epithelial Barrier and Bubble Formation. *ACS Biomaterials Science & Engineering* Mar 13;9(3):1620-1628. doi: 10.1021/acsbomaterials.2c00494. Epub 2023 Feb 10. PMID: 36763005.

Karaayvaz-Yildirim M, Silberman RE, Langenbucher A, et al. 2020. Aneuploidy and a Deregulated DNA Damage Response Suggest Haploinsufficiency in Breast Tissues of BRCA2 Mutation Carriers. *Science Advances* 6(5):eaay2611.

Shivange G, Mondal T, Lyerly E, et al. 2020. Analyzing Tumor and Tissue Distribution of Target Antigen-Specific Therapeutic Antibody. *Journal of Visualized Experiments* May 16;(159).

Zareei A, Jiang H, Chittiboyina S, et al. 2020. A Lab-on-Chip Ultrasonic Platform for Real-Time and Nondestructive Assessment of Extracellular Matrix Stiffness. *Lab on a Chip* 20(4):778-788.

Beck AP, Li H, Ervin SM, et al. 2019. Inhibition of Microbial Beta-Glucuronidase Does Not Prevent Breast Carcinogenesis in the Polyoma Middle T Mouse. *bioRxiv* 746602.

Chhetri A, Chittiboina S, Atrian F, et al. 2019. Cell Culture and Coculture for Oncological Research in Appropriate Microenvironments. *Current Protocols in Chemical Biology* 11(2):e65.

Ervin SM, Li H, Lim L, et al. 2019. Gut Microbial Beta-Glucuronidases Reactivate Estrogens as Components of the Estrobolome That Reactivate Estrogens. *The Journal of Biological Chemistry* 294(49):18586-18599.

Parashar D, Geethadevi A, Aure MR, et al. 2019. miRNA551b-3p Activates an Oncostatin Signaling Module for the Progression of Triple-Negative Breast Cancer. *Cell Reports* 29:4389-4406.

Parashar D, Geethadevi A, Aure MR, et al. 2019. miRNA551b-3p Activates an Oncostatin Signaling Module for the Progression of Triple-Negative Breast Cancer. *Cell Reports* Dec 24;29(13):4389-4406.e10. doi: 10.1016/j.celrep.2019.11.085. PMID: 31875548; PMCID: PMC7380555.

Yin H, Xiong G, Guo S, et al. 2019. Delivery of Anti-miRNA for Triple Negative Breast Cancer Therapy Using RNA Nanoparticles Targeting to Stem Cell Marker CD133. *Molecular Therapy*. Jul 27(7):1252-1261.

# Breast Cancer Research Stamp Program Funded Awards

| FY   | PI                 | Amount               | Institution                                  | Log Number | Proposal Title  |
|------|--------------------|----------------------|--|------------|---|
| FY99 | Roger Daly         | \$283,649            | Garvan Institute                             | BC990035   | Identification of Novel Prognostic Indicators for Breast Cancer through Analysis of the EMS1/Cortactin Signaling Pathway                          |
|      | Thomas Deuel       | \$5,000 <sup>6</sup> | Scripps Institute                            | BC990698   | Novel Angiogenic Domains: Use in Identifying Unique Transforming and Tumor-Promoting Pathways in Human Breast Cancer                              |
|      | Wolf Heyer         | \$111,444            | University of California, Davis              | BC990034   | In Vitro Recombination Activities of the Breast Cancer Predisposition Protein BRCA2   |
|      | Elizabeth Musgrove | \$222,652            | Garvan Institute                             | BC990037   | Role of Cyclin D1 and p27 in Steroidal Control of Cell Cycle Progression in the Mammary Gland in Vivo   |
|      | Sudhir Shah        | \$279,000            | University of Arkansas                       | BC990024   | Role of a Novel Matrix-Degrading Metalloproteinase in Breast Cancer Invasion  |
|      | Lihong Wang        | \$317,510            | Texas A&M University                         | BC990044   | Scanning Microwave-Induced Acoustic Tomography  |
|      | Michael White      | \$334,094            | University of Texas Southwest Medical Center | BC990022   | Isolation of Factors that Disrupt Critical Protein/Protein Interactions within the Telomerase Holoenzyme for Use in Breast Cancer Therapeutics    |
|      | Daniel Wreschner   | \$225,000            | Tel Aviv University                          | BC990013   | Analysis of the Secreted Novel Breast Cancer-Associated MUC1/Zs Cytokine  |
| FY00 | Eileen Adamson     | \$578,183            | Burnham Institute                            | BC000975   | Cripto: A Target for Breast Cancer Treatment  |
|      | Emmanuel Akporiaye | \$454,500            | University of Arizona                        | BC000662   | Tumor-Mediated Suppression of Dendritic Cell Vaccines   |
|      | Linda Penn         | \$296,142            | University of Toronto                        | BC000651   | Exploiting the Novel Repressed Transactivator Assay to Identify Protein Interactors and Peptide Inhibitors of the Myc Oncoprotein                 |
| FY01 | Qiuyin Cai         | \$560,144            | Vanderbilt University                        | BC010713   | Genetic Polymorphisms, Mitochondrial DNA Damage, and Breast Cancer Risk   |
|      | Kermit Carraway    | \$427,225            | University of California, Davis              | BC010296   | Identification of a Functional Human Homolog of Drosophila Kek1, an Inhibitor of Breast Tumor Cell Growth   |
|      | Preet Chaudhary    | \$312,000            | University of Texas Southwest Medical Center | BC010310   | The Role of Ectodysplasin A (EDA) and Its Receptors in the Pathogenesis of Breast Cancer  |
|      | Robert Geahlen     | \$425,425            | Purdue University                            | BC010725   | Characterization of Syk in Breast Carcinoma Cells   |
|      | William Rosner     | \$454,181            | St. Luke's-Roosevelt Hospital Center         | BC010710   | Autocrine and Paracrine Control of Breast Cancer Growth by Sex Hormone-Binding Globulin   |
| FY02 | Q. Ping Dou        | \$491,999            | Wayne State University                       | BC020507   | Synthetic Beta-Lactam Antibiotics as a Selective Breast Cancer Cell Apoptosis Inducer: Significance in Breast Cancer Prevention and Treatment     |
|      | Andrew Godwin      | \$504,000            | Fox Chase Cancer Center                      | BC020911   | The Nuclear Death Domain Protein p84N5, a Candidate Breast Cancer Susceptibility Gene   |
|      | Archibald Perkins  | \$490,500            | Yale University                              | BC021042   | Rapid Genomic Approach to Cancer Gene Discovery in Breast Cancer  |
| FY03 | Gina Chung         | \$490,447            | Yale University                              | BC031926   | Quantitative in Situ Assessment of the Somatostatin Receptor in Breast Cancer to Assess Response to Targeted Therapy with 111-in-Pentetreotide    |
|      | Rudolf Kaaks       | \$367,639            | German Cancer Research Center (DKFZ)         | BC030208   | Fatty Acid Synthesis Gene Variants and Breast Cancer Risk: A Study within the European Prospective Investigation into Cancer and Nutrition (EPIC) |
|      | Paul Yaswen        | \$508,790            | Lawrence Berkeley National Laboratory        | BC030545   | Functional Analysis of BORIS, a Novel DNA-Binding Protein   |
|      | Elad Ziv           | \$767,171            | University of California, San Francisco      | BC030551   | Admixture and Breast Cancer Risk Among Latinas  |
| FY04 | Mina Bissell       | \$386,569            | Lawrence Berkeley National Laboratory        | BC044087   | Use of HA-Metal Nanoparticles to Identify and Characterize Tumorigenic Progenitor Cell Subsets in Breast Tumors                                   |
|      | Christina Clarke   | \$588,738            | Northern California Cancer Center            | BC044177   | The Hygiene Hypothesis and Breast Cancer: A Novel Application of an Etiologic Theory for Allergies, Asthma, and Other Immune Disorders            |
|      | Todd Giorgio       | \$453,000            | Vanderbilt University                        | BC043908   | Surface Functionalized Nanoparticles and Nanocrystals for Proximity-Modulated, Early Neoplasia Detection, Imaging, and Treatment of Breast Cancer |
|      | Mark Lemmon        | \$475,500            | University of Pennsylvania                   | BC044225   | Harnessing Novel Secreted Inhibitors of EGF Receptor Signaling for Breast Cancer Treatment  |

Continued on next two pages.

# Breast Cancer Research Stamp Program Funded Awards

| FY   | PI                     | Amount                  | Institution                                   | Log Number | Proposal Title   |
|------|------------------------|-------------------------|---|------------|--|
| FY05 | Kurt Zinn <sup>7</sup> | \$436,500               | University of Alabama at Birmingham           | BC050034   | Novel Screening and Precise Localization of Early-Stage Breast Cancer in Animal Model                              |
|      | Xin-Yun Huang          | \$483,600               | Cornell University, Weill Medical College     | BC050558   | Migrastatin Analogues as Potent Inhibitors of Breast Cancer Metastasis   |
|      | Yang Liu               | \$448,500               | The Ohio State University                     | BC051613   | Hunting for Novel X-Linked Breast Cancer Suppressor Genes in Mouse and Human                                       |
|      | Jianghong Rao          | \$468,000               | Stanford University                           | BC050909   | Ribozyme-Mediated Imaging of Oncogene Expression in Breast Tumor Cells   |
| FY06 | Gayathri Devi          | \$155,085 <sup>8</sup>  | Duke University Medical Center                | BC060434   | Modulation of Regulatory T Cells as a Novel Adjuvant for Breast Cancer Immunotherapy                               |
|      | Amy Lee                | \$489,000               | University of Southern California             | BC060145   | A New Mechanism for Estrogen-Starvation Resistance in Breast Cancer  |
|      | Yi Li                  | \$438,455               | Baylor College of Medicine                    | BC060332   | The ER/PR Status of the Originating Cell of ER-Negative Breast Cancer  |
|      | Shaker Mousa           | \$377,620               | Albany College of Pharmacy                    | BC061072   | Enhancing the Efficacy of Chemotherapeutic Breast Cancer Treatment with Non-anticoagulant Heparins                 |
|      | Fraydoon Rastinejad    | \$454,500               | University of Virginia                        | BC060108   | Structural Characterization of the Interdomain Features of the Estrogen Receptor                                   |
| FY07 | Charlotte Kuperwasser  | \$817,500               | Tufts University                              | BC063332   | Mechanisms of Breast Cancer Associated with Obesity  |
|      | Kimberly Kelly         | \$244,450 <sup>9</sup>  | University of Virginia                        | BC063128   | Genetically Encoded Targeted, Amplifiable, Imaging Agents for Early Detection of Breast Cancer                     |
|      | Susan Gerbi            | \$155,550 <sup>10</sup> | Brown University                              | BC063945   | Hormonal Involvement in Breast Cancer Gene Amplification   |
| FY08 | Chung Park             | \$111,663               | North Dakota State University                 | BC084025   | In Utero Exposure to Dietary Methyl Nutrients and Breast Cancer Risk in Offspring                                  |
|      | Maciej Radosz          | \$528,939               | University of Wyoming                         | BC083821   | Breast Cancer-Targeting Nuclear Drug Delivery Overcoming Drug Resistance for Breast Cancer Therapy                 |
|      | Ann Hill               | \$577,500               | Oregon Health and Science University          | BC084377   | Vaccine Vector for Sustained High-Level Antitumor CTL Response   |
|      | Youngjae You           | \$503,666               | University of Oklahoma Health Science Center  | BC084623   | Targeted Delivery and Remote-Controlled Release of Chemotherapeutic Agents   |
|      | Tiffany Seagroves      | \$166,667 <sup>11</sup> | University of Tennessee Health Science Center | BC083846   | The Role of HIF-1 Alpha in Breast Cancer: A Positive Factor in Cancer Stem Cell Expansion via Notch?               |
| FY09 | Peggy Reynolds         | \$730,000 <sup>12</sup> | Cancer Prevention Institute of California     | BC095145   | Hazardous Air Pollutants and Breast Cancer: An Unexplored Area of Risk   |
|      | John Wyslomerski       | \$620,626               | Yale University                               | BC095546   | Effects of Nuclear Parathyroid Hormone-Related Protein Signaling in Breast Cancer                                  |
| FY10 | Pepper Schedin         | \$368,125 <sup>13</sup> | University of Colorado, Denver                | BC101904   | The Immune Modulatory Program of Post-Partum Involution Promotes Pregnancy-Associated Breast Cancer                |
|      | Anthony Leung          | \$556,875 <sup>14</sup> | Johns Hopkins University                      | BC101881   | The Role of Poly(ADP-Ribose) in microRNA Activity in Breast Cancers  |
| FY11 | Andy Minn              | \$399,942               | University of Pennsylvania                    | BC111503   | Regulation of Metastasis and DNA Damage Resistance Pathways by Transposable Elements                               |
|      | Xiaosong Wang          | \$409,693               | Baylor College of Medicine                    | BC111902   | Copy Number Signature of Recurrent Gene Fusions Reveals Potential Drug Targets in Invasive Breast Cancer           |
|      | Susana Gonzalo Hervas  | \$58,975 <sup>15</sup>  | St. Louis University                          | BC110089   | Stabilization of 53BP1 in Triple-Negative and BRCA-Deficient Breast Tumors: A Novel Therapeutic Strategy           |
| FY12 | Jing Yang              | \$465,000               | University of California, San Diego           | BC121670   | Regulation of Breast Cancer Stem Cell by Tissue Rigidity   |
|      | Filippo Giaccotti      | \$174,837 <sup>16</sup> | Memorial Sloan-Kettering Cancer Center        | BC121829   | Autophagy and TGF-Beta Antagonist Signaling in Breast Cancer Dormancy at Premetastatic Sites                       |
| FY13 | Seth Rubin             | \$457,075               | University of California, Santa Cruz          | BC131294   | Inhibition of Retinoblastoma Protein Inhibition  |
|      | Geoffrey Luke          | \$96,992 <sup>17</sup>  | Dartmouth College                             | BC133216   | Noninvasive Label-Free Detection of Micrometastases in the Lymphatics with Ultrasound-Guided Photoacoustic Imaging |

# Breast Cancer Research Stamp Program Funded Awards

| FY   | PI                          | Amount                  | Institution  | Log Number | Proposal Title  |
|------|-----------------------------|-------------------------|--|------------|---|
| FY14 | Dan Shu                     | \$364,343               | The Ohio State University                            | BC140428   | Ultrastable Nontoxic RNA Nanoparticles for Targeting Triple-Negative Breast Cancer Stem Cells   |
|      | Leif Ellisen                | \$93,050 <sup>18</sup>  | Massachusetts General Hospital                       | BC140903   | Defining High-Risk Precursor Signaling to Advance Breast Cancer Risk Assessment and Prevention  |
|      | Edward Brown                | \$7,457 <sup>19</sup>   | University of Rochester                              | BC140798   | Prediction of Metastasis Using Second Harmonic Generation   |
|      | David DeNardo               | \$7,061 <sup>20</sup>   | Washington University                                | BC141770   | Reprogramming the Metastatic Microenvironment to Combat Disease Recurrence  |
| FY15 | Ricardo Bonfil              | \$254,765 <sup>21</sup> | Wayne State University                               | BC150621   | Discoidin Domain Receptors: Novel Targets in Breast Cancer Bone Metastasis  |
|      | Carl Maki                   | \$254,765 <sup>22</sup> | Rush University Medical Center                       | BC150340   | Targeting Prolyl Peptidases in Triple-Negative Breast Cancer  |
| FY16 | Sridhar Mani                | \$174,992 <sup>23</sup> | Albert Einstein College of Medicine                  | BC161093   | Inhibition of Microbial Beta-Glucuronidase as a Strategy Toward Breast Cancer Chemoprevention   |
|      | Sophie Lelievre             | \$353,879 <sup>24</sup> | Purdue University                                    | BC161889   | Risk-on-a-Chip for Tailored Primary Prevention of Breast Cancers  |
| FY17 | Jogender Tushir-Singh       | \$282,378 <sup>25</sup> | University of Virginia                               | BC170197   | A Highly Superior and Selective Cancer Immunotherapy-Based Approach for Triple-Negative Breast Cancers                                |
|      | Pradeep Chaluvally-Raghavan | \$282,378 <sup>26</sup> | Medical College of Wisconsin                         | BC170885   | Targeting miR551b to Prevent Tumor Formation and Metastasis of Triple-Negative Breast Cancer  |
| FY18 | David Potter                | \$263,717 <sup>27</sup> | University of Minnesota, Twin Cities                 | BC180596   | Potential of Immune Checkpoint Blockade by Inhibition of Epoxyeicosatrienoic Acid-Driven Tumor Respiration                            |
|      | Abhishek Sharma             | \$263,716 <sup>28</sup> | Stevens Institute of Technology                      | BC180833   | A Novel Class of Antagonists for Robust Inhibition of Mutant Estrogen Receptor Action in Endocrine-Resistant Metastatic Breast Cancer |
| FY19 | Jeffrey Frost               | \$295,109 <sup>29</sup> | University of Texas Health Science Center at Houston | BC190383   | Targeting the Tumor Microenvironment and Metastatic Niche in Breast Cancer  |
|      | Hannah Rabinowich           | \$295,110 <sup>30</sup> | University of Pittsburgh                             | BC190622   | A New Persistence Mechanism for Drug-Tolerant Breast Cancer Cells   |
| FY20 | Weizhou Zhang               | \$104,128 <sup>31</sup> | University of Florida                                | BC200100   | Developing a Novel PROTAC-Based NR4A1 Degradator for Breast Cancer Therapy  |
|      | Eran Andrechek              | \$350,000 <sup>32</sup> | Michigan State University                            | BC200335   | Amplification Events Altering Tumor Microenvironment That Drive Metastasis in HER2+ Breast Cancer                                     |
| FY21 | Sandy Chang                 | \$753,749 <sup>33</sup> | Yale University                                      | BC210086   | Targeting Replication Stress in Triple-Negative Breast Cancer   |
|      | Anna Vilgelm                | \$708,752 <sup>34</sup> | The Ohio State University                            | BC210483   | Harnessing Innate Immunity to Improve Metastatic Breast Cancer Therapy  |
| FY22 | Ming-Ru Wu                  | \$261,673 <sup>35</sup> | Dana-Farber Cancer Institute                         | BC220541   | Turning Breast Cancer Cells Against Themselves as the Next-Generation Immunotherapy   |
|      | Geoffrey Clark              | \$261,673 <sup>36</sup> | University of Louisville Research Foundation, Inc.   | BC220575   | A Direct RAS Pan-Inhibitor as a Novel Strategy for Luminal B Breast Cancer  |

<sup>6</sup> Total award amount was \$404,176; remaining funds were from the FY99 BCRP.

<sup>7</sup> The original Principal Investigator, Dr. Tandra Chaudhuri, is deceased.

<sup>8</sup> Total award amount was \$461,933; remaining funds were from the FY06 BCRP.

<sup>9</sup> Total award amount was \$687,397 remaining funds were from the FY06 BCRP.

<sup>10</sup> Total award amount was \$787,325; remaining funds were from the FY06 and FY07 BCRP.

<sup>11</sup> Total award amount was \$554,987; remaining funds were from the FY08 BCRP.

<sup>12</sup> Total award amount was \$860,883; remaining funds were from the FY09 BCRP.

<sup>13</sup> Total award amount was \$556,028; remaining funds were from the FY10 BCRP.

<sup>14</sup> Total award amount was \$585,652; remaining funds were from the FY10 BCRP.

<sup>15</sup> Total award amount was \$744,661; remaining funds were from the FY11 BCRP.

<sup>16</sup> Total award amount was \$331,449; remaining funds were from the FY12 BCRP.

<sup>17</sup> Total award amount was \$497,288; remaining funds were from the FY13 BCRP.

<sup>18</sup> Total award amount was \$605,208; remaining funds were from the FY14 BCRP.

<sup>19</sup> Total award amount was \$215,628; remaining funds were from the FY14 BCRP.

<sup>20</sup> Total award amount was \$527,797; remaining funds were from the FY14 BCRP.

<sup>21</sup> Total award amount was \$522,715; remaining funds were from the FY15 BCRP.

<sup>22</sup> Total award amount was \$581,250; remaining funds were from the FY15 BCRP.

<sup>23</sup> Total award amount was \$626,252; remaining funds were from the FY16 BCRP.

<sup>24</sup> Total award amount was \$564,673; remaining funds were from the FY16 BCRP.

<sup>25</sup> Total award amount was \$573,784; remaining funds were from the FY17 BCRP.

<sup>26</sup> Total award amount was \$563,272; remaining funds were from the FY17 BCRP.

<sup>27</sup> Total award amount was \$567,344; remaining funds were from the FY18 BCRP.

<sup>28</sup> Total award amount was \$471,719; remaining funds were from the FY18 BCRP.

<sup>29</sup> Total award amount was \$693,001; remaining funds were from the FY19 BCRP.

<sup>30</sup> Total award amount was \$704,250; remaining funds were from the FY19 BCRP.

<sup>31</sup> Total award amount was \$551,489; remaining funds were from the FY20 BCRP.

<sup>32</sup> Total award amount was \$635,304; remaining funds were from the FY20 BCRP.

<sup>33</sup> Total award amount was \$753,749; remaining funds were from the FY21 BCRP.

<sup>34</sup> Total award amount was \$708,752; remaining funds were from the FY21 BCRP.

<sup>35</sup> Total award amount was \$261,673; remaining funds were from the FY22 BCRP.

<sup>36</sup> Total award amount was \$261,673; remaining funds were from the FY22 BCRP.



For more information, please visit  
<https://cdmrp.health.mil>  
or contact us at:  
[usarmy.detrick.medcom-cdmrp.mbx.cdmrp-public-affairs@health.mil](mailto:usarmy.detrick.medcom-cdmrp.mbx.cdmrp-public-affairs@health.mil)

