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Melanoma Research Alliance Announces More Than \$8.5 million in New Grants for Melanoma Research

Scientists in Six Countries to Share Awards Advancing Treatment and Understanding of Melanoma

WASHINGTON, DC, April 27, 2017 – On the cusp of Melanoma Awareness Month (May), the Melanoma Research Alliance (MRA) today announced 34 new research awards to 28 institutions in six countries. The over \$8.5 million in new funding will help to accelerate additional therapeutic approaches, optimize the use of existing drugs and gain a better understanding of how melanoma forms.

The 2017 grants bring the total awarded by MRA, the largest private funder of melanoma research, to \$88 million since its founding ten years ago.

"The caliber of scientific proposals presented this year to our Grant Review Committee surpassed all expectations," says Debra Black, chair and co-founder of MRA. "These awards will further our ability to improve melanoma outcomes, support the next generation of melanoma researchers and help draw us ever closer to a cure."

Among the 2017 projects funded are innovative programs to discover the next generation of treatments building from the remarkable progress to date with both immunotherapy and targeted therapy for melanoma. Overall, the 2017 awards will expand the understanding of how melanoma arises, lead to new and improved ways to treat it and develop new detection methods to determine if treatments are working as soon as possible.

"What's exciting about these latest awards is the scope of innovation and calculated risk to advance the field," says Louise M. Perkins, PhD, Chief Science Officer at MRA. "Fresh perspectives from senior and young melanoma investigators as well as insights from astrophysicists, materials scientists and others new to the field are converging to drive pivotal advances in the prevention and diagnosis of melanoma and continue to build on our momentum of unlocking the most favorable treatments."

Twenty-three academic institutions in the U.S. are sharing in the 2017 grants, in addition to centers in Australia, Belgium, Israel, Spain and the United Kingdom.

MRA's 2017 grants are made possible through the significant contributions of individuals, families, institutions, and corporate allies. Donors and partners include The Tara Miller Melanoma Foundation; The Sokoloff Family; Immunocore, Ltd; and The Anna-Maria and Stephen Kellen Foundation.

"MRA's partnerships with those impacted as well as corporate allies continue to be an integral part of the outstanding research procured through our global peer review grant process, providing unique access to leading scientists in the field," says Michael Kaplan, CEO and president of MRA. "These awards not only will lead to the advancement of research for improved treatments and leveraging of additional funds, but also allow families the opportunity to honor loved ones."

In addition, through its unique collaborative funding program in which it provides one-third of funding matched by sponsoring institutions, MRA is pleased to collaboratively fund investigators with the following: The New York Genome Center-MRA Young Investigator Award; University of California Irvine-MRA Young Investigator Award; and, MD Anderson-MRA Young Investigator Award.

A complete list of 2017 awards, including the applicant institution and Principal Investigator, is listed below.

For more information, visit www.CureMelanoma.org.

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About Melanoma Research Alliance (MRA)

Founded in 2007 under the auspices of the Milken Institute, with the generous support of Debra and Leon Black, the Melanoma Research Alliance exists to accelerate treatment options and find a cure for melanoma. As the largest nonprofit funder of melanoma research, it has dedicated \$88 million and leveraged an additional \$82 million towards its mission. Through its support, MRA has championed revolutions in immunotherapy, targeted therapies, novel combinations and diagnostics. Due to the ongoing support of its founders, 100 percent of donations to MRA go directly to its melanoma research program. MRA's ability to fund wide-ranging research in melanoma is amplified by unique collaborations and partnerships with individuals, private foundations, and corporations. Visit www.CureMelanoma.org for more information, or follow us on Twitter and Facebook.

2017 Awards

Established Investigator Awards

Single cell analysis and perturbation of the tumor-immune ecosystem: Seeks to use single cell sequencing techniques to identify tumor, tumor microenvironment and immune cell features that correlate with therapeutic response to PD-1 therapy *MRA Established Investigator Award, 2017-2020* Ido Amit, Weizmann Institute of Medicine

DNA-based biomarkers for melanoma diagnosis and prognostication: Aims to identify genetic

alterations in melanoma tumors that correlate with outcome and develop a candidate algorithm that can distinguish low from high risk patients *MRA Established Investigator Award, 2017-2020*

Boris Bastian, University of California, San Francisco

Melanocyte stem cells and their progression to malignancy and metastasis: Will use genomics and transcriptomics techniques to better characterize melanocyte stem cells and their role in melanoma development and progression *MRA Established Investigator Award, 2017-2020* Elaine Fuchs, The Rockefeller University

Molecular mechanism of UV-induced mutagenesis in melanoma: Seeks to determine how the alterations in the DNA repair response induced by ultraviolet radiation affects melanoma genetic instability and tumorigenesis *MRA Established Investigator Award, 2017-2020* Chengyu Liang, University of Southern California

Identification of active drugs for NF1-mutant, BRAF/NRAS-wildtype melanoma: Aims to better understand the underlying biology of and discover new treatments for melanomas that harbor mutations in the gene NF1 *Leveraged Finance Fights Melanoma-MRA Established Investigator Award, 2017-2020* A. Thomas Look, University of Southern California

Granzyme B imaging to predict efficacy of immunotherapy in melanoma: Will use PET imaging to visualize T cells directly killing tumor cells, which has potential to act as a biomarker of immunotherapy efficacy *MRA Established Investigator Award, 2017-2020* Umar Mahmood, Massachusetts General Hospital

Development of YAP inhibitors to modulate regulatory T cell in melanoma: Plans to manipulate regulatory T cell function by using YAP inhibitors to slow melanoma growth *MRA Established Investigator Award, 2017-2020* Fan Pan, Johns Hopkins University-School of Medicine

Non-invasive imaging of the anti-melanoma immune response: Aims to employ PET imaging in combination with small camelid antibody fragments to track anti-tumor immune responses induced by checkpoint inhibitors *Leveraged Finance Fights Melanoma-MRA Established Investigator Award, 2017-2020* Hidde Ploegh, Children's Hospital Boston

Advancing SBI-756, a translation initiation inhibitor, for melanoma therapy: Will further characterize the molecular mechanism of action and therapeutic potential of a drug candidate that targets the protein translation machinery inside melanoma cells *Sokoloff Family-MRA Established Investigator Award, 2017-2020* Ze'ev Ronai, Technion Israel Institute of Technology

Cell of origin as a driver of heterogeneity in melanoma: Aims to better understand how the cell of origin may contribute to different phenotype characteristics and outcomes in melanoma *Anna-Maria and Stephen Kellen Foundation-MRA Established Investigator Award, 2017-2020* Lorenz Studer, Memorial Sloan-Kettering Cancer Center

Multiplex biomarkers for response to PD-1/PD-L1 checkpoint blockade: Plans to combine comprehensive genomic and protein expression analysis to identify biomarkers that predict anti-PD-1 responders and non-responders *Leveraged Finance Fights Melanoma-MRA Established Investigator Award, 2017-2020* Janis Taube, Johns Hopkins University School of Medicine

Single-cell biomarkers for engineering T-cell function and metabolism: Seeks to understand

how the tumor microenvironment influences T cell metabolism and in turn, how this impacts the anti-tumor activities of these T cells

MRA Established Investigator Award, 2017-2020 Navin Varadarajan, University of Houston

Adipocytes in the melanoma microenvironment: Will better elucidate interactions between melanoma cells and their surrounding microenvironment, in particular, how fat cells called adipocytes influence melanoma growth and metastasis *MRA Established Investigator Award, 2017-2020* Richard White, Memorial Sloan-Kettering Cancer Center

Targeting TEAD autopalmitoylation in YAP-dependent uveal melanoma: Will investigate aberrant signaling in uveal melanoma cells to identify potential new drug targets *The Samuel Ming-Sum Fisher Memorial Award-MRA Established Investigator Award, 2017-2020* Xu Wu, Massachusetts General Hospital

Young Investigator Awards

Development of novel anti-checkpoint strategies based on nanobodies: Will evaluate novel immune checkpoint drugs with a strong potential for direct translation from bench to bedside *MRA Young Investigator Award, 2017-2020* Karine Breckpot, Vrije Universiteit Brussel

Biomarker-based application of anti-apoptotic inhibitors in melanoma: Aims to determine the ability of a novel technology to predict responses to BRAF inhibitors in the clinic and evaluate a new strategy to enhance cell death responses to BRAF/MEK inhibitors in pre-clinical models *MRA Young Investigator Award, 2017-2020* Rizwan Haq, Dana-Farber Cancer Institute

Overcome resistance to PD1 blockade by adding oncolytic virus TVEC: Will analyze cellular and genomic changes in tumor biopsies from patients that are progressing on anti-PD-1 therapy and are the receiving the oncolytic virus TVEC, to better understand the effects of TVEC on the anti-tumor immune response

MRA Young Investigator Award, 2017-2020 Siwen Hu-Lieskovan, University of California, Los Angeles

Immune evasion mechanisms in MAPKi and anti-PD-1 treated melanoma: Seeks to reverse the immune suppression induced by MAPK inhibitors, with the aim to delay acquired MAPK inhibitor resistance

MRA Young Investigator Award, 2017-2020 Willy Hugo, University of California, Los Angeles

Effective melanoma immunity by targeting NK cell checkpoints: Aims to identify, characterize and validate the mechanistic interplay between IL-15 and TGF- β in controlling natural killer cell activity against metastatic melanoma

MRA Young Investigator Award, 2017-2020 Nick Huntington, The Walter and Eliza Hall Institute of Medical Research

The miR-29 circuit in melanoma initiation and progression: Aims to interrogate how microRNAs impinge on oncogenic signaling to regulate melanoma development *MRA Young Investigator Award, 2017-2020* Florian Karreth, H. Lee Moffitt Cancer Center and Research Institute

A nanoscale technology for real-time tracking of immunotherapy response: Will use biology-

inspired engineering to develop nanoparticles that can both deliver an immunotherapy payload and report back on efficacy in real time

MRA Young Investigator Award, 2017-2020 Ashish Kulkarni, Brigham and Women's Hospital

PKCalpha as a node to overcome intrinsic MEK inhibitor resistance in melanoma: Aims to validate PKCalpha as a highly promising avenue for clinical translation, particularly for non-BRAF-mutant melanoma

University of Texas M.D. Anderson Cancer Center-MRA Young Investigator Award, 2017-2020 Lawrence Kwong, University of Texas M.D. Anderson Cancer Center

Molecular epidemiology on gender difference in early onset melanoma: Seeks to better understand the gender difference in melanoma etiology using combined basic science and population study approaches

The University of California, Irvine-MRA Young Investigator Award, 2017-2020 Feng Liu-Smith, University of California, Irvine

Epigenetic effectors of responses to immune checkpoint blockade agent: Will investigate the relationships between the tumor epigenome and its response to the tumor microenvironment, which will propel the testing of anti-PD1 or anti-PD1/anti-CTLA4 combinations with epigenetic inhibitors *Tara Miller Melanoma Foundation-MRA Young Investigator Award, 2017-2020* Kunal Rai, University of Texas M.D. Anderson Cancer Center

A human T cell genetic screen for melanoma immunotherapy: Aims to characterize genetic mutations that lead to immunotherapy resistance in melanoma *The New York Genome Center-MRA Young Investigator Award, 2017-2020* Neville Sanjana, The New York Genome Center

Down-regulating CTLA4 on effector T cells to improve anti-CTLA4 efficacy: Plans to test a therapeutic strategy to prevent resistance to anti-CTLA4 therapy that is based on selectively reducing the expression of CTLA4 on effector but not regulatory T cells *MRA Young Investigator Award, 2017-2020* Erica Stone, The Wistar Institute

Blocking melanoma brain metastasis by targeting the microenvironment: Seeks to investigate actionable targets that will lead to more efficient design of anticancer treatments for patients with metastatic melanoma to the brain *MRA Young Investigator Award, 2017-2020* Manuel Valiente, Fundacion Centro Nacional de Investigaciones Oncologicas Carlos III

"Smart" nanoparticles for immunotherapeutic targeting of the STING pathway: Plans to engineer an innovative, innate immunity-targeting technology to reprogram the tumor microenvironment to support anti-tumor immunity *Leveraged Finance Fights Melanoma-MRA Young Investigator Award, 2017-2020* John Wilson, Vanderbilt University

Academic-Industry Partnership Awards

An international prospective natural history study in uveal melanoma: Proposes a natural history study to provide an international registry of overall survival data for uveal melanoma patients Immunocore-MRA Academic Industry Partnership Award, 2017-2020 Industry Partner: Immunocore, Ltd Richard Carvajal, Columbia University Medical Center

Pilot Awards

Next generation inhibitors against wild-type and mutant BRAF dimers: Aims to develop a panel of novel inhibitors that would serve as next generation drug development leads to inhibit BRAF in melanoma *MRA Pilot Award, 2017-2020* Evripidis Gavathiotis, Albert Einstein College of Medicine

MDSC recruitment as an adaptive resistance mechanism to PD-1 antibody therapy: Seeks to understand the role of myeloid-derived suppressive cells in resistance to anti-PD-1 therapy *MRA Pilot Award, 2017-2020* Brent Hanks, Duke University Medical Center

Targeting Foxp3 and NMD blockade in melanoma to unleash tumor immunity: Plans to test the therapeutic potential of blocking nonsense-mediated mRNA decay in melanoma cells *MRA Pilot Award, 2017-2020* Fernando Pastor, Foundation for Applied Medical Research

Dissecting the significance of pigment heterogeneity in cutaneous melanoma: Aims to better characterize how pigmentation affects melanoma development and progression *MRA Pilot Award, 2017-2020* Mark Shackleton, University of Melbourne

A novel T cell regulatory receptor as a target for cancer therapy: Seeks to investigate the therapeutic potential of targeting LRIG1, an inhibitory protein expressed by T cells *MRA Pilot Award, 2017-2020* Li Wang, The Medical College of Wisconsin