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Associateship Program

PRINCIPAL INVESTIGATOR: Howard Gamble

CONTRACTING ORGANIZATION: National Academy of Sciences/NAE/IOM
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14. ABSTRACT During this reporting period, the NRC promoted research opportunities at AMRMC institutes through a broad outreach plan. A total of 12 applications were received during the period and of these, 10 were reviewed by NRC panels. 8 awards were offered and all 8 were accepted. A total of 13 Associates ended their tenure during the reporting period and of these 9 submitted a final report. The productivity of these Associates is listed in the technical report.					
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The National Academies of
SCIENCES • ENGINEERING • MEDICINE
RESEARCH ASSOCIATESHIP PROGRAM

with

**Walter Reed Army Institute for Research
U.S. Army Medical Research & Materiel Command
and Naval Medical Research Center/Naval Health Research Center**

Annual Contract Technical Report

Contract No. W81XWH-12-2-0033
Contract Period: 05/01/2012-02/28/2018
Report Period: 05/01/2016-04/30/2017

During the reporting period, the National Academies of Sciences, Engineering, and Medicine (the Academies) NRC conducted the following activities in support of the subject contract:

Outreach and Promotion

The promotional schedule to advertise the NRC Research Associateship Programs included the following: 1) attendance at meetings of major scientific and engineering professional societies; 2) advertising in programs and career centers for these and other professional society meetings; 3) direct mailing and emailing of announcements and program materials to presidents, graduate deans, and heads of appropriate science and engineering departments and minority-affairs offices of all academic degree-granting institutions in the United States; 4) posting announcements on internet job sites, electronic newsletters and professional society websites; 5) print advertising in high profile publications (e.g., Science magazine, the Chronicle of Higher Education); and, 6) maintaining a presence on social media sites such as Facebook.

The Academies attended a number of minority focused events in which we maintained exhibit booths, participated in workshops and advertised in meeting literature, newsletters and websites or submitted materials for distribution. In addition, ads were placed in a variety of minority publications (e.g., Affirmative Action, Black Collegian).

In advertising the Research Opportunities available to prospective applicants, the Academies maintained an up-to-date listing of all active Research Advisers, current Adviser contact information and details of each Research Opportunity.

Processing and Review of Applications

Applications to the Research Associateship Programs were submitted via a web-based application system. Each application cycle opened two months prior to the application deadline. Academies staff provided support to prospective applicants including providing application instructions, technical support and additional information as requested.

A summary of applications for the reporting period is shown in Table 1.

For each applicant, the Academies received and processed an application form, a research proposal, transcripts, a statement of previous and current research, and confidential reference reports. An application file check was made prior to the review and each applicant was notified if required documents were missing.

The Academies convened panels in five broad discipline areas for the competitive review of applications in the NRC Research Associateship Programs. Results of the review were made available to Laboratory Program Representatives immediately following the conclusion of the each review.

A summary of the outcome of the review of applications for the reporting period is shown in Table 1.

Administration of Awards

The Academies made awards to applicants based on sponsor authorization. A summary of awards authorized and the acceptance or declination by the applicant during the current reporting period is shown in Table 1.

For NRC Research Associates beginning or continuing tenure, the Academies provided the administrative functions described in the contract Statement of Work. These functions included stipend payments,

management of a major medical benefits insurance program, and reimbursement for relocation and travel to professional meetings.

A summary of NRC Research Associates on tenure during the reporting period is shown in Table 2.

Outcomes Reporting

All NRC Research Associates who completed tenure were required to submit a final report that described the outcome of their Research Associateship award. Final reports received by the Academies during the current reporting period are attached to this technical report.

The activities of NRC Research Associates submitting final reports during this reporting period, including publications, presentations and patents, as well as an assessment of their experience in the program, are summarized in Table 3. Specific accomplishments of NRC Research Associates completing tenure during the reporting period are summarized in individual Final Reports (attached).

Table 1. Summary of applications and awards

Table 2. NRC Research Associates on tenure during the reporting period

Table 3. Activities of NRC Research Associates who completed tenure during the reporting period

Attachments: NRC Research Associates Final Reports, including Research Accomplishments and Scholarly Productivity

Naval Medical Research Center/Naval Health Research Center

Table 1: Summary of applications and awards

	May 2016	Aug 2016	Nov 2016	Feb 2017	Total
TOTAL APPLICATIONS	0	0	0	1	1
Applications not reviewed	0	0	0	1	1
Applications reviewed	0	0	0	0	0
Not recommended	0	0	0	0	0
Recommended	0	0	0	0	0
Withdrawn	0	0	0	0	0
Lab decision pending	0	0	0	0	0
Awards offered	0	0	0	0	0
Applicant decision pending	0	0	0	0	0
Awards accepted	0	0	0	0	0
Awards declined	0	0	0	0	0
Not funded	0	0	0	0	0

Table 2: NRC Research Associates on tenure during the reporting period

Associate	Adviser	Tenure Dates	Country of Citizenship	Final Report
No associates on tenure during report period.				

Table 3: Activities of NRC Research Associates who completed tenure during the reporting period

- ☐ Associates ended tenure during the report period
- ☐ months was the average tenure length
- ☐ months was the longest
- ☐ months was the shortest
- ☐ submitted final reports

In the final reports, Associates indicated the following scholarly activity while on tenure.

- ☐ Articles published in refereed journals
- ☐ Articles other (Proceedings, Book Chapters, other)
- ☐ Domestic presentations
- ☐ International presentations
- ☐ Patent applications
- ☐ Awards

After ending their tenure, Associates indicated their future plans as follows:

- ☐ Permanent position at the NRC host agency
- ☐ Contract or temporary position at the NRC host agency
- ☐ Research/administrative position with another U.S. government agency
- ☐ Research/administrative position with foreign government agency
- ☐ Research/teaching at US college/university
- ☐ Research/teaching position at a foreign college or university
- ☐ Research/administrative position in private industry in the U.S.
- ☐ Research/administrative position in private industry outside of the U.S.
- ☐ Research/administrative position with a non-profit
- ☐ Self-employed/consulting
- ☐ Postdoctoral Research
- ☐ Other
- ☐ No information provided

In their final reports, Associates were asked to evaluate certain aspects of their experiences on a scale of 1 (low) to 10 (high). The average rating for each item follows:

- 0.0 Short-term value (lab)-Development of knowledge, skills, and research productivity at lab
- 0.0 Long-term value (career)-How your Research Associateship affected your career to date
- 0.0 Laboratory Support-Equipment, funding, orientation, safety & health training, etc.
- 0.0 Adviser Mentoring-Quality of mentoring from the Research Adviser
- 0.0 LPR Support-Quality of administrative support from the LPR
- 0.0 NRC Support-Quality of administrative support from the NRC

Attachments

Associates Final Reports, including Research Accomplishments and Scholarly Productivity, follow.

U.S. Army Medical Research & Materiel Command

Table 1: Summary of applications and awards

	May 2016	Aug 2016	Nov 2016	Feb 2017	Total
TOTAL APPLICATIONS	6	3	4	4	17
Applications not reviewed	0	0	0	1	1
Applications reviewed	6	3	4	3	16
Not recommended	0	0	0	0	0
Recommended	6	3	4	3	16
Withdrawn	0	0	0	0	0
Lab decision pending	0	0	0	1	1
Awards offered	6	3	4	2	15
Applicant decision pending	0	1	0	0	1
Awards accepted	5	2	4	2	13
Awards declined	1	0	0	0	1
Not funded	0	0	0	0	0

Table 2: NRC Research Associates on tenure during the reporting period

Associate	Adviser	Tenure Dates	Final Report
U.S. Army Institute of Surgical Research			
Cheppudira, Bopaiah Pooviah	Christy, Robert John	9/4/2012-9/3/2017	
Greene, Whitney Ann	Wang, Heuy-Ching H.	4/25/2012-7/24/2017	
Holt, Andrew Whyte	Wang, Heuy-Ching H.	2/13/2017-2/12/2018	
Karna, Sai Lakshmi Rajasekhar	Leung, Kai P	4/1/2013-4/13/2017	Received
Nguyen, Jesse Quoc	Leung, Kai P	3/1/2017-2/28/2018	
Olekson, Melissa Ann	Leung, Kai P	9/2/2014-9/1/2016	Received
Parida, Bijaya Kumar	Dubick, Michael A.	3/19/2012-9/18/2016	Received
Penn, Alexander Hayes	Torres Filho, Ivo P	1/14/2015-5/14/2017	
Sosanya, Natasha	Christy, Robert John	4/20/2015-2/28/2018	
U.S. Army Medical Research Institute of Chemical Defense			
Beske, Phillip Howard	McNutt, Patrick Michael	8/29/2013-5/16/2017	
U.S. Army Medical Research Institute of Infectious Diseases			
Bachert, Beth Alexandra	Bozue, Joel A	1/3/2017-1/2/2018	
Bixler, Sandra Lynn	Goff, Arthur James	8/18/2014-11/25/2016	Received
Coate, Eric Allan	Bozue, Joel A	12/30/2015-12/29/2017	
Cohen, Courtney Alicia	Glass, Pamela J	7/28/2014-7/31/2016	Received
DeLaine-Elias, BreOnna C.	Palacios, Gustavo F	3/1/2017-2/28/2018	
Duy, Janice	Minogue, Timothy Devins	8/1/2013-7/31/2017	
Hollidge, Bradley Sherman	Schmaljohn, Connie	5/2/2016-2/28/2018	
Huse, Valerie	Minogue, Timothy Devins	9/29/2014-7/29/2016	Received
Kohler, Lara Juliette	Cote, Christopher Kevin	1/17/2017-1/16/2018	
Krishnamurthy, Malathy	Panchal, Rekha G.	10/5/2015-10/4/2017	
Maxson, Tucker	Minogue, Timothy Devins	2/1/2017-1/31/2018	
Mielech, Anna Maria	Ulrich, Robert Glenn	2/2/2016-2/1/2018	
Ricks, Keersten Michelle	Schoepp, Randal J.	12/7/2015-12/6/2017	
Shoemaker, Charles Jason	Schmaljohn, Connie	2/3/2014-2/2/2017	Received
Smith, Jessica L	Ulrich, Robert Glenn	6/24/2013-2/28/2018	
Stefan, Christopher Patrick	Minogue, Timothy Devins	1/2/2014-1/1/2018	
Stojadinovic, Marija	Panchal, Rekha G.	12/1/2014-11/30/2017	
Tursiella, Melissa Lynne	Schmaljohn, Connie	4/1/2014-1/31/2018	
Zeng, Xiankun	Sun, Mei Guo	5/4/2015-7/31/2016	Received
Walter Reed Army Institute of Research, Silver Spring			
Anderson, Margery Diane	Yourick, Debra Lynn	3/11/2014-2/28/2018	
Barasa, Sheila Ogoma	Mancuso, James D	5/5/2015-2/28/2018	
Brager, Allison J	Capaldi, Vincent F	7/18/2016-3/13/2017	Received
Crivat, Georgeta	Angov, Evelina	5/16/2016-11/15/2017	
DeDominicis, Kristen Elizabeth	Boutte, Angela M	9/8/2015-3/31/2017	Received
Kobylinski, Kevin Conrad	Davidson, Silas Andrew	10/17/2011-4/16/2017	Received
Kuehn, Emily Denise	Yourick, Debra Lynn	11/14/2016-11/13/2017	
Linton, Yvonne-Marie	Clark, Jeffrey William	10/3/2011-10/2/2016	Not Recv'd
Margulieux, Katie Rose	Swierczewski, Brett Edward	8/4/2016-8/3/2017	
McCracken, Michael Kevin	Jarman, Richard George	3/9/2015-2/28/2018	
McDermott, Emily Gray	Garver, Lindsey Susannah	1/9/2017-1/8/2018	
Pollett, Simon	Jarman, Richard George	6/27/2016-6/26/2017	
Simonelli, Guido	Capaldi, Vincent F	10/6/2014-10/5/2017	
Tenenbaum, Laura Subbiah	Yourick, Debra Lynn	6/3/2013-6/2/2017	
Zarling, Stasya Nicole	Krzych, Urszula	2/7/2011-5/15/2016	Received

Table 3: Activities of NRC Research Associates who completed tenure during the reporting period

- 13 Associates ended tenure during the report period
- 35 months was the average tenure length
- 66 months was the longest
- 8 months was the shortest
- 12 submitted final reports

In the final reports, Associates indicated the following scholarly activity while on tenure.

- 62 Articles published in refereed journals
- 16 Articles other (Proceedings, Book Chapters, other)
- 41 Domestic presentations
- 15 International presentations
- 0 Patent applications
- 9 Awards

After ending their tenure, Associates indicated their future plans as follows:

- 0 Permanent position at the NRC host agency
- 8 Contract or temporary position at the NRC host agency
- 1 Research/administrative position with another U.S. government agency
- 0 Research/administrative position with foreign government agency
- 0 Research/teaching at US college/university
- 0 Research/teaching position at a foreign college or university
- 0 Research/administrative position in private industry in the U.S.
- 0 Research/administrative position in private industry outside of the U.S.
- 1 Research/administrative position with a non-profit
- 0 Self-employed/consulting
- 0 Postdoctoral Research
- 1 Other
- 1 No information provided

In their final reports, Associates were asked to evaluate certain aspects of their experiences on a scale of 1 (low) to 10 (high). The average rating for each item follows:

- 9.8 Short-term value (lab)-Development of knowledge, skills, and research productivity at lab
- 9.7 Long-term value (career)-How your Research Associateship affected your career to date
- 9.7 Laboratory Support-Equipment, funding, orientation, safety & health training, etc.
- 9.4 Adviser Mentoring-Quality of mentoring from the Research Adviser
- 9.5 LPR Support-Quality of administrative support from the LPR
- 9.9 NRC Support-Quality of administrative support from the NRC

Attachments

Associates Final Reports, including Research Accomplishments and Scholarly Productivity, follow.

NRC RESEARCH ASSOCIATESHIP PROGRAM ASSOICATE FINAL REPORT

Associate: Brager, Allison J
Program: AMRMC - U.S. Army Medical Research & Materiel Command
Walter Reed Army Institute of Research
Psychiatry & Neurosciences-Behavioral Biology Branch
Silver Spring, MD 20910
Opportunity: B4509/Strategies for Maintaining Neurobehavioral Effectiveness during Chronic Sleep Restriction and Total Sleep Deprivation
Adviser: Capaldi, Vincent F
Research Proposal: ADORA2A SNP-mediated Differences in Ability to Sustain Arithmetic Performance During Sleep Loss
Tenure Dates: 07/18/2016-03/13/2017

RESEARCH ACCOMPLISHMENTS

1. I submitted four papers related to sleep and performance/sleep resiliency and genetics (2 published; 2 under review): Journal of Strength & Conditioning Research (published), Biochimie (published), eLife (under review), and Wilderness & Environmental Medicine (under review).
2. I served as co-PI for a study looking at genetic markers related to sleep resiliency and performance and performance maintenance with caffeine administration. This study is near the final stages of analysis.
3. I served as an AI for a study looking at changes in inflammatory markers with sleep manipulation. We submitted several abstracts related to that.
4. I have done preparatory work as AI of a study looking at sleep, mental health, and sports performance study.
5. I served as an AI for a study looking at sleep and neurobehavioral performance conducted on different platforms.

SCHOLARLY PRODUCTIVITY

ARTICLES - PEER REVIEWED

Brager, Allison; Mistovich, Justin, 2017, Game Times and Higher Winning Percentages of West Coast Teams of the National Football League Correspond With Reduced Prevalence of Regular Season Injury, Journal of Strength & Conditioning, 31(2):462-467
Brager AJ, Heemstra L, Bhambra R, Ehlen JC, Esser KA, Paul KN, Novak CM, 2017, Homeostatic effects of exercise and sleep on metabolic processes in mice with an overexpressed skeletal muscle clock, Biochimie; 132:161-165
Brager, AJ; Hammer SB; Capaldi V; Campbell B, 2017, In search of adaptive homeostasis in ultra-marathon runners, submitted to Wilderness & Environmental Medicine
Ehlen JC*; Brager A*; Gray C; Baggs J; DeBruyne J; Esser KA; Takahashi J; Paul KN, 2017, Bmal1 function in skeletal muscle regulates sleep, eLife Sciences

ARTICLES - OTHER (PROCEEDINGS, BOOK CHAPTERS, OTHER)

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PRESENTATIONS - DOMESTIC

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PRESENTATIONS - INTERNATIONAL

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PATENTS

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AWARDS

02/03/2017, Chair, Public Advocacy Committee, Society for Research of Biological Rhythms
01/15/2017, National Collegiate Athletic Association (NCAA) Sleep Task Force, Sleep Research Society

NRC RESEARCH ASSOCIATESHIP PROGRAM ASSOICATE FINAL REPORT

Associate: DeDominicis, Kristen Elizabeth
Program: AMRMC - U.S. Army Medical Research & Materiel Command
Walter Reed Army Institute of Research
Psychiatry & Neurosciences-Brain Trauma Neuroprotection and Neurorestoration
Silver Spring, MD 20910
Opportunity: B8288/Mechanisms and Biomarkers of Neurotrauma at the Walter Reed Army Institute for Research
Adviser: Boutte, Angela M
Research Proposal: Evaluating MicroRNAs as Prognostic Indicators of Chronic Deficits Following Mild Traumatic Brain Injury in Rats
Tenure Dates: 09/08/2015-03/31/2017

RESEARCH ACCOMPLISHMENTS

Project 1: Single or repeat projectile concussive impact (sPCI or rPCI) injuries, or sham control manipulations, were induced in adult male Sprague-Dawley rats. The PCI model results in concussion symptomology in the absence of overt gross pathology or skull fracture. Assessments for loss of consciousness, gait, and cognitive and affective behaviors were performed. Fludeoxyglucose (FDG) Positron Emission Tomography (PET) experiments were conducted at 24h, 3 day(d), 7d, 1m, 3m, and 6m to assess alterations in glucose uptake.

Significant Findings:

Acute behavioral effects of PCI included greater righting reflex times, indicative of increased loss of consciousness, and gait dysfunction evident at 2h detected by the Catwalk gait analysis system across a wide number of parameters. Gait deficits were equally distributed across all limbs and, as hypothesized, more severe after rPCI than sPCI. The Morris water maze and elevated plus maze tasks did not reveal significant alterations in cognition or anxiety-like behavior, respectively, at 1m, 3m, or 6m after injury.

FDG-PET revealed significant alterations in FDG uptake in multiple brain regions following PCI. Overall, these results suggest that acute hypermetabolism resolves by 24h but is followed by chronic hypometabolism. Noteworthy alterations include elevated uptake in the olfactory bulb at 24h following both sPCI and rPCI and depressed uptake in the thalamus, which is present at 3d, resolves, then re-emerges chronically.

Project 2: Adult male Sprague-Dawley rats were injured by penetrating ballistic-like brain injury (PBBI), which mimics a gunshot wound to the head, or a less severe probe injury. Sham injured rats were included as a control. Abundance of the TBI hallmark proteins GFAP, alpha-II-spectrin, and their break-down products (BDPs) were assessed at 24h, 3d, 7d, 1m, and 3m after injury by Western blot and/or ELISA in discrete brain regions of interest and cerebrospinal fluid (CSF).

Significant Findings:

PBBI induced widespread tissue pathology in all markers assessed. This pathology was more robust and prolonged in areas encompassing the injury trajectory as opposed distal regions. Elevations in both full length GFAP and GFAP-BDPs were evident throughout 24h - 3m. Mild decreases in full length spectrin were seen throughout 3m while robust increases in calpain mediated spectrin BDPs were limited to 7d after injury. Probe injury alone resulted in less robust alterations than PBBI which were limited to areas of the injury trajectory only.

In CSF, GFAP and its BDPs were detectable after PBBI through 3d. Spectrin BDPs at 145/150 kDa were significantly elevated from 24h – 1m after PBBI. Significant correlations were obtained between CSF and brain tissues levels, suggesting the utility of these CSF proteins to predict underlying pathology. These results suggest that spectrin BDPs, rather than GFAP or its BDPs, may have greater utility as an acute – chronic biomarker after penetrating TBI.

SCHOLARLY PRODUCTIVITY

ARTICLES - PEER REVIEWED

ARTICLES - OTHER (PROCEEDINGS, BOOK CHAPTERS, OTHER)

PRESENTATIONS - DOMESTIC

DeDominicis, Kristen; Mountney, Andrea; Wilson, Colin; Jones, Scott; Jaiswal, Shalini; Bryant, Ying; Braverman, Stephanie; Hwang, Hye Mee; Hahn, Justin; Hoy, Andrew; Dardzinski, Bernard; Shear, Deborah; Selwyn, Reed; Cartagena, Casandra, 08/16/2016, Longitudinal FDG uptake changes following mild concussive brain injuries and correlation to clinical mTBI assessors in rats, 2016 Military Health Services Research Symposium, Orlando/Kissimmee, FL/USA
DeDominicis, Kristen; Hwang, Hye; Deng-Bryant, Ying; Shear, Deborah; Boutte, Angela; Cartagena, Casandra, 08/16/2016,

Regional acute and subacute alterations in GFAP, spectrin, and breakdown products following penetrating ballistic-like TBI in rats, 2016 Military Health Services Research Symposium, Orlando/Kissimmee, FL/USA
DeDominicis, Kristen; Hwang, Hye; Deng-Bryant, Ying; Shear, Deborah; Boutte, Angela; Cartagena, Casandra, 08/16/2016, Longitudinal changes in BAX and Bcl-2 in key regions of interest following penetrating traumatic brain injury in rats, 2016 Military Health Services Research Symposium, Orlando/Kissimmee, FL/USA
DeDominicis, Kristen; Hwang, Hye; Deng-Bryant, Ying; Shear, Deborah; Boutte, Angela; Cartagena, Casandra, 06/27/2016, Regional acute and subacute alterations in GFAP, spectrin, and breakdown products following penetrating ballistic-like TBI in rats., 2016 National Neurotrauma Symposium, Lexington, KY/USA
DeDominicis, Kristen; Hwang, Hye; Deng-Bryant, Ying; Shear, Deborah; Boutte, Angela; Cartagena, Casandra, 06/27/2016, Longitudinal changes in BAX and Bcl-2 in key regions of interest following penetrating traumatic brain injury in rats, 2016 National Neurotrauma Symposium, Lexington, KY/USA
DeDominicis, Kristen; Mountney, Andrea; Wilson, Colin; Jones, Scott; Jaiswal, Shalini; Bryant, Ying; Braverman, Stephanie; Hwang, Hye Mee; Hahn, Justin; Hoy, Andrew; Dardzinski, Bernard; Shear, Deborah; Selwyn, Reed; Cartagena, Casandra, 06/27/2016, Longitudinal FDG uptake changes following mild concussive brain injuries and correlation to clinical mTBI assessors in rats., 2016 National Neurotrauma Symposium, Lexington, KY/USA

PRESENTATIONS - INTERNATIONAL

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PATENTS

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AWARDS

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NRC RESEARCH ASSOCIATESHIP PROGRAM ASSOICATE FINAL REPORT

Associate: Kobylinski, Kevin Conrad
Program: AMRMC - U.S. Army Medical Research & Materiel Command
Walter Reed Army Institute of Research
Infectious Diseases-Entomology Branch
Silver Spring, MD 20910
Opportunity: B5951/Transmission of Leishmaniasis by Phlebotomine Sand Flies
Adviser: Davidson, Silas Andrew
Research Proposal: Research on vector/pathogen biology and surveillance/control methods that protect personnel from vector-borne diseases.
Tenure Dates: 10/17/2011-04/16/2017

RESEARCH ACCOMPLISHMENTS

- Demonstrated that ivermectin inhibits development of Plasmodium falciparum in the primary malaria vector, Anopheles gambiae
- Demonstrated that ivermectin is lethal to important Southeast Asian and Latin American malaria vectors
- Demonstrated that ivermectin inhibits the development of Plasmodium vivax in Southeast Asian malaria vectors, Anopheles dirus and Anopheles minimus, and Latin American vector, Anopheles darling
- Demonstrated that ivermectin, dihydroartemisinin-piperaquine, and primaquine are safe, well-tolerated, and mosquito-lethal effects indicate that there is an active mosquito-lethal metabolite of ivermectin
- Established the Ivermectin for Malaria Elimination Network, participated in multiple presentations and meetings of ivermectin within the WHO, acquired a grant which will facilitate further field studies on the utility of ivermectin mass drug administration in Southeast Asia

SCHOLARLY PRODUCTIVITY

ARTICLES - PEER REVIEWED

Kobylinski, Kevin; Ubalee, Ratawan; Ponlawat, Alongkot; Phasomkusolsil, Siriporn; Tarning, Joel; Wattanakul, Thanaporn; Na-Bangchang, Kesara; McCardle, Wes; Szumlas, Daniel; Davidson, Silas; Richardson, Jason, 2017, Ivermectin susceptibility and sporontocidal effect in Greater Mekong Subregion Anopheles, Malaria Journal, pending
Kobylinski, Kevin; Vasquez, Gissella; Baldeviano, Christian; Lopez, Victor; Escobedo, Karin; Stoops, Craig , 2017, Ivermectin susceptibility of the Amazonian malaria vector, Anopheles darlingi , Malaria Journal. pending
Slater, Hannah; Kobylinski, Kevin; Aguas, Ricardo; White, Lisa; Azra, Ghani, 2017, Modelling the impact of ivermectin mass drug administration on Plasmodium transmission in the Greater mekong Subregion, Malaria Journal. pending
Kobylinski, Kevin; Davidson, Silas; Jittamala, Podjanee; Pukrittayakamee, Sasithon; Hanboonkunupakarn, Borimas; van der Pluijm, Rob; Tarning, Joel; Dondorp, Arjen; Day, Nicholas; White, Nicholas, 2017, Safety, tolerability, pharmacokinetic interaction, and mosquito-lethal efficacy of ivermectin, dihydroartemisinin-piperaquine, and primaquine., Clinical Infectious Diseases. pending
Sampaio, Vanderson; Beltrán, Tatiana; Kobylinski, Kevin; Lima, José; da Silva, Sara; Rodriguez, Íria; Silveira, Henrique; Guerra, Maria; Pimenta, Paulo; Lacerda, Marcus; Monteiro, Wuelton , 2016, Filling gaps on ivermectin knowledge: effects on the survival and reproduction of Anopheles aquasalis, a Latin American malaria vector , Malaria Journal, 15, e491
Rowland, Tobin; Davidson, Silas; Kobylinski, Kevin; Menses, Claudio; Rowton, Edgar, 2015, Efficacy of permethrin treated bed nets against Leishmania major infected sand flies , United States Army Medical Department Journal. Jul-Sept. 10-15.
Chaccour, Carlos; Rabinovich, Regina; Slater, Hannah; Canavati, Sara; Bousema, Teun; Lacerda, Marcus; ter Kuile, Feiko; Drakeley, Chris; Bassat, Quique; Foy, Brian; Kobylinski, Kevin , 2015, Establishment of the Ivermectin Research for Malaria Elimination Network: updating the research agenda. , Malaria Journal. 14: e243.
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Alout, Haoues; Krajacich, Ben; Meyers, Jacob; Grubaugh, Nathan; Brackney, Doug; Kobylinski, Kevin; Diclaro, Joseph; Bolay, Fatorma; Fakoli, Lawrence; Diabaté, Abdoulaye; Dabiré, Roch; Bougma, Roland; Foy, Brian , 2014, Evaluation of ivermectin mass drug administration for malaria transmission control across different West African environments. , Malaria Journal. 13: e417.
Kobylinski, Kevin; Alout, Haoues; Foy, Brian; Clements, Archie; Adisakwattana, Poom; Swierczewski, Brett; Richardson, Jason, 2014, Rationale for the co-administration of albendazole and ivermectin to humans for malaria parasite transmission control.

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Sylla, Massamba; Kobylinski, Kevin; Foy, Brian, 2013, GCE Special: Endectocides for controlling transmission of mosquito-borne diseases.
, Malaria World Journal. 19: e40.
Chaccour, Carlos; Kobylinski, Kevin; Bassat, Quique; Bousema, Teun; Drakeley, Chris; Alonso, Pedro; Foy, Brian, 2013, Ivermectin to help control malaria: A research agenda for a promising new tool for malaria elimination. , Malaria Journal. 12: e153.
Kobylinski, Kevin; Foy, Brian; Richardson, Jason, 2012, Ivermectin inhibits the sporogony of Plasmodium falciparum in Anopheles gambiae
, Malaria Journal. 11: e381

ARTICLES - OTHER (PROCEEDINGS, BOOK CHAPTERS, OTHER)

PRESENTATIONS - DOMESTIC

Kobylinski, Kevin; Davidson, Silas; Jittamala, Podjane; Pukrittayakamee, Sasithon; Hanboonkunupakarn, Borimas; van der Pluijm, Rob; Mukaka, Mavuto; Tarning, Joel; Wattanakul, Thanaporn; Dondorp, Arjen; Day, Nicholas; White, Nicholas , 11/15/2016, Mosquito-lethal efficacy of ivermectin, dihydroartemisinin-piperaquine, and primaquine: Ivermectin for Malaria in Southeast Asia (IMSEA Study, Thailand)
, American Society of Tropical Medicine and Hygiene (Atlanta, Georgia)
Kobylinski, Kevin; Ubalee, Ratawan; Ponlawat, Alongkot; Foy, Brian; McCardle, Wes; Davidson, Silas; Wanja, Elizabeth; Szumlas, Daniel; Richardson, Jason, 10/01/2015, Ivermectin inhibits the development of Plasmodium vivax in Anopheles dirus, 64th annual meeting of the American Society of Tropical Medicine and Hygiene, Philadelphia, PA.
Kobylinski, Kevin; Ponlawat, Alongkot; Ubalee, Ratawan; Foy, Brian; Tarning, Joel; Wattanakul, Tanaporn; McCardle, Wes; Schuster, Anthony; Szumlas, Daniel; Richardson, Jason. , 11/01/2014, Assessing Ivermectin Susceptibility of Greater Mekong Subregion Malaria Vectors
, 63rd annual meeting of the American Society of Tropical Medicine and Hygiene. New Orleans, LA.
Kobylinski, Kevin; Foy, Brian; Richardson, Jason, 11/01/2012, Ivermectin inhibits the sporogony of Plasmodium falciparum in Anopheles gambiae, 61st annual meeting of the American Society of Tropical Medicine and Hygiene, Atlanta, GA.
Kobylinski, Kevin; Sylla, Massamba; Sarr, Moussa; Foy, Brian; Richardson, Jason, 09/01/2012, Ivermectin for malaria control
, 44th annual meeting of the Society for Vector Ecology, St. Augustine, FL

PRESENTATIONS - INTERNATIONAL

Kobylinski, Kevin; Davidson, Silas; Ponlawat, Alongkot; Ubalee, Ratawan; McCardle, Wes; Phasomkulsolsil, Siriporn; Szumlas, Dan; Richardson, Jason; Foy, Brian; Jittamala, Podjane; Pukrittayakamee, Sasithon; et al. , 09/17/2016, Ivermectin mass drug administration for malaria elimination in the Greater Mekong Subregion, International Conference on Tropical Medicine and Malaria (Brisbane, Australia)
Kobylinski, Kevin; Davidson, Silas; Jittamala, Podjane; Pukrittayakamee, Sasithon; Hanboonkunupakarn, Borimas; van der Pluijm, Rob; Tarning, Joel; Dondorp, Arjen; Day, Nicholas; White, Nicholas, 04/01/2016, Ivermectin for Malaria in Southeast Asia, WHO Global Malaria Programme, Technical consultation on ivermectin for malaria transmission control. Geneva, Switzerland
Kobylinski, Kevin; Ubalee, Ratawan; Ponlawat, Alongkot; Foy, Brian; McCardle, Wes; Davidson, Silas; Wanja, Elizabeth; Szumlas, Daniel; Richardson, Jason, 03/01/2016, Ivermectin mass drug administration for malaria elimination in the Greater Mekong Subregion, Malaria Consortium, Second Asia Symposium: Addressing infectious diseases through sustainable health systems. Bangkok, Thailand
Kobylinski, Kevin; Ubalee, Ratawan; Ponlawat, Alongkot; Foy, Brian; McCardle, Wes; Davidson, Silas; Wanja, Elizabeth; Szumlas, Daniel; Richardson, Jason, 12/01/2015, Ivermectin inhibits the development of Plasmodium vivax in Anopheles dirus and Anopheles minimus, Joint International Tropical Medicine Meeting. Bangkok, Thailand
Kobylinski, Kevin; Ponlawat, Alongkot; Ubalee, Ratawan; Foy, Brian; Tarning, Joel; Wattanakul, Tanaporn; McCardle, Wes; Schuster, Anthony; Szumlas, Daniel; Richardson, Jason, 01/01/2015, Ivermectin mass drug administration to humans as a potential tool for malaria elimination, 10th meeting of the Vector Control Working Group. Geneva, Switzerland
Kobylinski, Kevin; Ponlawat, Alongkot; Ubalee, Ratawan; McCardle, Wes; Schuster, Anthony; Foy, Brian; Tarning, Joel; Wattanakul, Tanaporn; Szumlas, Daniel; Richardson, Jason, 12/01/2014, Ivermectin mass drug administration for malaria elimination in the Greater Mekong Subregion, Joint International Tropical Medicine Meeting. Bangkok, Thailand
Kobylinski, Kevin; Foy, Brian; Ponlawat, Alongkot; Ubalee, Ratawan; McCardle, Wes; Schuster, Anthony; Szumlas, Daniel; Tarning, Joel; Richardson, Jason, 04/01/2014, Ivermectin mass drug administration as a malaria elimination tool, 3rd meeting of the WHO Technical Expert Group on Drug Resistance Containment. Geneva, Switzerland
Kobylinski, Kevin; Sylla, Massamba; Foy, Brian; Richardson, Jason. , 04/01/2014, The potential of ivermectin mass drug administration to humans for Plasmodium vivax control in Southeast Asia: preliminary evidence, 4th meeting of Advances in Plasmodium vivax Malaria Research, Barcelona, Spain
Kobylinski, Kevin; Foy, Brian; Saunders, David; Ponlawat, Alongkot; Ubalee, Ratawan; McCardle, Wes; Schuster, Anthony; Szumlas, Daniel; Richardson, Jason. , 12/01/2013, WRAIR-AFRIMS: the role of ivermectin in malaria elimination, WHO and B&MGF: Operational research convening to support accelerating malaria elimination in the context of artemisinin resistant falciparum malaria in the Greater Mekong Sub-Region, Bangkok, Thailand.

PATENTS

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AWARDS

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The National Academies of
SCIENCES • ENGINEERING • MEDICINE

NRC Research Associateship Programs

FINAL REPORT

1) Associate Last or Family Name	First Name	M.I.
ZARLING	STASYA	N
2) FORWARDING Address (to which your tax statement will be mailed)		FORWARDING Phone(s) and E-Mail (if known)
3) Today's Date		Dates of Tenure
May 16, 2016		from February 6, 2011 to May 15, 2016
4) Host Agency AMRMC (e.g., AFRL)	Laboratory or Center WRAIR (e.g., Wright Patterson AFB)	Division / Directorate / Department MVB (e.g., High-Speed Propulsion)
5) Name of Laboratory Adviser (and USMA Mentor, if applicable) URSZULA KRZYCH		

6) **TITLE OF RESEARCH PROPOSAL**

Characterization of Protective Immune Responses After Vaccination Against Plasmodium Species

7) **SUMMARY OF RESEARCH DURING TENURE** Itemize significant findings in concise form, utilizing key concepts/words.

- 1) Assessment of CD4 and CD8 T cell responses to novel pre-erythrocytic vaccine candidate antigens from human PBMCs collected following immunization with genetically attenuated sporozoites administered by mosquito bite
- 2) Determination of a critical role for IL-15 in the survival of CD8 central memory cells for protracted protection in mice following vaccination with radiation attenuated sporozoites
- 3) Assessment of immune responses and dependence on CD8 T cells following immunization with pre-erythrocytic vaccine candidate antigens in mice by DNA or virus vectored immunization
- 4) Attempted to generate protein antigens in E. coli expression system to use as vaccination platform for selected pre-erythrocytic antigens. This proved to be very difficult with the chosen antigens and subsequently was dropped from the project.
- 5) Assessed novel vaccine adjuvants and platforms for administration of pre-erythrocytic vaccine candidate antigens (USMA Davies Fellow: please add summary of teaching, including classes taught.)

8) **RESEARCH IN PROGRESS** Describe in no more than 100 words.

Assesment of T cell responses to pre-erythrocytic vaccine antigens from PBMCs collected from human volunteers immunized with radiation attenuated sporozoites (RAS) by the bite of Anopheles mosquitoes.

9) **PUBLICATIONS AND PAPERS RESULTING FROM NRC ASSOCIATESHIP RESEARCH**

Provide complete citations: author(s), title, full name of journal, volume number, page number(s), and year of publication.

a) Publications in peer-reviewed journals

- Pichugin, A., N. Steers, P. De La Vega, S. Zarling, U. Krzych. (2015) Protective immunity induced with radiation-attenuated Plasmodium sporozoites: TAP-mediated processing of exo-erythrocytic antigens is essential for protection. *European Journal of Immunology*. [Epub ahead of print].
- Krzych, U., S. Zarling, A. Pichugin. (2014) Memory T cells maintain protracted protection against malaria. *Immunology Letters*. 161(2):189-195.
- Krzych, U., S. Dalai, S. Zarling, A. Pichugin. (2012) Memory CD8 T cells specific for liver stage antigens maintain protracted protection against malaria. *Frontiers in Immunology*. 3:370.
- Zarling, S., D. Berenzon, S. Dalai, D. Liepinsh, N. Steers, U. Krzych. (2013) The survival of memory CD8 T cells that is mediated by IL-15 correlates with sustained protection against malaria. *The Journal of Immunology*. 190:5128-5141.
- Spring M.D., J. Murphy, R. Nielsen, M. Dowler, J. Bennett, S. Zarling, J. Williams, P. de la Vega, L. Ware, J. Komisar, M. Polhemus, T. Richie, J. Epstein, C. Tamminga, I. Chuang, N. Richie, M. O'Neil, D.G. Heppner, J. Healer, M. O'Neill, H.

Smithers, O. Finney, S. Mikolajczak, R. Wang, A. Cowman, C. Ockenhouse, U. Kryzch, S. Kappe. (2013) First-in-human evaluation of genetically attenuated Plasmodium falciparum sporozoites administered by bite of Anopheles mosquitoes to adult volunteers. Vaccine. 43:4975-4983.

b) Books, book chapters, other publications

Zarling, S and U. Krzych. Characterization of liver CD8 T cell subsets that are associated with protection against pre-erythrocytic plasmodium parasites. (2015) In A. Vaughn (Ed.). Methods in Molecular Biology: Malaria Vaccines. New York, NY: Springer.

c) Manuscripts in preparation, manuscripts submitted

Speake, C., A. Pichugin, T. Sahu, V. Malkov, R. Morrison, Y. Pei, L. Juompan, N. Milman, S. Zarling, S. Wong-Madden, J. Wendler, A. Ishizuka, Z.W. MacMillen, V. Garcia, S. Kappe, U. Krzych, P. Duffy. Identification of novel pre-erythrocytic malaria antigens that enhance protection induced by circumsporozoite protein vaccines. [Manuscript submitted]

10) PATENT OR COPYRIGHT APPLICATIONS RESULTING FROM NRC ASSOCIATESHIP RESEARCH

Provide titles, inventors, and dates of applications.

11) PRESENTATIONS AT SCIENTIFIC MEETINGS OR CONFERENCES

Provide complete references: author(s), title, abstract/proceeding citation, meeting name and location.

International

Domestic

Zarling, S. and U. Krzych. (2013) Increased Apoptosis of Intrahepatic Central Memory CD8 T cells in the Absence of IL-15 is Attributed to the Loss of Long-Lasting Protection against Malaria Infection. Johns Hopkins Malaria Research Institute Research Advances in Malaria meeting, Baltimore, MD.

Zarling, S. and U. Krzych. (2013) Increased Apoptosis of Intrahepatic Central Memory CD8 T cells in the Absence of IL-15 is Attributed to the Loss of Long-Lasting Protection against Malaria Infection. J. Immunol. (Abstr). American Association of Immunologists Annual Meeting. Honolulu, HI. (Received AAI Trainee Poster Award)

Zarling, S. and U. Krzych. (2013) IL-15 Mediated Survival of Intrahepatic CD8 Central Memory Cells is Associated with Long-Lasting Protection Against Malaria Infection. American Society of Tropical Medicine and Hygiene Annual Meeting. Washington DC.

Zarling, S., M. Spring, L. Ehrler, I. Chalom, T. Funk, A. Cowman, C. Ockenhouse, C. Speake, D. Heppner, P. Duffy, S. Kappe, U. Krzych. (2012) Ag-specific recall of cytokine producing CD4 and CD8 T cells in humans immunized with genetically attenuated Plasmodium falciparum sporozoite vaccine. J. Immunol. 188:166.12 (Abstr). American Association of Immunologists Annual Meeting. Boston, MA.

Zarling, S., M. Spring, L. Ehrler, I. Chalom, J. Williams, A. Cowman, C.F. Ockenhouse, D.G. Heppner, S. Kappe, U. Krzych. (2011) Genetically Attenuated Plasmodium falciparum Sporozoite Vaccine Induces Antigen-Specific CD4+ and CD8+ T cell Responses Characterized by the Production of Inflammatory Cytokines, American Society of Tropical Medicine and Hygiene (ASTMH), Philadelphia, PA.

12) SEMINARS OR LECTURES DELIVERED AT UNIVERSITIES AND/OR INSTITUTES Include dates, names and locations of seminars.

13) PROFESSIONAL AWARDS RECEIVED DURING TENURE

AMERICAN ASSOCIATION OF IMMUNOLOGISTS TRAINEE POSTER AWARD

14) POST-TENURE POSITION / JOB TITLE

RESEARCH MICROBIOLOGIST (IMMUNOLOGY)

15) NAME AND ADDRESS OF POST-TENURE POSITION / JOB ORGANIZATION

WRAIR, MALARIA VACCINE BRANCH

16) POST-TENURE POSITION STATUS / CATEGORY Please indicate only one.

- | | |
|---|--|
| <input type="checkbox"/> Permanent position at the host agency | <input type="checkbox"/> government agency |
| <input checked="" type="checkbox"/> Contract or temporary position at the host Agency | <input type="checkbox"/> Research/Administrative position with a foreign-government agency |
| Abbreviate Host Laboratory/Center <u>WRAIR</u> | |
| <input type="checkbox"/> Research/Administrative position with another U.S.- | <input type="checkbox"/> Research/teaching position at a U.S. college or university |

- ☐ Research/teaching position at a foreign college or university ☐ Self-employed/consulting
☐ Research/administration position in private industry in the U.S. ☐ Postdoctoral research
☐ Research/administration position in private industry outside of the U.S. ☐ Other (Please specify, possible) _____
☐ Research/administration position with a non profit ☐ No information provided

17) (For J-1 visa holders only) *SUMMARY OF CULTURAL AND EDUCATIONAL EXCHANGE DURING TENURE* **Itemize experiences that your laboratory (LPR and/or Adviser) has offered to you that facilitated your learning about American culture. Also itemize what you have done to share your culture with your colleagues and the community.**

- 1)
- 2)
- 3)
- 4)
- 5)

18) *APPRAISAL OF NRC RESEARCH ASSOCIATESHIP PROGRAM*

On a scale of 1 – 10 (poor - excellent), please rate the following:

SHORT TERM VALUE

- 10** Development of knowledge, skills, and research productivity
Comments

LONG TERM VALUE

- 10** How the NRC Research Associateship award affected your career to date
Comments

LAB SUPPORT

- 10** Quality of support from the Laboratory--equipment, funding, orientation, safety and health guidelines, etc.
Comments

ADVISER/MENTOR SUPPORT

- 10** Quality of mentoring from the Laboratory Adviser (USMA Mentor, if applicable)
Comments

LPR SUPPORT

- 10** Quality of administrative support from the Laboratory Program Representative (LPR)
Comments

NRC RESEARCH ASSOCIATESHIP PROGRAMS SUPPORT

- 10** Quality of administrative support. Please assess the support you received from the Fellowships Office (e.g., moving company, insurance, Omega, payroll, Program Coordinator, travel, etc.)
Comments

18) *PLEASE PROVIDE ANY SUGGESTIONS FOR PROGRAM IMPROVEMENT.*

Include information regarding Occupational Health Exam procedures on the website.

Please do NOT scan to PDF. Send the Final Report as MSWord document via e-mail to your Program Coordinator

*No handwritten signature required;
 but you may upload a scanned
 signature file below:*

Leah Probst: lprobst@nas.edu
 Linda Sligh: lsligh@nas.edu
 Melanie Suydam: msuydam@nas.edu
 Peggy Wilson: pwilson@nas.edu