Award Number: W81XWH-12-2-0018

TITLE: NRC/AMRMC Resident Research Associateship Program

PRINCIPAL INVESTIGATOR: Howard R. Gamble

CONTRACTING ORGANIZATION: National Academy of Sciences/NAE/IOM
Washington, DC 20001

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Fort Detrick, Maryland 21702-5012

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5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

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5f. WORK UNIT NUMBER

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   Washington, DC 20001

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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 8 applications were received during the period and of these, 8 were reviewed by NRC panels. A total of 3 award offers were made and 3 applicants accepted the award. A total of 6 Associates ended their tenure during the reporting period and of these 4 submitted final reports. The productivity of these Associates is listed in the technical report.

15. SUBJECT TERMS
    Associateship program, post-doc, awards

16. SECURITY CLASSIFICATION OF:
    a. REPORT
       U
    b. ABSTRACT
       U
    c. THIS PAGE
       U

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18. NUMBER OF PAGES
    47

19a. NAME OF RESPONSIBLE PERSON
    Howard R. Gamble
    email: rgamble@nas.edu

19b. TELEPHONE NUMBER
    (include area code)
National Research Council
RESEARCH ASSOCIATESHIP PROGRAM
with
U.S. Army Medical Research & Materiel Command

Annual Contract Technical Report

Contract No. W81XWH-12-2-0010
Contract Period: 02/06/2012-02/05/2017

Contract No. W81XWH-12-2-0015
Contract Period: 03/01/2012-02/28/2017

Contract No. W81XWH-12-2-0018
Contract Period: 03/15/2012-03/14/2017

Contract No. W81XWH-12-2-0030
Contract Period: 03/15/2012-03/14/2017

Contract No. W81XWH-12-2-0033
Contract Period: 05/01/2012-04/30/2017

Report Period: 05/01/2014-04/30/2015
During the reporting period, the NRC conducted the following activities in support of the subject contract:

**Outreach and Promotion**

The promotional schedule to advertise the National Research Council (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 NRC 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 NRC 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 Program were submitted via a web-based application system. Each of the four application cycles opened two months prior to the application deadline. NRC 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 NRC 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 NRC convened panels in five broad discipline areas for the competitive review of applications in the Research Associateship Programs. Results of the review were made available to Laboratory Program Representatives immediately following the conclusion of 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 NRC 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 Associates beginning or continuing tenure, the NRC 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 Associates who completed tenure were required to submit a final report that described the outcome of their Associateship award. Final reports received by the NRC during the current reporting period are attached to this technical report.

The activities of 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 research accomplishments of Associates completing tenure during the reporting period are summarized in Table 4.

**Table 1.** Applications and Awards

**Table 2.** Associates on Tenure

**Table 3.** Associates Activity

**Table 4.** Summary of Associate Research

**Attachments:** Associate Final Reports
### U.S. Army Medical Research & Materiel Command

#### Table 1: Applications and Awards

<table>
<thead>
<tr>
<th>Category</th>
<th>May 2014</th>
<th>Aug 2014</th>
<th>Nov 2014</th>
<th>Feb 2015</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>TOTAL APPLICATIONS</td>
<td>5</td>
<td>9</td>
<td>5</td>
<td>7</td>
<td>26</td>
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<td>Applications not reviewed</td>
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<td>3</td>
<td>1</td>
<td>0</td>
<td>5</td>
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<td>Applications reviewed</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>7</td>
<td>21</td>
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<td>0</td>
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<td>Recommended</td>
<td>4</td>
<td>5</td>
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<td>Withdrawal</td>
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<tr>
<td>Lab decision pending</td>
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<td>Awards offered</td>
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<td>Awards accepted</td>
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<td>Awards declined</td>
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<td>2</td>
<td>1</td>
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<tr>
<td>Associate</td>
<td>Adviser</td>
<td>Tenure Dates</td>
<td>Final Report</td>
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<tr>
<td><strong>U.S. Army Institute of Surgical Research</strong></td>
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<td>Benov, Avi</td>
<td>Darlington, Daniel Norman</td>
<td>8/1/2014-7/31/2015</td>
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<tr>
<td>Hurtgen, Brady Joe</td>
<td>Wenke, Joseph C</td>
<td>12/3/2012-9/18/2014</td>
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<td>Karna, Sai Lakshmi Rajasekhar</td>
<td>Leung, Kai P</td>
<td>4/1/2013-4/13/2016</td>
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<tr>
<td>Kreyer, Stefan Franz Xaver</td>
<td>Batchinsky, Andriy I</td>
<td>12/7/2012-9/18/2014</td>
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<tr>
<td>Nyland, Jennifer Elaine</td>
<td>Clifford, John L</td>
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<td>Olekson, Melissa Ann</td>
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<td>Parida, Bijaya Kumar</td>
<td>Dubick, Michael A.</td>
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<td>Penn, Alexander Hayes</td>
<td>Torres, Ivo P</td>
<td>1/14/2015-1/13/2016</td>
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<td>Pilia, Marcello</td>
<td>Rathbone, Christopher R</td>
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<td>Rose, Lloyd Frederick</td>
<td>Leung, Kai P</td>
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<td>Salas, Margaux Marie</td>
<td>Clifford, John L</td>
<td>10/10/2012-10/9/2015</td>
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<td>Sanchez, Carlos Jose</td>
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<td>Van Laar, Tricia Annette</td>
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<td>Ward, Catherine Lindsey</td>
<td>Wenke, Joseph C</td>
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<td><strong>U.S. Army Medical Research Institute of Chemical Defense</strong></td>
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<td>Hubbard, Kyle</td>
<td>McNutt, Patrick Michael</td>
<td>6/1/2012-5/31/2015</td>
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<td><strong>U.S. Army Medical Research Institute of Infectious Diseases</strong></td>
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<td>Bernhards, Robert Cory</td>
<td>Welkos, Susan Lee</td>
<td>7/11/2013-7/10/2015</td>
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<td>DeWald, Lisa Marie</td>
<td>Glass, Pamela J</td>
<td>5/7/2012-5/6/2015</td>
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<td>Duy, Janice</td>
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<td>8/1/2013-7/31/2015</td>
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<td>Friedrich, Brian Michael</td>
<td>Hensley, Lisa E.</td>
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<td>Haddow, Andrew Douglas</td>
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<td>Maes, Piet</td>
<td>Hooper, Jay W.</td>
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<td>Stefan, Christopher Patrick</td>
<td>Minogue, Timothy Devins</td>
<td>1/2/2014-1/1/2016</td>
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<td>Stojadinovic, Marija</td>
<td>Panchal, Rekha G.</td>
<td>12/1/2014-11/30/2015</td>
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<td>Stonier, Spencer William</td>
<td>Dye, John Michael</td>
<td>8/1/2011-6/30/2014</td>
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<tr>
<td><strong>Walter Reed Army Institute of Research, Silver Spring</strong></td>
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<td>Cauble, Krista Layne</td>
<td>Tortella, Frank Casper</td>
<td>1/28/2013-7/13/2014</td>
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<td>Kobylinski, Kevin Conrad</td>
<td>Szumlak, Daniel Edward</td>
<td>10/17/2011-10/16/2015</td>
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<td>Linton, Yvonne-Marie</td>
<td>Clark, Jeffrey William</td>
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<td>Pichard, Luis Eduardo</td>
<td>Balkin, Thomas J.</td>
<td>7/24/2012-7/23/2014</td>
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<tr>
<td>Simonelli, Guido</td>
<td>Balkin, Thomas J.</td>
<td>10/6/2014-10/5/2015</td>
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<td>Tenenbaum, Laura Subbiah</td>
<td>Yourick, Debra Lynn</td>
<td>6/3/2013-6/2/2015</td>
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</table>
Table 3: Associates’ Activities

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>15</td>
<td>Associates ended tenure during the report period</td>
</tr>
<tr>
<td>29</td>
<td>months was the average tenure length</td>
</tr>
<tr>
<td>48</td>
<td>months was the longest</td>
</tr>
<tr>
<td>7</td>
<td>months was the shortest</td>
</tr>
<tr>
<td>11</td>
<td>submitted final reports</td>
</tr>
</tbody>
</table>

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

- 34 Articles published in refereed journals
- 1 Patent applications
- 4 International presentations
- 39 Domestic presentations
- 1 Awards

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

- 1 Permanent position at the NRC host agency
- 6 Contract or temporary position at the NRC host agency
- 2 Research/administrative position with another U.S. government agency
- 0 Research/administrative position with foreign government agency
- 0 Research/administrative position with a non-profit
- 0 Self-employed/consulting
- 0 Postdoctoral Research
- 0 Other
- 0 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:

- **8.2** Short-term value (lab)-Development of knowledge, skills, and research productivity at lab
- **8.6** Long-term value (career)-How your Research Associateship affected your career to date
- **8.6** Laboratory Support-Equipment, funding, orientation, safety & health training, etc.
- **7.4** Adviser Mentoring-Quality of mentoring from the Research Adviser
- **9.5** LPR Support-Quality of administrative support from the LPR
- **9.8** NRC Support-Quality of administrative support from the NRC
Table 4: Summary of Associate Research

<table>
<thead>
<tr>
<th>Associate</th>
<th>Tenure Dates</th>
<th>Summary</th>
</tr>
</thead>
</table>
| Caudle, Krista| 1/28/2013-7/13/2014 | 1. Current literature review on preclinical investigations of drug treatments for traumatic brain injury shows that the majority of studies use only a single dose of the experimental drug within ~1 hour of the injury. Longer dosing regimens should be explored further.  
2. Three days of twice daily Levetiracetam (Keppra) treatment (50 mg/kg concentration) attenuates nonconvulsive seizures in our model (previous colleague's work), however three days is not sufficient to bring about neurofunctional improvements in motor and cognitive performance (completed dosing duration study).  
3. The findings from the dosing duration study establish that a ten day dosing regimen (50 mg/kg) is required for a significant therapeutic benefit in cognitive and motor performance after penetrating severe traumatic brain injury in the rat.  
4. Ten days of twice daily Keppra dosing will be used in the full dose response study; dose concentrations to be tested are 12.5 mg/kg, 25 mg/kg, 100 mg/kg, 200 mg/kg, and 800 mg/kg (currently underway).  
5. Given our positive results so far, Keppra is a prime target and qualifies for combination drug therapy with Minocycline or other drugs also showing therapeutic benefit in our model, i.e. Simvastatin. |
| Hurtgen, Brady| 12/3/2012-9/18/2014 | 1. Determined Staphylococcus aureus biofilms induced osteoblast necrosis and apoptosis (See publication 1).  
2. Showed Dakin’s solution reduced macrophage phagocytosis of fungal spores (See publication 2).  
3. Determined that osteotomy plus volumetric muscle loss resulted in increased collagen deposition in muscle tissue (See publication #3).  
4. Developed a rat model of polytrauma that is relevant to military trauma and characterized the ensuing immune response.  
5. Determined that fracture healing is delayed in the newly developed rat model of polytrauma (In progress).  
6. Showed heightened and prolonged innate and adaptive immune responses following complex musculoskeletal injury (osteotomy plus volumetric muscle loss; Manuscript in progress).  
7. Determined muscle autograft therapy reduced inflammation, which correlated with improved healing of both bone and muscle tissue following complex musculoskeletal injury (Manuscript in progress).  
8. Found that cells isolated from nine different anatomical locations on a pig could be cultured and differentiated into mesenchymal stem cells as determined by increased expression of CD90 and CD105 expression (Work in preparation for a figure in an upcoming manuscript).  
9. Identified optimal transection conditions to knockdown Pax7 gene expression by shRNA in skeletal muscle tissue. Others will perform future studies to knockdown Pax7 following musculoskeletal injury. |
| Nyland, Jennifer | 2/1/2013-12/31/2014 | 1. Developed collaborations with the BAMC Pain Management Clinic, focus on translational work from bench to bedside, clinical research involving opioid use and long term outcomes  
2. Developed collaborations with the USAISR Burn Center, clinical studies focused on psychological aspects of pain, opioid use, and long term outcomes  
3. Testing of novel analgesics in animal models of burn injury  
4. Tested the effects of opioid administration during recovery on later drug-seeking behaviors in a rat model  
5. Investigated stress as a pain generator, and possible interventions in a rat model |
2. Proved that increase in vascularization in soft tissue does not increase healing without a myogenic cell source |
3 Successfully vascularized demineralized bone allografts using microvascular fragments both in an ectopic rat model and in a 6mm femoral defect.

4 Again, without an appropriate cell source vascularization is not enough

5 Started investigating the addition of satellite cells and/or minced muscle grafts to the microvascular fragments to determine functional outcome

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1 Discovered that the C-terminus of Botulinum neurotoxin serotype A is involved in product removal and catalysis</td>
<td></td>
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<tr>
<td>2 Developed enzymatic assay for BoNT/A catalytic domain</td>
<td></td>
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<tr>
<td>3 Demonstrated that BoNT bound ions affect enzymatic activity</td>
<td></td>
</tr>
<tr>
<td>4 Demonstrate that C-terminus of BoNT/A Lc interacts with BoNT/A belt affecting catalysis</td>
<td></td>
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<table>
<thead>
<tr>
<th>Sanchez, Carlos</th>
<th>9/7/2011-9/6/2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Developed in vitrobiofilm assays to test susceptibility to various antimicrobials (and antiseptics) as well as to evaluate the effectiveness of various biofilm dispersal agents utilizing a number of bacterial species as well as fungal isolates related to combat casualties.</td>
<td></td>
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<tr>
<td>2 Reported through prospective studies, the importance and incidence of biofilm formation by clinical isolates associated with combat casualty and showing the relationship between this phenotype and the development of persistent infections in combat related wounds.</td>
<td></td>
</tr>
<tr>
<td>3 Demonstrated the utility of combinations of biofilm dispersal agents and antimicrobials as an alternate therapy for targeting bacterial biofilms.</td>
<td></td>
</tr>
<tr>
<td>4 Through collaborative efforts contributed to the development of biomaterials capable of delivering biofilm dispersal agents (alone or in combination with antimicrobials) to reduce infection in contaminated femoral segmental defects.</td>
<td></td>
</tr>
<tr>
<td>5 Characterized host responses of osteoblasts, a bone cell line, to biofilms vs. planktonic (culture grown) bacteria, and identified those factors responsible for reducing cell viability and cell differentiation.</td>
<td></td>
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<tr>
<td>6 Characterized temporal host responses during bacterial osteomyelitis infection in vivo and have begun to identify factors that may be responsible for host pathologies associated with orthopaedic infections, namely those involving S. aureus.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Stonier, Spencer</th>
<th>8/1/2011-6/30/2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Antibody responses appear to be most acutely responsible for protection against filovirus infection after vaccination</td>
<td></td>
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<tr>
<td>2 CD8 T cells may contribute to protection but it varies by mouse strain slightly</td>
<td></td>
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<tr>
<td>3 Both CD4 and CD8 T cell responses to Ebola glycoprotein are detectable after VRP vaccination</td>
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<tr>
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<tbody>
<tr>
<td>1 Utilized and optimized an injectable polyurethane (PUR) matrix for delivery of cells (bone marrow mesenchymal stem cells, BMSCs) and osteogenic agents (Lovastatin, LV) for a bone regeneration therapy in collaboration with Dr. Scott Guelcher (Vanderbilt University).</td>
<td></td>
</tr>
<tr>
<td>2 Developed methods to encapsulate cells in alginate matrices for survivability during PUR curing.</td>
<td></td>
</tr>
<tr>
<td>3 Analyzed cell fate within injectable scaffolds (PUR). In vitro analysis included determining viability, attachment and proliferation of cells onto the scaffolds in culture. In vivo analysis included determining cell survivability after injection in a rat calvarial defect.</td>
<td></td>
</tr>
<tr>
<td>4 Investigated osteogenic potential of injectable cell delivery scaffolds with the addition of osteogenic agents in the system</td>
<td></td>
</tr>
</tbody>
</table>
Combination Drug Therapy for Traumatic Brain Injury: Keppra and Minocycline

SUMMARY OF RESEARCH DURING TENURE  
1) Current literature review on preclinical investigations of drug treatments for traumatic brain injury shows that the majority of studies use only a single dose of the experimental drug within ~1 hour of the injury. Longer dosing regimens should be explored further.

2) Three days of twice daily Levetiracetam (Keppra) treatment (50 mg/kg concentration) attenuates nonconvulsive seizures in our model (previous colleague’s work), however three days is not sufficient to bring about neurofunctional improvements in motor and cognitive performance (completed dosing duration study).

3) The findings from the dosing duration study establish that a ten day dosing regimen (50 mg/kg) is required for a significant therapeutic benefit in cognitive and motor performance after penetrating severe traumatic brain injury in the rat.

4) Ten days of twice daily Keppra dosing will be used in the full dose response study; dose concentrations to be tested are 12.5 mg/kg, 25 mg/kg, 100 mg/kg, 200 mg/kg, and 800 mg/kg (currently underway).

5) Given our positive results so far, Keppra is a prime target and qualifies for combination drug therapy with Minocycline or other drugs also showing therapeutic benefit in our model, i.e. Simvastatin.

(USMA Davies Fellow: please add summary of teaching, including classes taught.)

NA

RESEARCH IN PROGRESS  
I am currently writing the manuscript for the first completed study establishing the optimal dosing duration for Levetiracetam (Keppra). I am in Phase 1A (Year 2) of the proposal currently performing the full dose-response study for Keppra.

PUBLICATIONS AND PAPERS RESULTING FROM NRC ASSOCIATESHIP RESEARCH

a) Publications in peer-reviewed journals  
NA

b) Books, book chapters, other publications  
NA

c) Manuscripts in preparation, manuscripts submitted  
Krista Caudle, Deborah Shear, Andrea Mountney, Kara Schmid, Frank Tortella, Xi-Chun May Lu. Levetiracetam Treatment for Nonconvulsive Seizures and Neuroprotection in a Model of Penetrating Ballistic-Like Brain Injury in the Rat. in preparation for J. Neurotrauma
10) PATENT OR COPYRIGHT APPLICATIONS RESULTING FROM NRC ASSOCIATESHIP RESEARCH
   Provide titles, inventors, and dates of applications.
   NA

11) PRESENTATIONS AT SCIENTIFIC MEETINGS OR CONFERENCES
   Provide complete references: author(s), title, abstract/proceeding citation, meeting name and location.

International
   NA

Domestic
   Krista Caudle, Deborah Shear, Rebecca Pedersen, Justin Sun, William Flerlage, Julie Faden, Andrea Mountney, Kara Schmid, Frank Tortella, Xi-Chun May Lu (2014). Neuroprotective Effects of Levetiracetam Requires Extended Treatment in a Rat Model of Penetrating Ballistic-like Brain Injury. 32nd Annual Symposium of the National Neurotrauma Society, San Francisco, CA.


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

13) PROFESSIONAL AWARDS RECEIVED DURING TENURE
   NA

14) POST-TENURE POSITION / JOB TITLE
   Research Biologist DB-03

15) NAME AND ADDRESS OF POST-TENURE POSITION / JOB ORGANIZATION
   Walter Reed Army Institute of Research, Center for Military Psychiatry and Neuroscience, Brain Trauma Neuroprotection and Neurorestoration Branch, 503 Robert Grant Ave. Silver Spring, MD 20910

16) POST-TENURE POSITION STATUS / CATEGORY
   Please indicate only one.
   □ Permanent position at the NRC host agency
   X Contract or temporary position at the NRC host Agency
   Abbreviate Host Laboratory/Center WRAIR
   □ Research/Administrative position with another U.S.-government agency
   □ Research/Administrative position with a foreign-government agency
   □ Research/teaching position at a U.S. college or university
   □ Research/teaching position at a foreign college or university
   □ Research/administration position in private industry in the U.S.
   □ Research/administration position in private industry outside of the U.S.
   □ Research/administration position with a non profit
   □ Self-employed/consulting
   □ Postdoctoral research
   □ Other (Please specify, possible) ___
   □ 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) NA
   2)
   3)
   4)
   5)

18) APPRAISAL OF RESEARCH ASSOCIATESHIP PROGRAM
   On a scale of 1 – 10 (poor - excellent), please rate the following:

   SHORT TERM VALUE
   □ Development of knowledge, skills, and research productivity
   □ Other (Please specify, possible) ___
   □ No information provided
   □ Comments
**LONG TERM VALUE**

10 How the NRC 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 NRC Adviser (USMA Mentor, if applicable)

Comments

**LPR SUPPORT**

10 Quality of administrative support from the Laboratory (e.g., NIST, NRL, IWR, FHWA) NRC Program Representative (LPR)

Comments

**NRC SUPPORT**

10 Quality of administrative support. Please assess respective NRC aspects (e.g., moving company, insurance, Omega, payroll, Program Coordinator, travel, etc.)

Comments

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18) PLEASE PROVIDE ANY SUGGESTIONS FOR PROGRAM IMPROVEMENT.

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

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

- Asha Davis: a_adavis@nas.edu
- Linda Sligh: lsligh@nas.edu
- Melanie Suydam: msuydam@nas.edu
- Peggy Wilson: pwilson@nas.edu

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<th>Rev. April, 2014</th>
<th>Proj/Act ID#</th>
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</table>
1) Associate Last or Family Name  
Haddow

2) First Name  
Andrew

3) M.I.  
D

4) Today's Date  
12 December 2014

5) Dates of Tenure  
from April 2014 to November 2014

4) Host Agency  
MRMC  
(e.g., AFRL)

5) Laboratory or Center  
USAMRIID  
(e.g., Wright Patterson AFB)

6) Division / Directorate / Department  
Virology  
(e.g., High-Speed Propulsion)

7) Name of Laboratory NRC Adviser (and USMA Mentor, if applicable)  
Michael Turell

6) TITLE OF RESEARCH PROPOSAL

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

1) None

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

None

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  
None

b) Books, book chapters, other publications  
None

c) Manuscripts in preparation, manuscripts submitted  
None

10) PATENT OR COPYRIGHT APPLICATIONS RESULTING FROM NRC ASSOCIATESHIP RESEARCH  
Provide titles, inventors, and dates of applications.

None

11) PRESENTATIONS AT SCIENTIFIC MEETINGS OR CONFERENCES  
Provide complete references: author(s), title, abstract/proceeding citation, meeting name and location.

International  
None

Domestic  
None
12) SEMINARS OR LECTURES DELIVERED AT UNIVERSITIES AND/OR INSTITUTES
Include dates, names and locations of seminars.
None

13) PROFESSIONAL AWARDS RECEIVED DURING TENURE
None

14) POST-TENURE POSITION / JOB TITLE
Research Entomologist

15) NAME AND ADDRESS OF POST-TENURE POSITION / JOB ORGANIZATION
Contractor with Ke`aki Technologies
United States Army Medical Research Institute of Infectious Diseases
1425 Porter Street, Fort Detrick
Frederick, MD, 21702-5011

16) POST-TENURE POSITION STATUS / CATEGORY
Please indicate only one.
☐ Permanent position at the NRC host agency
☒ Contract or temporary position at the NRC host Agency
Abbreviate Host Laboratory/Center ______
☐ Research/Administrative position with another U.S.-government agency
☐ Research/Administrative position with a foreign-government agency
☐ Research/teaching position at a U.S. college or university
☐ Research/teaching position at a foreign college or university
☐ Research/administration position in private industry in the U.S.
☐ Research/administration position in private industry outside of the U.S.
☐ Research/administration position with a non profit
☐ Self-employed/consulting
☐ Postdoctoral research
☐ Other (Please specify, possible) ______
☐ 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 RESEARCH ASSOCIATESHIP PROGRAM
On a scale of 1 – 10 (poor - excellent), please rate the following:

SHORT TERM VALUE
☑ Development of knowledge, skills, and research productivity
Comments

LONG TERM VALUE
5 How the NRC Associateship award affected your career to date
Comments

LAB SUPPORT
2 Quality of support from the Laboratory--equipment, funding, orientation, safety and health guidelines, etc.
Comments

ADVISER/MENTOR SUPPORT
1 Quality of mentoring from the Laboratory NRC Adviser (USMA Mentor, if applicable)
Comments

LPR SUPPORT
10 Quality of administrative support from the Laboratory (e.g., NIST, NRL, IWR, FHWA) NRC Program Representative (LPR)
Comments

NRC SUPPORT

Quality of administrative support. Please assess respective NRC aspects (e.g., moving company, insurance, Omega, payroll, Program Coordinator, travel, etc.)

Comments

18) PLEASE PROVIDE ANY SUGGESTIONS FOR PROGRAM IMPROVEMENT.

I still do not have access to the facilities to perform the NRC research project that I was awarded. As such I have been unable to perform any research at USAMRIID.

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

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

<table>
<thead>
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<td>Asha Davis</td>
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<td><a href="mailto:lsligh@nas.edu">lsligh@nas.edu</a></td>
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<td>Melanie Suydam</td>
<td><a href="mailto:msuydam@nas.edu">msuydam@nas.edu</a></td>
</tr>
<tr>
<td>Peggy Wilson</td>
<td><a href="mailto:pwilson@nas.edu">pwilson@nas.edu</a></td>
</tr>
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</table>

Id#                    Rev. September 2014  Proj/Act ID#
Development and use of a rat model of polytrauma to evaluate therapies that reduce inflammation and restore normal wound healing

1) Determined Staphylococcus aureus biofilms induced osteoblast necrosis and apoptosis (See publication 1).
2) Showed Dakin’s solution reduced macrophage phagocytosis of fungal spores (See publication 2).
3) Determined that osteotomy plus volumetric muscle loss resulted in increased collagen deposition in muscle tissue (See publication #3).
4) Developed a rat model of polytrauma that is relevant to military trauma and characterized the ensuing immune response.
5) Determined that fracture healing is delayed in the newly developed rat model of polytrauma (In progress).
6) Showed heightened and prolonged innate and adaptive immune responses following complex musculoskeletal injury (osteotomy plus volumetric muscle loss; Manuscript in progress).
7) Determined muscle autograft therapy reduced inflammation, which correlated with improved healing of both bone and muscle tissue following complex musculoskeletal injury (Manuscript in progress).
8) Found that cells isolated from nine different anatomical locations on a pig could be cultured and differentiated into mesenchymal stem cells as determined by increased expression of CD90 and CD105 expression (Work in preparation for a figure in an upcoming manuscript).
9) Identified optimal transfection conditions to knockdown Pax7 gene expression by shRNA in skeletal muscle tissue. Others will perform future studies to knockdown Pax7 following musculoskeletal injury.

(USMA Davies Fellow: please add summary of teaching, including classes taught.)

NA

As I participated in multiple research projects, continuing research will involve the following:
1. Confirming polytrauma delays wound healing in the developed rat model (done by others) and preparing a manuscript (done by myself).
2. Analyze data to assess purity of porcine stem cells isolated from nine different anatomical locations. (Figure in a manuscript).
3. Continued research in immunomodulation studies of complex musculoskeletal injury. This includes use of drugs and shRNA to target innate and adaptive immune cells as well as shRNA to target satellite cells. (This will be performed by others, but I will participate in data interpretation and manuscript preparation)

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


b) Books, book chapters, other publications

None

c) Manuscripts in preparation, manuscripts submitted


10) PATENT OR COPYRIGHT APPLICATIONS RESULTING FROM NRC ASSOCIATESHIP RESEARCH

Provide titles, inventors, and dates of applications.

NA

11) PRESENTATIONS AT SCIENTIFIC MEETINGS OR CONFERENCES

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

International

None

Domestic


Submitted abstracts for upcoming conferences:


12) SEMINARS OR LECTURES DELIVERED AT UNIVERSITIES AND/OR INSTITUTES

Include dates, names and locations of seminars.

None

13) PROFESSIONAL AWARDS RECEIVED DURING TENURE

1st Place Poster Presentation at the 2nd Annual San Antonio Postdoctoral Research Forum (September 16, 2014)

14) POST-TENURE POSITION / JOB TITLE

Immunologist

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

Joint Inflammatory Modulation of Trauma Research Program/ US Air Force

16) POST-TENURE POSITION STATUS / CATEGORY

Please indicate only one.

☑ 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/Teaching position at a U.S. college or university
☐ Research/teaching position at a foreign college or university
☐ Research/administration position in private industry in the U.S.
☐ Research/administration position in private industry outside of the U.S.
☐ Research/administration position with a non profit
☐ Self-employed/consulting
☐ Postdoctoral research
☐ Other (Please specify, possible) —
☐ 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.
18) APPRAISAL OF RESEARCH ASSOCIATESHIP PROGRAM

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

SHORT TERM VALUE
7 Development of knowledge, skills, and research productivity
Comments

LONG TERM VALUE
8 How the NRC Associateship award affected your career to date
Comments
My training prepared me and allowed me to obtain the position I am moving onto.

LAB SUPPORT
8 Quality of support from the Laboratory--equipment, funding, orientation, safety and health guidelines, etc.
Comments

ADVISER/MENTOR SUPPORT
7 Quality of mentoring from the Laboratory NRC Adviser (USMA Mentor, if applicable)
Comments

LPR SUPPORT
10 Quality of administrative support from the Laboratory (e.g., NIST, NRL, IWR, FHWA) NRC Program Representative (LPR)
Comments
Responsive

NRC SUPPORT
10 Quality of administrative support. Please assess respective NRC aspects (e.g., moving company, insurance, Omega, payroll, Program Coordinator, travel, etc.)
Comments
Very pro-active, timely, friendly, and responsive.

18) PLEASE PROVIDE ANY SUGGESTIONS FOR PROGRAM IMPROVEMENT.

Compare your metrics to other Postdoc agencies and see where NRC fits in.

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

No handwritten signature required; but you may upload a scanned signature file below:
Asha Davis: adavis@nas.edu
Linda Sligh: lsligh@nas.edu
Melanie Suydam: msuydam@nas.edu
Peggy Wilson: pwilson@nas.edu

Id# Rev. September 2014 Proj/Act ID#
The effect of spontaneous breathing in combination with extracorporeal lung support in experimental lung injury

Changed to

Early usage of a low flow CO$_2$ – removal device (hemolung) in acute lung injury

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

1) Until now only preliminary data of the project exist (see ADVISER/MENTOR SUPPORT)
2) The use of a low-flow CO$_2$ removal device enables to reduce the invasiveness of mechanical ventilation
3) Recirculation of ultrafiltrate does not improve CO$_2$-removal in a low-flow CO$_2$ removal device (see 9) PUBLICATIONS AND PAPERS RESULTING FROM NRC ASSOCIATESHIP RESEARCH)
4) Acidification of blood entering a membrane lung can enhance CO$_2$-removal (see 11) PRESENTATIONS AT SCIENTIFIC MEETINGS OR CONFERENCES)

(USMA Davies Fellow: please add summary of teaching, including classes taught.)

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

At the moment I am calculating and deriving specific parameters of mechanical ventilation (e.g. tidal volume, minute ventilation, airway pressures). With these parameters I hope I am able to show if the low-flow CO$_2$ removal device (hemolung) is sufficient to reduce invasiveness of mechanical ventilation.

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

1) Title: Modular Extracorporeal Life Support: effects of ultrafiltrate recirculation on the performance of an extracorporeal carbon dioxide removal (ECCO$_2$R) device

Authors:
Vittorio Scaravilli, Stefan Kreyer, Katharina Linden, Slava Belenky, Bryan Jordan, Antonio Pesenti, Leopoldo C. Cancio, Andriy I. Batchinsky


2) Title: Extracorporeal blood purification in burns: A review

Authors: Katharina Linden, Ian J. Stewart, Stefan Kreyer, Vittorio Scaravilli, Jeremy W. Cannon, Leopoldo C. Cancio, Andriy I. Batchinsky, Kevin K. Chung


b) Books, book chapters, other publications
c) Manuscripts in preparation, manuscripts submitted

1) **Title:** Extracorporeal CO₂ removal: Effect of short time infusion of three different metabolic acids  
   **Authors:** Vittorio Scaravilli, Stefan Kreyer, Katharina Linden, Bryan Jordan, Antonio Pesenti, Christian Putensen, Leopoldo C. Cancio, Andriy I. Batchinsky  
   *Abstract and Poster presented at SCAI (Society for Complexity in Acute Illness) international meeting.* Undergoing submission to ASAIO (American Society for Artificial Internal Organs) journal

2) **Title:** Extracorporeal Membrane Oxygenation and mechanical ventilation  
   *Review paper in progress.*

10) **PATENT OR COPYRIGHT APPLICATIONS RESULTING FROM NRC ASSOCIATESHIP RESEARCH**  
   Provide titles, inventors, and dates of applications.  
   none

11) **PRESENTATIONS AT SCIENTIFIC MEETINGS OR CONFERENCES**  
   Provide complete references: author(s), title, abstract/proceeding citation, meeting name and location.

   **International**

   1) **Title:** Extracorporeal CO₂ removal: Effect of short time infusion of three different metabolic acids  
      **Authors:** Stefan Kreyer, Vittorio Scaravilli, Katharina Linden, Bryan Jordan, Antonio Pesenti, Christian Putensen, Leopoldo C. Cancio, Andriy I. Batchinsky  
      *Abstract and Poster presented at SCAI (Society for Complexity in Acute Illness) international meeting, Budapest 2013.*

   2) **Title:** Modular Extracorporeal Life Support: effects of ultrafiltrate recirculation on the performance of an extracorporeal carbon dioxide removal (ECCO₂R) device  
      **Authors:** Vittorio Scaravilli, Stefan Kreyer, Katharina Linden, Slava Belenky, Bryan Jordan, Antonio Pesenti, Leopoldo C. Cancio, Andriy I. Batchinsky  
      *Abstract and Poster presented at SCAI (Society for Complexity in Acute Illness) international meeting, Budapest 2013.*

   **Domestic**

   none

12) **SEMINARS OR LECTURES DELIVERED AT UNIVERSITIES AND/OR INSTITUTES**  
   Include dates, names and locations of seminars.  
   none

13) **PROFESSIONAL AWARDS RECEIVED DURING TENURE**

   none

14) **POST-TENURE POSITION / JOB TITLE**

   Anesthesiologist at the University hospital of Bonn, Germany

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

   University hospital Bonn, Dept. for Anesthesiology and operative Intensive Care medicine, Sigmund-Freud-Str 25, 53127 Bonn, Germany

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

   - [ ] 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 a foreign-government agency  
   - [ ] Research/teaching position at a U.S. college or university  
   - [X] Research/teaching position at a foreign college or university  
   - [ ] Research/administration position in private industry in the U.S.  
   - [ ] Research/administration position in private industry outside of the U.S.  
   - [ ] Research/administration position with a non profit  
   - [ ] Self-employed/consulting  
   - [ ] Postdoctoral research  
   - [ ] Other (Please specify, possible)  
   - [ ] No information provided
1) Everyone in the lab, co-researchers as well as technicians helped me getting to know a lot about American culture, ways of thinking and traditions. During lunchtime often political issues where discussed so that I got the possibility to understand the opinions of different people living in the USA. My colleagues took me to local events like Rodeo and Fiesta. They invited me to share American Holidays with them, like Thanksgiving, so that I had the possibility to experience traditions along with culinary specialties. Whenever I had questions regarding culture but also things concerning daily life in the USA everyone was always offering help.

2) In a lot of discussions regarding political issues and way of life I was able to offer a foreigner’s perspective on things. I invited my colleagues to get to know German food. Interestingly, the part of Texas where I stayed was already influenced by German culture and I was able to tell my colleagues what of this was “real German” and what more American.

3)

4)

5)

18) APPRAISAL OF RESEARCH ASSOCIATESHIP PROGRAM

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

SHORT TERM VALUE

Development of knowledge, skills, and research productivity

Comments

The program gave me the possibility to learn and improve my skills in animal research. I improved my skills in scientific writing by the review of co-workers and supervisors.

LONG TERM VALUE

How the NRC Associateship award affected your career to date

Comments

At this point, the NRC award did not influence my career very much. I think that this will change in the future if scientific papers will result out of my work. Furthermore, the experience of working in another country, together with improvements in the English language, will enable me to plan and structure my research better in the future.

LAB SUPPORT

Quality of support from the Laboratory—equipment, funding, orientation, safety and health guidelines, etc.

Comments

The equipment of this laboratory was extraordinary and the possibilities that this laboratory could have offered are extremely good. In my opinion these incredible possibilities could not be used to full extent. The laboratory personnel were helpful and tried to fulfill the tasks that were given. This was sometimes complicated by a big workload on them due to simultaneously ongoing projects and the fact that research goals and working plans were not communicated in this lab, which I felt let to a certain frustration. The ISR has strict regulations about health guidelines and training before entering the laboratory. Although these regulations reduced the effectiveness of the laboratory and led to a delayed start of the experiments, I appreciate the required training in the beginning.

ADVISER/MENTOR SUPPORT

Quality of mentoring from the Laboratory NRC Adviser (USMA Mentor, if applicable)

Comments

After I finished all the ISR specific requirements like training and in-processing, I was told that grants for the project I planned were canceled, so that I could not perform the study I applied with. This was especially disappointing because I started to prepare a smaller side-project to the original planned study here. After investing effort into the main- and the side-project it was very frustrating that this work was done for nothing. After speaking with my adviser and explaining my frustration the relationship got tense. Finally I was offered to work on another project that was already planned and funded. I did not have the possibility to influence this project like I would have liked to do and it did not exactly meet my goals for coming to this laboratory, but will hopefully lead to a publication in the end. I think that the communication about the planned projects and the goals of the laboratory was suboptimal. The changed project also led to a late start of experiments which results in the fact that I cannot finish my work while being in the USA.

Regarding my family situation (e.g. I became a father while being in the USA) my mentor was always understanding and offered help and support.

LPR SUPPORT

Quality of administrative support from the Laboratory (e.g., NIST, NRL, IWR, FHWA) NRC Program Representative (LPR)

Comments

Whenever I needed help, Dr. Dubick was able to help me. Also contacting him was very easy. I had no need to contact him very often, therefore I can’t go into further details.
NRC SUPPORT

Quality of administrative support. Please assess respective NRC aspects (e.g., moving company, insurance, Omega, payroll, Program Coordinator, travel, etc.)

Comments
I was very impressed and satisfied with the help and support by NRC. Thank you very much.

18) PLEASE PROVIDE ANY SUGGESTIONS FOR PROGRAM IMPROVEMENT.

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<td>Peggy Wilson:</td>
<td><a href="mailto:pwilson@nas.edu">pwilson@nas.edu</a></td>
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</table>

Id#               Rev. April 2014               Proj/Act ID#
Manipulating the Syrian hamster model for use in developing medical countermeasures to HFRS

1) There is no significant difference in genome organization between hantaviruses from a high hantavirus incidence region and a low incidence region
2) Hamsters can be chronically infected with Hantaan virus and Puumala virus
3) Immunosuppressed hamsters infected with Puumala virus develop disease 21 dpi

(USMA Davies Fellow: please add summary of teaching, including classes taught.)

Both hamster models (i.e. Hantaan virus and Puumala virus disease models) need to be further refined to show that the disease observed is specifically caused by the infection with Hantaan virus or Puumala virus. Furthermore, it is important to minimize the immunosuppression therapy for the hamsters. Additional experiments need to be performed to examine which level of immune suppression needs to be reached to develop disease in the hamsters.
12) **SEMINARS OR LECTURES DELIVERED AT UNIVERSITIES AND/OR INSTITUTES**
Include dates, names and locations of seminars.

‘Zoonotic viruses in Belgian wildlife’. September 25, 2013. Pasteur Institute, Brussels, Belgium

13) **PROFESSIONAL AWARDS RECEIVED DURING TENURE**
none

14) **POST-TENURE POSITION / JOB TITLE**
Research leader at the Zoonotic Infectious Diseases Unit

15) **NAME AND ADDRESS OF POST-TENURE POSITION / JOB ORGANIZATION**
KU Leuven, Rega Institute, Minderbroedersstraat 10, BE3000 Leuven Belgium.

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

- 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 a foreign-government agency
- Research/teaching position at a U.S. college or university
- Research/teaching position at a foreign college or university

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) I had the honor to enjoy the tradition of Thanksgiving twice with colleagues and had a lot of ‘American style BBQs’ in the summer.

2) We had several ‘cook-off’ occasions in the lab with typical American and Belgian recipes.

3) For Belgians, it’s all about foods and drinks. So we shared a lot of recipes for making typical Belgian foods and desserts. A real Belgian waffle for example, seems to be something completely different than what people are used to.

4) As a Belgian, I like to talk about politics. It has been very educational knowing about how politics work in the states. It has been very interesting to witness the election of an American president and to go and watch the inauguration speech in D.C.

5) I tried to educate people here that Belgium is more than just about chocolate, beers and waffles.

18) **APPRAISAL OF RESEARCH ASSOCIATESHIP PROGRAM**
On a scale of 1 – 10 (poor - excellent), please rate the following:

**SHORT TERM VALUE**

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

**LONG TERM VALUE**

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

**LAB SUPPORT**

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

**ADVISER/MENTOR SUPPORT**

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

**LPR SUPPORT**

- Quality of administrative support from the Laboratory (e.g., NIST, NRL, IWR, FHWA) NRC Program Representative (LPR)
  - 10
Comments

NRC SUPPORT

Quality of administrative support. Please assess respective NRC aspects (e.g., moving company, insurance, Omega, payroll, Program Coordinator, travel, etc.)

Comments

18) PLEASE PROVIDE ANY SUGGESTIONS FOR PROGRAM IMPROVEMENT.

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

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

Asha Davis: adavis@nas.edu
Linda Sligh: lsligh@nas.edu
Melanie Suydam: msuydam@nas.edu
Peggy Wilson: pwilson@nas.edu

Id#                             Rev. April. 2014                             Proj/Act ID#
Jennifer Nyland

December 19, 2014

The Use of Glial Inhibitors to Increase the Efficacy of Opioid Analgesics while Eliminating the Propensity for Addiction

1) Developed collaborations with the BAMC Pain Management Clinic, focus on translational work from bench to bedside, clinical research involving opioid use and long term outcomes

2) Developed collaborations with the USAISR Burn Center, clinical studies focused on psychological aspects of pain, opioid use, and long term outcomes

3) Testing of novel analgesics in animal models of burn injury

4) Tested the effects of opioid administration during recovery on later drug-seeking behaviors in a rat model

5) Investigated stress as a pain generator, and possible interventions in a rat model

All projects during tenure are currently in progress. I will continue to pursue this research in my new position.


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


12) **SEMINARS OR LECTURES DELIVERED AT UNIVERSITIES AND/OR INSTITUTES**

Include dates, names and locations of seminars.

Substance Use in the Military, USAISR Seminar Series, August 13, 2014

Pain Meds for Algernon: What we can and cannot learn from animal models, USAISR Burns and Trauma Research Workgroup meeting, July 10, 2014

13) **PROFESSIONAL AWARDS RECEIVED DURING TENURE**
14) POST-TENURE POSITION / JOB TITLE

Staff Scientist

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

Battlefield Pain Management Task Area, US Army Institute of Surgical Research, 3698 Chambers Pass, Fort Sam Houston, TX 78234

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

- Permanent position at the NRC host agency
- Contract or temporary position at the NRC host Agency
- Abbreviate Host Laboratory/Center USAISR
- Research/Administrative position with another U.S.-government agency
- Research/Administrative position with a foreign-government agency
- Research/teaching position at a U.S. college or university
- Research/teaching position at a foreign college or university
- Research/administration position in private industry in the U.S.
- Research/administration position in private industry outside of the U.S.
- Research/administration position with a non profit
- Self-employed/consulting
- Postdoctoral research
- Other (Please specify, possible) ______
- 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 RESEARCH ASSOCIATESHIP PROGRAM

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

**SHORT TERM VALUE**

- Development of knowledge, skills, and research productivity
  Comments

**LONG TERM VALUE**

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

**LAB SUPPORT**

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

**ADVISER/MENTOR SUPPORT**

- Quality of mentoring from the Laboratory NRC Adviser (USMA Mentor, if applicable)
  Comments
  While I did not receive much support from John Clifford, I did not require much mentorship.

**LPR SUPPORT**

- Quality of administrative support from the Laboratory (e.g., NIST, NRL, IWR, FHWA) NRC Program Representative (LPR)
  Comments

**NRC SUPPORT**

- Quality of administrative support. Please assess respective NRC aspects (e.g., moving company, insurance, Omega, payroll, Program Coordinator, travel, etc.)
  Comments

18) PLEASE PROVIDE ANY SUGGESTIONS FOR PROGRAM IMPROVEMENT.
Please do NOT scan to PDF. Send the Final Report as MSWord document via e-mail to your NRC Program Coordinator

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

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linda Sligh</td>
<td><a href="mailto:lsligh@nas.edu">lsligh@nas.edu</a></td>
</tr>
<tr>
<td>Asha Soutar</td>
<td><a href="mailto:asoutar@nas.edu">asoutar@nas.edu</a></td>
</tr>
<tr>
<td>Melanie Suydam</td>
<td><a href="mailto:msuydam@nas.edu">msuydam@nas.edu</a></td>
</tr>
<tr>
<td>Peggy Wilson</td>
<td><a href="mailto:pwilson@nas.edu">pwilson@nas.edu</a></td>
</tr>
</tbody>
</table>

| Id# | Rev. December 2014 | Proj/Act ID# |
# Final Report

1. **Associate Last or Family Name**
   - Pilia

2. **First Name**
   - Marcello

3. **M.I.**

4. **Today's Date**
   - January 29, 2015

5. **Dates of Tenure**
   - from September 4, 2012 to February 6, 2015

6. **Host Agency**
   - AMRMC
   - USAISR

7. **Laboratory or Center**
   - (e.g., AFRL)
   - (e.g., Wright Patterson AFB)

8. **Division / Directorate / Department**
   - ETRM
   - (e.g., High-Speed Propulsion)

9. **Name of Laboratory NRC Adviser**
   - Soft Tissue Regeneration Lab
   - Christopher Rathbone

10. **Title of Research Proposal**
    - Composite pre-vascularized scaffolds for large bony defect reconstruction

11. **Summary of Research During Tenure**
    - Itemize significant findings in concise form, utilizing key concepts/words.
    - 1) Successfully vascularized a Volumetric Muscle Loss defect using Microvascular Fragments
    - 2) Proved that increase in vascularization in soft tissue does not increase healing without a myogenic cell source
    - 3) Successfully vascularized demineralized bone allografts using Microvascular Fragments both in an ectopic rat model and in a 6mm femoral defect.
    - 4) Again, without an appropriate cell source vascularization is not enough
    - 5) Started investigating the addition of satellite cells and/or minced muscle grafts to the microvascular fragments to determine functional outcome

12. **Research in Progress**
    - Describe in no more than 100 words.
    - Every project was finished and the manuscripts are being published right now. Started investigating addition of myogenic source to microvascular fragments but another PI will assess the outcome in 8 weeks

13. **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


   b) Books, book chapters, other publications


   c) Manuscripts in preparation, manuscripts 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

   1 Pilia M*, McDaniel JS, Corona BT, Rathbone CR. Microvascular fragments improve vessel density of allograft bone in vivo; San Antonio Postdoc Research Forum, San Antonio TX, September 2014 – Poster Presentation

   2 McDaniel JS, Pilia M*, Walker J, Corona BT, Rathbone CR. Use of microvascular fragments for improving regeneration in musculoskeletal defects; San Antonio Postdoc Research Forum, San Antonio TX, September 2014 – Poster Presentation

   3 Pilia M*, McDaniel JS, Corona BT, Rathbone CR. Microvascular fragments improve vessel density of allograft bone in vivo; Military Health System Research Symposium, Ft. Lauderdale FL, August 2014 – Poster Presentation

   4 McDaniel JS, Pilia M*, Walker J, Corona BT, Rathbone CR. Use of microvascular fragments for improving regeneration in musculoskeletal defects; Military Health System Research Symposium, Ft. Lauderdale FL, August 2014 – Poster Presentation


   8 Pilia M*, McDaniel JS, Corona BT, Rathbone CR. Transplantation and Perfusion of Microvascular Constructs in an Experimental Volumetric Muscle Loss Model; Military Health System Research Symposium, Ft. Lauderdale FL, August 2013 – Poster Presentation

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

13) PROFESSIONAL AWARDS RECEIVED DURING TENURE

14) POST-TENURE POSITION / JOB TITLE
Special Assistant, Intra- & Extramural Research Prog.

15) NAME AND ADDRESS OF POST-TENURE POSITION / JOB ORGANIZATION
16) POST-TENURE POSITION STATUS / CATEGORY  Please indicate only one.

☒ Permanent position at the NRC host agency

☐ Contract or temporary position at the NRC host Agency

☐ Research/Host Laboratory/Center __________

☐ Research/Administrative position with another U.S.-government agency

☐ Research/Administrative position with a foreign-government agency

☐ Research/teaching position at a U.S. college or university

☐ Research/teaching position at a foreign college or university

☐ Research/administration position in private industry in the U.S.

☐ Research/administration position in private industry outside of the U.S.

☐ Research/administration position with a non profit

☐ Self-employed/consulting

☐ Postdoctoral research

☐ Other (Please specify, possible) ______

☐ 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 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 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 NRC Adviser (USMA Mentor, if applicable)

Comments

LPR SUPPORT

10  Quality of administrative support from the Laboratory (e.g., NIST, NRL, IWR, FHWA) NRC Program Representative (LPR)

Comments

NRC SUPPORT

10  Quality of administrative support. Please assess respective NRC aspects (e.g., moving company, insurance, Omega, payroll, Program Coordinator, travel, etc.)

Comments

Special thanks to Peggy and Jason for making our lives so much easier. I really want to thank the entire institution, it has been an amazing experience. Thank you!

18) PLEASE PROVIDE ANY SUGGESTIONS FOR PROGRAM IMPROVEMENT.

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

No handwritten signature required; Linda Sligh: lsligh@nas.edu

but you may upload a scanned signature file below: Asha Soutar: asoutar@nas.edu

Melanie Suydam: msuydam@nas.edu
<table>
<thead>
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<th>Id#</th>
<th>Rev. December 2014</th>
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<tbody>
<tr>
<td>Peggy Wilson: <a href="mailto:pwilson@nas.edu">pwilson@nas.edu</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Peggy Wilson: pwilson@nas.edu |
1) **Associate Last or Family Name:** RAHMAN

2) **First Name:** Md. Mizanur

3) **Today's Date:** 10/01/2014

4) **Dates of Tenure:**
   - from: 03/01/2011
   - to: 11/30/2014

5) **Host Agency:** AMRMC
   - (e.g., AFRL)

6) **Laboratory or Center:** USAMRIID
   - (e.g., Wright Patterson AFB)

7) **Division / Directorate / Department:** MTS
   - (e.g., High-Speed Propulsion)

8) **Name of Laboratory NRC Adviser (and USMA Mentor, if applicable):** Biochemistry
   - Dr. S. Ashraf Ahmed

9) **TITLE OF RESEARCH PROPOSAL:**
   Effects of Botulinum neurotoxin derived peptides and post-translational modification on the structure, function and biology of BoNT

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

   1) Discovered that the C-terminus of Botulinum neurotoxin serotype A is involved in product removal and catalysis
   2) Developed enzymatic assay for BoNT/A catalytic domain
   3) Demonstrated that BoNT bound ions affect enzymatic activity
   4) Demonstrate that C-terminus of BoNT/A Lc interacts with BoNT/A belt affecting catalysis
   5) (USMA Davies Fellow: please add summary of teaching, including classes taught.)

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

   I have been working on to determine the extended role of C-terminus of BoNT/A Lc on the stability and catalytic activity of the enzyme.

12) **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


   b) Books, book chapters, other publications

   c) Manuscripts in preparation, manuscripts submitted

   1. **Rahman M. Mizanur**, and S. Ashraf Ahmed†The Belt Sequence Mimics the Role of Substrate SNAP25 Upstream Sequence in the Catalysis of type A Botulinum Neurotoxin
2. Vicki A. Montgomery, S. Ashraf Ahmed, Mark A. Olson, Rahman M Mizanur, Virginia I. Roxas-Duncan, and Leonard A. Smith: *Ex vivo* inhibition of *C. botulinum* neurotoxins types B, C, E, and F by Small Molecular Weight Inhibitors (Manuscript prepared for Toxicon)

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**

1. May 2013: The C-Terminus of the Catalytic Domain of Type A Botulinum Neurotoxin May Facilitate Product Release From the Active Site, NIH, Frederick, Maryland
2. September 2012: Roles of Acetate, Sulfate and Calcium on the Catalytic Activities of Botulinum Neurotoxin Protease Domains of Serotypes A, B and E. IBRCC, Baltimore, Maryland

12) **SEMINARS OR LECTURES DELIVERED AT UNIVERSITIES AND/OR INSTITUTES**

Include dates, names and locations of seminars.

2. May 2014: Botulinum Neurotoxin: Structure and Mechanism of Action, University of Maryland, College Park

13) **PROFESSIONAL AWARDS RECEIVED DURING TENURE**

14) **POST-TENURE POSITION / JOB TITLE**

Microbiologist

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

USAMRIID, 1425 Porter St, Fort Detrick, Frederick

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

- X Permanent position at the NRC host agency
- □ Contract or temporary position at the NRC host Agency
- □ Abbreviate Host Laboratory/Center ______
- □ Research/Administrative position with another U.S.-government agency
- □ Research/Administrative position with a foreign-government agency
- □ Research/teaching position at a U.S. college or university
- □ Research/teaching position at a foreign college or university
- □ Research/administration position in private industry in the U.S.
- □ Research/administration position in private industry outside of the U.S.
- □ Research/administration position with a non profit
- □ Self-employed/consulting
- □ Postdoctoral research
- □ Other (Please specify, possible) ______
- □ 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 RESEARCH ASSOCIATESHIP PROGRAM**

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

**SHORT TERM VALUE**

- ☐ Development of knowledge, skills, and research productivity
LONG TERM VALUE
How the NRC Associateship award affected your career to date
Comments
Excellent (10)

LAB SUPPORT
Quality of support from the Laboratory--equipment, funding, orientation, safety and health guidelines, etc.
Comments
Excellent (10)

ADVISER/MENTOR SUPPORT
Quality of mentoring from the Laboratory NRC Adviser (USMA Mentor, if applicable)
Comments
Excellent (10)

LPR SUPPORT
Quality of administrative support from the Laboratory (e.g., NIST, NRL, IWR, FHWA) NRC Program Representative (LPR)
Comments
Excellent (10)

NRC SUPPORT
Quality of administrative support. Please assess respective NRC aspects (e.g., moving company, insurance, Omega, payroll, Program Coordinator, travel, etc.)
Comments
Excellent (10)

18) PLEASE PROVIDE ANY SUGGESTIONS FOR PROGRAM IMPROVEMENT.

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

No handwritten signature required; but you may upload a scanned signature file below:
Asha Davis: adavis@nas.edu
Linda Sligh: lsligh@nas.edu
Melanie Suydam: msuydam@nas.edu
Peggy Wilson: pwilson@nas.edu

Id# Rev. September 2014 Proj/Act ID#
1) Associate Last or Family Name
Sanchez Jr

2) First Name
Carlos

3) Today's Date
26 August 2014

4) Dates of Tenure
from 07 Sept 2011 to 06 Sept 2014

5) Host Agency
ARMC US Army Institute of Surgical Research, Combat Casualty Care/Extremity Trauma and Regenerative Medicine

6) Laboratory or Center
JBSA San Antonio TX (e.g., Wright Patterson AFH)

7) Division / Directorate / Department
Combat Casualty Care/Extremity Trauma and Regenerative Medicine (e.g., High-Speed Propulsion)

8) Name of Laboratory NRC Adviser (and USMA Mentor, if applicable)
Joseph C Wenke, PhD

9) Title of Research Proposal
Improving Outcomes of Extremity Trauma through Infection Control and Bone Regeneration

10) Summary of Research During Tenure
Itemize significant findings in concise form, utilizing key concepts/words.

1) Developed in vitro biofilm assays to test susceptibility to various antimicrobials (and antiseptics) as well as to evaluate the effectiveness of various biofilm dispersal agents utilizing a number of bacterial species as well as fungal isolates related to combat casualties.

2) Reported through prospective studies, the importance and incidence of biofilm formation by clinical isolates associated with combat casualty and showing the relationship between this phenotype and the development of persistent infections in combat related wounds.

3) Demonstrated the utility of combinations of biofilm dispersal agents and antimicrobials as an alternative therapy for targeting bacterial biofilms.

4) Through collaborative efforts contributed to the development of biomaterials capable of delivering biofilm dispersal agents (alone or in combination with antimicrobials) to reduce infection in contaminated femoral segmental defects.

5) Characterized host responses of osteoblasts, a bone cell line, to biofilms vs planktonic (culture grown) bacteria, and identified those factors responsible for reducing cell viability and cell differentiation.

6) Characterized temporal host responses during bacterial osteomyelitis infection in vivo and have begun to identify factors that may be responsible for host pathologies associated with orthopaedic infections, namely those involving S. aureus.

(USMA Davies Fellow: please add summary of teaching, including classes taught.)

11) Research in Progress
Describe in no more than 100 words.

The primary focus of my research has been to develop and/or optimize treatment strategies to reduce infectious complications associated with open fractures, sustained during combat trauma. Based on previous work completed at ISR, we have identified a number of currently FDA approved antimicrobials, as well as novel agents capable of specifically targeting and disrupting biofilms, that have shown great efficacy as a treatment option for a number of microbial agents predominately responsible for infection in combat related injuries; moreover which have also been shown to specifically target/disrupt microbial biofilms. We are currently in the process of translating these findings into potential therapies to reduce infection using an established contaminated segmental defect model. Additionally we are testing the application of various materials, loaded with idea agents, to evaluate sustained release of single and multiple compounds.

12) 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:


b) Books, book chapters, other publications

N/A

c) Manuscripts in preparation, manuscripts submitted

Homeyer D, Sanchez CJ, Mende K, Beckius ML, Akers KS, Wenke JC, Murray CK. In Vitro Toxicity and Activity of Tea Tree Oil on Filamentous Fungi and Human Cells. (Manuscript In Revision, Journal of Medical Mycology.)


White B, Sanchez CJ, Mende K, Beckius ML, Akers KS, Wenke JC, and Murray CK. In Vitro Toxicity and Activity of Medical Grade Honey on Filamentous Fungi and Human Cells (Manuscript in preparation for Journal of Orthopaedic Trauma)


Hardy SK, Cardile AP, Akers KS, Murray CK, Wenke JC and Sanchez CJ. Preclinical evaluation of Rifaxymcins for Treatment of Staphylococcal aureus Biofilms (Manuscript in Preparation for Clinical Orthopaedics and Related Research)

Allen K, Sanchez CJ, Homeyer D, Romano DR, Hardy SK and Akers KS. Voriconazole Enhances Osteogenic Activity of Human Osteoblasts In vitro. (Manuscript in Preparation for Antimicrobial Agents and Chemotherapeutics)

Cardile AP, Woodbury RW, Hardy SK, Becerra S, Albach AM, Akers KS, Wenke JS and Sanchez CJ. Antibiofilm Activity of Norspermidine Against Clinical Orthopaedic Isolates. (Manuscript Submitted to BMC Microbiology)
Albach AM, Hardy SK, Chang DC, Garcia RG, Cardile AP, Wenke JC and Sanchez CJ. Antimicrobial Activity of Gallium and Zinc Meso- and Protoporphyrins against Biofilms of Clinical Isolates of Staphylococcus aureus (Manuscript In Progress)

Chang DC, Garcia RG, Hardy SK, Akers KS, Wenke JC and Sanchez CJ. Antimicrobial Activity of Gallium and Zinc Meso- and Protoporphyrins against Biofilms of Clinical Isolates of Multidrug-Resistant Acinetobacter baumannii (Manuscript In Progress)

10) PATENT OR COPYRIGHT APPLICATIONS RESULTING FROM NRC ASSOCIATESHIP RESEARCH
Provide titles, inventors, and dates of applications.
Composition with biofilm dispersal agents; Publication number W02014026052 A1 2013

11) PRESENTATIONS AT SCIENTIFIC MEETINGS OR CONFERENCES
Provide complete references: author(s), title, abstract/proceeding citation, meeting name and location.

International
N/A

Domestic


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

13) PROFESSIONAL AWARDS RECEIVED DURING TENURE
NA

14) POST-TENURE POSITION / JOB TITLE
Extension of Current position, through Oak Ridge National Laboratory (ORAU)

15) NAME AND ADDRESS OF POST-TENURE POSITION / JOB ORGANIZATION
US ARMY Institute of Surgical Research
3698 Chambers Pass Ft. Sam Houston, TX 78234
Staff Scientist

16) POST-TENURE POSITION STATUS / CATEGORY Please indicate only one.
☐ Permanent position at the NRC host agency
☒ Contract or temporary position at the NRC host Agency
Abbreviate Host Laboratory/Center ARMY-USAISR
☐ Research/Administrative position with another U.S.-government agency
☐ Research/Administrative position with a foreign-
government agency

☐ Research/teaching position at a U.S. college or university
☐ Research/teaching position at a foreign college or university
☐ Research/administration position in private industry in the U.S.
☐ Research/administration position in private industry outside of the U.S.

☐ Research/administration position with a non profit
☐ Self-employed/consulting
☐ Postdoctoral research
☐ Other (Please specify, possible) ___
☐ No information provided

17) APPRAISAL OF RESEARCH ASSOCIATESHIP PROGRAM
On a scale of 1 – 10 (poor - excellent), please rate the following:

SHORT TERM VALUE
☐ Development of knowledge, skills, and research productivity

Comments:

In addition to expanding my research skill sets to include other bacterial agents and filamentous fungi, this opportunity has given me an appreciation and knowledge to conduct research in orthopaedics, using various animal and in vitro models, antimicrobial susceptibility testing, including a variety of antimicrobial and antiseptics, as well as an introduction into biomaterials.

LONG TERM VALUE
☐ How the NRC Associateship award affected your career to date

Comments:

This opportunity has been a great experience overall that has introduced me to areas of research, in which I can apply my previous specialization into, and that I will likely further pursue upon the completion of this tenure.

LAB SUPPORT
☐ Quality of support from the Laboratory—equipment, funding, orientation, safety and health guidelines, etc.

Comments:

Every effort was made to ensure that all necessary equipment and research reagents required for the completion of research projects were readily available. Additionally, there was tremendous support from the research staff and

ADVISER/MENTOR SUPPORT
☐ Quality of mentoring from the Laboratory NRC Adviser (USMA Mentor, if applicable)

Comments:

My mentor had an open door policy and always made the best efforts to keep up with ongoing projects and provide support while not directly micro-managing research efforts.

LPR SUPPORT
☐ Quality of administrative support from the Laboratory (e.g., NIST, NRL, IWR, FHWA) NRC Program Representative (LPR)

Comments:

NRC SUPPORT
☐ Quality of administrative support. Please assess respective NRC aspects (e.g., moving company, insurance, Omega, payroll, coordinator, travel, etc.)

Comments:

During my tenure the experiences in all aspects of the fellowship, in regards to the administrative support, was excellent. Everyone in on the support staff was always very helpful and worked extremely hard on our behalf to make this experience great.

18) PLEASE PROVIDE ANY SUGGESTIONS FOR PROGRAM IMPROVEMENT:

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

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

Maria Crocco: mcrocco@nas.edu
Asha Davis: sadavis@nas.edu
Linda Sleigh: lsleigh@nas.edu
Peggy Wilson: pwilson@nas.edu

Id# ____________

Rev. Nov. 2013

Proj/Act ID# ____________
**Title of Research Proposal**

Determination of the requirements for B cell and CD8 T cell responses in protection against Ebola virus infection after VRP-GP vaccination

**Summary of Research During Tenure**

1. Antibody responses appear to be most acutely responsible for protection against filovirus infection after vaccination.

2. CD8 T cells may contribute to protection but it varies by mouse strain slightly.

3. Both CD4 and CD8 T cell responses to Ebola glycoprotein are detectable after VRP vaccination.

**Research in Progress**

My current projects involve further describing VRP immune responses and components of the immune system that are involved. Additionally, I am involved in a team that is evaluating memory immune responses in filovirus outbreak survivors in Uganda. Recently, the lab was awarded an NIH grant to evaluate antibody therapeutics and I am involved in this effort as well.

**Publications and Papers Resulting from NRC Associateship Research**


b) Books, book chapters, other publications

c) Manuscripts in preparation, manuscripts submitted
11) PRESENTATIONS AT SCIENTIFIC MEETINGS OR CONFERENCES
Provide complete references: author(s), title, abstract/proceeding citation, meeting name and location.

International


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

Antibody and memory T cell responses in Ebolavirus and Marburgvirus outbreak survivors. MD Anderson Cancer Center, April 2014

13) PROFESSIONAL AWARDS RECEIVED DURING TENURE

14) POST-TENURE POSITION / JOB TITLE
Research Scientist

15) NAME AND ADDRESS OF POST-TENURE POSITION / JOB ORGANIZATION
USAMRIID
1425 Porter St
Ft Detrick, MD 21702

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

☐ Permanent position at the NRC host agency
☒ Contract or temporary position at the NRC host Agency
Abbreviate Host Laboratory/Center USAMRIID
☐ Research/Administrative position with another U.S.-government agency
☐ Research/Administrative position with a foreign-government agency
☐ Research/teaching position at a U.S. college or university
☐ Research/teaching position at a foreign college or university
☐ Research/administration position in private industry in the U.S.
☐ Research/administration position in private industry outside of the U.S.
☐ Research/administration position with a non profit
☐ Self-employed/consulting
☐ Postdoctoral research
☐ Other (Please specify, possible) ——
☐ 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 RESEARCH ASSOCIATESHIP PROGRAM
On a scale of 1 – 10 (poor - excellent), please rate the following:

SHORT TERM VALUE
☐ Development of knowledge, skills, and research productivity
Comments

LONG TERM VALUE
☐ How the NRC Associateship award affected your career to date
Comments

LAB SUPPORT
☐ Quality of support from the Laboratory--equipment, funding, orientation, safety and health guidelines, etc.
Comments
ADVISER/MENTOR SUPPORT
9  Quality of mentoring from the Laboratory NRC Adviser (USMA Mentor, if applicable)
Comments

LPR SUPPORT
9  Quality of administrative support from the Laboratory (e.g., NIST, NRL, IWR, FHWA) NRC Program Representative (LPR)
Comments

NRC SUPPORT
10  Quality of administrative support. Please assess respective NRC aspects (e.g., moving company, insurance, Omega, payroll, Program Coordinator, travel, etc.)
Comments

18) PLEASE PROVIDE ANY SUGGESTIONS FOR PROGRAM IMPROVEMENT.

Please do NOT scan to PDF. Send the Final Report as MSWord document via e-mail to your NRC Program Coordinator
No handwritten signature required; but you may upload a scanned signature file below:
Asha Davis: adavis@nas.edu
Linda Sligh: lsligh@nas.edu
Melanie Suydam: msuydam@nas.edu
Peggy Wilson: pwilson@nas.edu

Id#  Rev. April. 2014  Proj/Act ID#
**FINAL REPORT**

1) **Associate Last or Family Name**  
Ward

2) **First Name**  
Catherine

3) **M.I.**  
L

4) **Today's Date**  
9/2/2014

5) **Dates of Tenure**  
from 8/23/2011 to 9/5/2014

6) **Host Agency**  
MRMC (e.g., AFRL)

7) **Laboratory or Center**  
USAISR (e.g., Wright Patterson AFB)

8) **Division / Directorate / Department**  
ETRM (e.g., High-Speed Propulsion)

9) **Name of Laboratory NRC Adviser (and USMA Mentor, if applicable)**  
Joseph C. Wenke

10) **TITLE OF RESEARCH PROPOSAL**  
Improving Cellular Therapies for Osseous Trauma Using Injectable Scaffolds for Bone Regeneration

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

1) Utilized and optimized an injectable polyurethane (PUR) matrix for delivery of cells (bone marrow mesenchymal stem cells, BMSCs) and osteogenic agents (Lovastatin, LV) for a bone regeneration therapy in collaboration with Dr. Scott Guelcher (Vanderbilt University).

2) Developed methods to encapsulate cells in alginate matrices for survivability during PUR curing.

3) Analyzed cell fate within injectable scaffolds (PUR). *In vitro* analysis included determining viability, attachment and proliferation of cells onto the scaffolds in culture. *In vivo* analysis included determining cell survivability after injection in a rat calvarial defect.

4) Investigated osteogenic potential of injectable cell delivery scaffolds with the addition of osteogenic agents in the system.

(USMA Davies Fellow: please add summary of teaching, including classes taught.)

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

An optimized cell (BMSC) and osteogenic agent (Lovastatin) delivery system using an injectable polymer (polyurethane) will be tested in a rat femur segmental defect model to determine the ability to form new bone in a critical-size defect. BMSCs and Lovastatin within the injectable system have been optimized and tested *in vitro* to determine ideal concentrations to support osteogenic differentiation. This model will assess the ability of the system in a relevant model of bone regeneration.

13) **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**


**b) Books, book chapters, other publications**
c) Manuscripts in preparation, manuscripts 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

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

13) PROFESSIONAL AWARDS RECEIVED DURING TENURE

14) POST-TENURE POSITION / JOB TITLE
Staff Scientist

15) NAME AND ADDRESS OF POST-TENURE POSITION / JOB ORGANIZATION
United States Army Institute of Surgical Research
3698 Chambers Pass
Fort Sam Houston TX 78234

16) POST-TENURE POSITION STATUS / CATEGORY Please indicate only one.
□ Permanent position at the NRC host agency
☒ Contract or temporary position at the NRC host Agency
Abbreviate Host Laboratory/Center USAISR
☐ Research/Administrative position with another U.S.-government agency
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☐ Research/teaching position at a foreign college or university
☐ Research/administration position in private industry in the U.S.
☐ Research/administration position in private industry outside of the U.S.
☐ Research/administration position with a non profit
☐ Self-employed/consulting
☐ Postdoctoral research
☐ Other (Please specify, possible) ______
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18) APPRAISAL OF RESEARCH ASSOCIATESHIP PROGRAM

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

SHORT TERM VALUE

Development of knowledge, skills, and research productivity

Comments

As an NRC fellow, I was able to lead a project with the opportunity to contribute to grants on the project. I was also able to be involved in several other projects in the lab, which led to collaborations and publications.

LONG TERM VALUE

How the NRC Associateship award affected your career to date

Comments

The associateship has progressed my career through experience in the field and also through very valuable networking internally and externally.

LAB SUPPORT

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

Comments

Despite a learning curve with government laboratories (ordering, finances, etc.), the facilities were amazing and extremely helpful in accelerating the project.

ADVISER/MENTOR SUPPORT

Quality of mentoring from the Laboratory NRC Adviser (USMA Mentor, if applicable)

Comments

The NRC Advisor was always constructive and helpful. He aided in mentoring me through my project while also facilitating several opportunities for collaborations with other projects.

LPR SUPPORT

Quality of administrative support from the Laboratory (e.g., NIST, NRL, IWR, FHWA) NRC Program Representative (LPR)

Comments

The LPR was very helpful and supportive of my actions as an NRC fellow.

NRC SUPPORT

Quality of administrative support. Please assess respective NRC aspects (e.g., moving company, insurance, Omega, payroll, Program Coordinator, travel, etc.)

Comments

The NRC admin was very attentive to any issues I had.

18) PLEASE PROVIDE ANY SUGGESTIONS FOR PROGRAM IMPROVEMENT.

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

No handwritten signature required;

but you may upload a scanned signature file below:

Asha Davis: adavis@nas.edu
Linda Sligh: bslish@nas.edu
Melanie Suydam: msuydam@nas.edu
Peggy Wilson: pwilson@nas.edu