AWARD NUMBER:   W81XWH-15-1-0115

TITLE:  Phase I Trial of Intratumoral Administration of NIS-Expressing Strain of Measles Virus in Unresectable or Recurrent Malignant Peripheral Nerve Sheath Tumor

PRINCIPAL INVESTIGATOR:  Dusica Babovic-Vuksanovic, MD

CONTRACTING ORGANIZATION:  Mayo Clinic and Foundation
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PREPARED FOR:   U.S. Army Medical Research and Materiel Command
  Fort Detrick, Maryland  21702-5012

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5c. PROGRAM ELEMENT NUMBER  
5d. PROJECT NUMBER  
5e. TASK NUMBER  
5f. WORK UNIT NUMBER  

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8. PERFORMING ORGANIZATION REPORT NUMBER  

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)  U.S. Army Medical Research and Materiel Command
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13. SUPPLEMENTARY NOTES  

14. ABSTRACT  Study approved by Mayo IRB on April 18, 2016, and by USAMRMC/ORP/HRPO on May 6, 2016. All study staff completed IRB training. Dose volume charts have been developed to facilitate pharmacy orders. Study opened for enrollment on May 17, 2016. Study coordinators identified and assigned to the study by Mayo Clinic Cancer Center.

Three patients have been enrolled in the study. They completed treatment per protocol and continue the follow up. None of the treated patients experienced side effects. With the first 3 patients we have completed the first dose level. We are continuing recruitment for the second dose level.

15. SUBJECT TERMS  Neurofibromatosis 1, Malignant Peripheral Nerve Sheath Tumor (MPNST), MV-NIS, Oncolytic Virus, Measles Virus

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

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   a. REPORT OF RESPONSIBLE PERSON  10
   b. ABSTRACT  
   c. THIS PAGE  

19a. NAME OF RESPONSIBLE PERSON  
19b. TELEPHONE NUMBER  
   (include area code)  

Standard Form 298 (Rev. 8-98) Prescribed by ANSI Std. Z39.18
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1. INTRODUCTION:

Malignant peripheral nerve sheath tumors (MPNST) is the major complication contributing to early mortality and overall decrease in life expectancy in Neurofibromatosis 1 patients. Oncolytic viruses can selectively infect and destroy tumor cells. Our preliminary data confirm that MPNST cells are highly susceptible to MV-NIS. We are conducting Phase I clinical trial to determine safety of intratumoral administration of MV-NIS. Protocol includes MV-NIS injections under ultrasound or CT guidance, in vivo monitoring of distribution and kinetics of virus using SPEC/CT or planar gamma camera imaging after TC-99m administration and assessing changes in tumor size by using WHO criteria. Our correlate studies will explore the time course of viral gene expression, virus elimination and humoral and cellular immune response to the injected virus.

2. KEYWORDS:

Neurofibromatosis 1, malignant peripheral nerve sheath tumor (MPNST), MV-NIS, oncolytic virus, measles virus

3. ACCOMPLISHMENTS: The PI is reminded that the recipient organization is required to obtain prior written approval from the awarding agency grants official whenever there are significant changes in the project or its direction.

What were the major goals of the project?

Major Task 1: Prepare Protocol for Phase I Clinical Trial --completed
Major Task 2: Coordinate Study Staff for Clinical Trial I--completed
Major Task 2: Conduct Phase I Clinical Trial---study open and recruitment in progress
Major Task 3: Perform Correlate Studies
    Subtask 1: Evaluate virus incorporation and persistence in MPNST after injection
    Subtask 2: Assess viremia and viral shedding

What was accomplished under these goals?

1. Received Mayo IRB approval on 04/18/2016
2. The US Army Medical Research and Materiel Command (USAMRMC), Office of Research Protections (ORP), Human Research Protection Office (HRPO) reviewed the protocol and found that it complies with applicable DOD, US Army, and USAMRMC human subjects protection requirements. Approval Received on May 6, 2016.
3. All stuff completed IRB training
4. Developed drug dose volume chart to facilitate pharmacy orders once patients start enrolling
5. Study opened for patient enrollment on May 17, 2016 to Mayo Clinic in Rochester
6. Study coordinators identified and assigned to the study by Mayo Cancer center
7. Three patients treated per protocol, completed first dose level
What opportunities for training and professional development has the project provided?

Nothing to report

How were the results disseminated to communities of interest?

Nothing to report

What do you plan to do during the next reporting period to accomplish the goal?

Continue patient accrual and procedures per protocol

4. IMPACT: Describe distinctive contributions, major accomplishments, innovations, successes, or any change in practice or behavior that has come about as a result of the project relative to:

What was the impact on the development of the principal discipline(s) of the project?

Nothing to report

What was the impact on other disciplines?

Nothing to report
What was the impact on technology transfer?

Nothing to report

What was the impact on society beyond science and technology?

Nothing to report

5. CHANGES/PROBLEMS: The PD/PI is reminded that the recipient organization is required to obtain prior written approval from the awarding agency grants official whenever there are significant changes in the project or its direction. If not previously reported in writing, provide the following additional information or state, “Nothing to Report,” if applicable:

Changes in approach and reasons for change

Nothing to report

Actual or anticipated problems or delays and actions or plans to resolve them

The study is now open and actively recruiting eligible patients, however, the IRB approval was longer than anticipated due to administrative delays.

Changes that had a significant impact on expenditures

Nothing to report
Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents

Significant changes in use or care of human subjects

| Received Mayo IRB approval on 04/18/2016.  
The US Army Medical Research and Materiel Command (USAMRMC), Office of Research Protections (ORP), Human Research Protection Office (HRPO) reviewed the protocol and found that it complies with applicable DOD, US Army, and USAMRMC human subjects protection requirements. Approval Received on May 6, 2016.  
Annual IRB progress report approved by Mayo IRB 1/11/2017 |

Significant changes in use or care of vertebrate animals

Nothing to report

Significant changes in use of biohazards and/or select agents

Nothing to report

6. PRODUCTS: List any products resulting from the project during the reporting period. If there is nothing to report under a particular item, state “Nothing to Report.”

- Publications, conference papers, and presentations
  Report only the major publication(s) resulting from the work under this award.

  Journal publications.

  Nothing to report
Books or other non-periodical, one-time publications.

Nothing to repost

Other publications, conference papers and presentations.

Nothing to report

- Website(s) or other Internet site(s)

Nothing to report

- Technologies or techniques

Nothing to report

- Inventions, patent applications, and/or licenses

Nothing to report

- Other Products

Nothing to report
7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

What individuals have worked on the project?

<table>
<thead>
<tr>
<th>Name</th>
<th>Project role</th>
<th>Person months worked</th>
<th>Contribution to projects</th>
<th>Funding support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dusica Babovic-Vuksanovic</td>
<td>PI</td>
<td>22</td>
<td>submitted quarterly reviews, coordinated activities needed for study opening for accrual</td>
<td>this award</td>
</tr>
<tr>
<td>Scott Okuno</td>
<td>co-PI</td>
<td>14</td>
<td>patient accrual</td>
<td>this award</td>
</tr>
<tr>
<td>Jennifer Picket</td>
<td>study coordinator</td>
<td>2</td>
<td>coordination of study procedures</td>
<td>this award</td>
</tr>
<tr>
<td>Jaclynn Wessling</td>
<td>study coordinator</td>
<td>1.5</td>
<td>coordination of study procedures</td>
<td>this award</td>
</tr>
<tr>
<td>Jodi Klocke</td>
<td>study coordinator</td>
<td>8</td>
<td>coordination of study procedures</td>
<td>this award</td>
</tr>
</tbody>
</table>
Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?

Nothing to report

What other organizations were involved as partners?

Nothing to report

8. SPECIAL REPORTING REQUIREMENTS

COLLABORATIVE AWARDS: N/A

QUAD CHARTS: N/A

9. APPENDICES: N/A