Idaho Incubation Fund Program

Final Report Form

Proposal No.	**IF15-002**
Name:	**Cheryl Jorcyk**
Name of Institution:	**Boise State University**
Project Title:	**Small Molecule Inhibitors for the Reduction of Cancer Metastasis**

Information to be reported in your final report is as follows:

1. Provide a summary of overall project accomplishments to include goals/milestones met, any barriers encountered, and how the barriers were overcome:

The goal of this project was to help a novel breast/prostate cancer therapeutic developed at Boise State University to reach its full economic potential. Breast cancer is the most commonly diagnosed cancer in women worldwide, while prostate cancer is the second (to lung) most common cancer for males. These cancers are relatively treatable and patient survival is high, unless the tumor spreads (metastasizes) to different tissues in the body like lung, liver, bone, and brain. For example, the five-year breast cancer survival rate is 98% for women who are diagnosed with localized disease, yet the survival rate is only 23% for patients with distant metastases. Currently, there are no FDA-approved therapeutics specifically targeting early stages of metastasis, when intervention could be most efficacious. The work performed related to this project was to improve development of a potential drug called an oncostatin M small molecule inhibitor (OSM-SMI), which showed promise in early-stage testing by reducing the potential for tumor cells to become motile and metastasize to other tissues. Oncostatin M (OSM) is an inflammatory protein important in normal wound healing and disease states such as arthritis and cancer. OSM binds its receptor (OSMR) on tumor cells and signals many events associated with the metastatic cascade. An OSM-SMI works by interacting with OSM and preventing it from binding its receptor and signaling downstream metastatic events.

Milestone #1: Construct a bank of theoretical OSM-SMI-2 analogs.
This work was completed.

Milestone #2: Identify top 3 OSM-SMI-2 analogs based on *in silico* screening and pharmacological properties.
Complications arose while trying to reach this milestone. Originally, our consultant, Dr. Dong Xu, at the Idaho State University Meridian campus, was going to perform an *in silico* screen to analyze the bank of OSM-SMI-2 analogs for those that are predicted to bind OSM with the highest affinity. Boise State University and Idaho State University came to difficulties in the technology transfer discussions.

We have recently found another group who can help us with our in silico screen. Dr. Owen McDougall and his postdoctoral researcher, Dr. Matthew King, are both located in the Department of Chemistry and Biochemistry and Boise State University.

Milestone #3: Synthesize top 3 OSM-SMI-2 analogs.
This work was completed without the assistance of Dr. Dong Xu, and three different OSM-SMI-2-like chemicals were constructed by Dr. Don Warner. None of these chemicals worked better than the original OSM-SMI-2. Work to construct more analogs is currently underway.

Milestone #4: Examine analogs for inhibition of OSM signaling.
All compounds were successfully tested for inhibition of OSM signaling. OSM-SMI-8 remains the most promising compound.

Milestone #5: Assess compounds for inhibition of metastatic potential.
The compounds responding best in Milestone #4 were tested for *in vitro* inhibition of metastatic potential. OSM-SMI-8 remains the most promising compound.

Other Milestones reached:

- Dr. Cheryl Jorcyk and her graduate student Ken Tawara, MS, attended the American Association for the Advancement of Cancer (AACR) annual meeting in Philadelphia, PA in April 2015 to learn 'state-of-the-art' technologies.
- Drs. Cheryl Jorcyk and Don Warner were invited to submit a Department of Defense (DOD) Impact Award to continue this work for the development of anti-metastatic prostate cancer drugs. This grant is due September 24, 2015.

2. Describe the current state of the technology and related product/service:

The current state of the technology is that we are developing three potential OSM-SMI inhibitors, which have passed numerous *in vitro* assays. They will be tested in pre-clinical studies within the year. The most successful OSM-SMI may pre-clinical studies will be marketed for licensing to pharmaceutical companies.

3. List the number of faculty and student participants as a result of funding:

Two Faculty	**Drs. Cheryl Jorcyk and Don Warner**
One PhD Student	**Ken Tawara**
Two Technicians	**Daniel Hedeen and Jackie Emanthinger**
One High School Teacher	**John Doherty**

Four Undergraduate Students	**Hannah Scott (Jorcyk)** **Katie Neal (Jorcyk)** **Carson Kidwell (Warner)** **Lauren Hosek (Warner)**

4. What are the potential economic benefits:

The potential economic benefits remains high, with a market potential for cancer therapeutics over $4 billion. If a drug is developed that passes pre-clinical trials and is able to enter clinical trials, we can license it to a pharmaceutical company for $1,000,000+.

5. Description future plans for project continuation or expansion:

We submitted a Pre-Application to the Department of Defense (DOD) Prostate Cancer Impact Award mechanism entitled "High-Impact Anti-Inflammatory Therapeutic for the Treatment and Possible Prevention of Metastatic Prostate Cancer", and we were invited to submit a full proposal. It will be submitted by September 24, 2015.

We will also submit a Pre-Application to the DOD Breast Cancer Breakthrough Award program, which is also due in September.

6. Please provide a final expenditure report (attached) and include any comments here:

See below.

7. List invention disclosures, patent, copyright and PVP applications filed, technology licenses/options signed, start-up businesses created, and industry involvement:

One patent application (#P10980US01) entitled "Oncostatin M (OSM) antagonists for preventing cancer metastasis and IL-6 related disorders" was submitted 9/5/14.

8. Any other pertinent information:

FINAL EXPENDITURE REPORT

A. FACULTY AND STAFF		
Name/Title	$ Amount Requested	Actual $ Spent
Cheryl Jorcyk		$953.10
Hannah Scott		$2700
Don Warner		$1750
B. VISITING PROFESSORS		
Name/Title	$ Amount Requested	Actual $ Spent
C. POST DOCTORAL ASSOCIATES/OTHER PROFESSIONALS		
Name/Title	$ Amount Requested	Actual $ Spent
D. GRADUATE/UNDERGRADUATE STUDENTS		
Name/Title	$ Amount Requested	Actual $ Spent
Lauren Hosek		$3,960
Ken Tawara		$12,278.50
E. FRINGE BENEFITS		
Rate of Fringe (%)	$ Amount Requested	Actual $ Spent
Lauren Hosek		$330.23
Cheryl Jorcyk		$249.49
Hannah Scott		$225.07
Ken Tawara		$345.87
Don Warner		$554.09
PERSONNEL SUBTOTAL:		$23,346.35
F. EQUIPMENT: (List each item with a cost in excess of $1000)		
Item/Description	$ Amount Requested	Actual $ Spent
1.		
2.		
3.		
4.		
EQUIPMENT SUBTOTAL:		
G. TRAVEL		
Description	$ Amount Requested	Actual $ Spent
1. Conference Travel	$1,500	$1608.54
2.		
3		

TRAVEL SUBTOTAL:	$1,500	$1608.54

H. PARTICIPANT SUPPORT COSTS:		
Description	$ Amount Requested	Actual $ Spent
1.		
2.		
3		
PARTICIPANT SUPPORT COSTS SUBTOTAL:		

I. OTHER DIRECT COSTS:			
Description		$ Amount Requested	Actual $ Spent
1. Materials and Supplies		$8,150	$19861.67
2. Graduate Student Fees		$5,167	$5,166
3. Consultant Services includes travel			
OTHER DIRECT COSTS SUBTOTAL:		$14,317	25027.67
TOTAL COSTS (Add Subtotals):		$50,000	

TOTAL AMOUNT REQUESTED:	$50,000
TOTAL AMOUNT SPENT:	49,982.56