

Idaho Incubation Fund Program

Final Report Form

Proposal No. IF14-009
Name: Guang Yan
Name of Institution: Idaho State University
Project Title: Cationic Prodrugs to Improve Topical Treatment of MSD

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:
 - We have synthesized and characterized a series of cationic prodrugs: ketoprofen choline ester, ketoprofen β -methylcholine ester, Ketoprofen α -methylcholine ester, Ketoprofen N,N-dimethylamino-1-propanol ester, ketoprofen trimethylammonium-1-propanol ester, diclofenac β -methylcholine ester. All the prodrugs have low protein binding and can be converted to parent drug in rat and human plasma.
 - We have conducted the in vivo rat studies with several of the cationic prodrugs. Several iontophoresis conditions were investigated including 0.7 mA for 6 hr, 0.7 mA for 2 hr, 0.7 mA for 2 hr than with no current for 4 hr, 0.1 mA for 6 hr. The prodrugs showed more penetration into the local tissues including skin, subcutaneous, and muscle tissues.
 - We have filed the provisional patent to USPTO on April 17th.
 - We have conducted additional in vivo study with rats and determined the amount of drug delivered into the knee joint. There are more drug delivered to the knee with the cationic prodrug approach.
 - We have successfully established an arthritis rat model. We applied the drug or the cationic prodrug to the knee area. In the rats the treated with the cationic prodrug, the swollen of the knee was significantly reduced compared to the control group, and the pain from the arthritic knee was significantly less than the control group.
2. Describe the current state of the technology and related product/service:

We have explored a variety of prodrugs and tested the efficacy in treatment of arthritis pain in animals and showed great results. We are in the stage to find third party for further development of this technology.

3. List the number of faculty and student participants as a result of funding:
 - There were one faculty and two graduate students participated in this project.

4. What are the potential economic benefits:
 - As we demonstrated the efficacy of this technology in treatment of muscular skeletal pain in animals, there will be great potential of product to be commercialized and provide licensing/royalty to the Idaho State University.

5. Description future plans for project continuation or expansion:
 - We will try to find some third part partner for further development of this technologies, eventually going to clinical trials for the product and commercialization.

6. Please provide a final expenditure report (attached) and include any comments here:
 - Thanks for supporting this great project.

7. List invention disclosures, patent, copyright and PVP applications filed, technology licenses/options signed, start-up businesses created, and industry involvement:
 - We filed a [provisional patent to the USPTO on April 17th.
 - We have contacted several private companies. One company showed great interest in this project and has expressed their interest in further development of this project. We are in early negotiation stage with the company.

8. Any other pertinent information:

N/A

FINAL EXPENDITURE REPORT

A. FACULTY AND STAFF		
Name/Title	\$ Amount Requested	Actual \$ Spent
Guang Yan, Assistant Professor	12,600	21,011
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
Shabbir Lobo (graduate student)	10,800	0
Naresh Arelly (graduate student)	0	1,692
Annurag Balabour (graduate student)	0	1,188
E. FRINGE BENEFITS		
Rate of Fringe (%)	\$ Amount Requested	Actual \$ Spent
Guang Yan (21%)	2,700	4,412
Shabbir Lobo, Naresh Arelly, Annurag Balabour (8.9%)	1,000	256
PERSONNEL SUBTOTAL:	27,100	28,559
F. EQUIPMENT: (List each item with a cost in excess of \$1000)		
Item/Description	\$ Amount Requested	Actual \$ Spent
1.Syring pump	1,500	0
2. microdialysis sample collector	2,000	0
3. AT261 Balance	0	1,914
4. Leybold Vaccum pump	0	1,338
EQUIPMENT SUBTOTAL:	3,500	3,252
G. TRAVEL		
Description	\$ Amount Requested	Actual \$ Spent
1.		
2.		
3		
TRAVEL SUBTOTAL:	0	0

H. PARTICIPANT SUPPORT COSTS:			
Description		\$ Amount Requested	Actual \$ Spent
1.			
2.			
3.			
PARTICIPANT SUPPORT COSTS SUBTOTAL:		0	0
I. OTHER DIRECT COSTS:			
Description		\$ Amount Requested	Actual \$ Spent
1. Materials and supplies		13,100	10,750
2. Animal and animal care cost		6,300	7,439
3.			
OTHER DIRECT COSTS SUBTOTAL:		19,400	18,189
TOTAL COSTS (Add Subtotals):		50,000	50,000
TOTAL AMOUNT REQUESTED:			50,000
TOTAL AMOUNT SPENT:			50,000