

Mini-grant Project Description and Budget Form

Student Name(s): **SAMPLE MINI-GRANT** _____ Date: _____

Please BRIEFLY answer the following questions regarding the proposed project (can be completed by mentor or student). No more than 1 page.

Brief description of mentor's area of expertise or research area (keywords acceptable)

Understanding how developmental biology can be applied to understanding early organogenesis. Early heart formation, particularly the formation of the atrioventricular (AV) canal. Developmental biology approaches to create models used to study regenerative medicine

Research question/statement or general area of interest to be pursued

Defining and categorizing the effects of mechanical forces on bone marrow stem cells (BMSCs) in our collagen scaffolds, towards the formation of vascularized bone tissue constructs. Ultimately, we are looking at the use of BMSCs in cardiac regenerative approaches because the use of stem cells to treat cardiac disease has been minimally successful. The use of the collagen scaffold previously built in the lab will allow us to investigate the interactions between cardiac myocytes and stem cells.

Short project description and timeline (max 300 words)

I will be working 7 hours per week in the lab. During the initial phases of my work, I will be trained in basic laboratory techniques. I will learn sterile isolation and culturing techniques. I will learn how to isolate both tissues and cells. The laboratory uses primary culture of stem cells and cardiac tissue. I will learn to isolate both of these tissues. As I become competent in these techniques, I will learn both protein and nucleic acid isolation and analysis ie, Western Blots, RTPCR. Then, I will begin experiments of studying the effects of mechanical forces on the formation of vascularized bone using BMSCs and the lab's scaffold. I will be required to take careful notes and attend and present my work at weekly lab meetings. I will also be required to attend appropriate regional scientific meetings such as the Southeast INBRE meeting and North Carolina Tissue Engineering and Regenerative Medicine meetings.

Timeline:

Jan. 2010- Basic laboratory training, sterile isolation and culture techniques.

Feb. 2010- Isolation of stem cells, cardiac tissues, protein, and nucleic acid

Mar. 2010- Begin experimentation of studying mechanical force effects

Apr. 2010- Continue experimentation, present at Discovery Day 2010

May/June 2010- Attend and present at regional meetings/conferences

How project is connected to student's goals (academic, personal, or professional) (max 200 words)

From this project I will gain research experience, participate in a research team, learn important tissue engineering concepts, and gain proficiency in essential research skills. I will present the results at Discovery Day and in other forums of scholarly discussion including regional conferences and journal publications. I am a Biomedical Engineering and Business – Management dual degree candidate and am pre-med. Since I have no previous research experience, this project will be invaluable to me as a developing scholar. I will learn how to conduct methodical scientific research and write research notes first-hand. Academically, this will give me a deeper understanding of the aforementioned topics and concepts, and will help me to compete for further grants and scholarships in the future when available. These will all help me towards one of my major career goals, which is to found and lead a very successful and effective regenerative medicine research company.

Impact statement (why is this project important, how can the research be used, etc) (max 200 words)

Stem cell research and tissue engineering are rapidly expanding disciplines in a larger interdisciplinary field named regenerative medicine. The research going into creating new and futuristic therapies for medical illnesses is intellectually rigorous, academically pertinent, and highly competitive and requires skilled training and thorough understanding of relevant biological processes. This project is important because it has the potential to contribute to the scientific understanding of biomaterials and tissue engineering and of cell biology and mechanics. The results of this project could provide or contribute to a base for new engineering research, medical research, and/or biomedical engineering entrepreneurship. Furthermore this research could help build the foundation for novel bone replacement therapies utilizing vascularized tissue engineered constructs, e.g., for skull fractures, using tissue engineered vascularized bone instead of metal plates. I will present my research process, products, and results to the USC community on Discovery Day. Presentation of this research will help educate the community on how tissue engineering research is conducted, how it affects society, and what progress is being made towards major biomedical engineering research goals. It will also allow the greater USC community to better understand the magnitude and quality of research being done to advance the biomedical field here at the university.

If your project involves research outside the US, please complete page 2. If not, skip to page 3 (Budget form)

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The mini-grant program was created to off-set expenses related to undergraduate research, not to fund **study** abroad trips. However, projects conducted while studying abroad are accepted and encouraged to apply for funding. Closer scrutiny is given to these projects and how the money is being used. It is recommended that funds be requested to off-set local transportation or supplies directly required to complete your project rather than plane tickets, etc., although partial reimbursement for tickets is possible. To assist in the review of your Research Abroad project, please answer the following questions. You may also wish to speak with Julie Morris, director of the Office of Undergraduate Research prior to applying.

1. Will you be participating in a Study Abroad program during your research trip?

Yes No, this trip is **ONLY** for the research project.

If no, skip to Q3: Language Issues.

If yes, complete Q2 & Q3:

2. How will your research fit into your academic schedule?

Examples: 1) classes are 4 days a week giving one day + weekends for research – this is only appropriate if your research could be conducted on weekends, 2) I will be staying an extra week after classes to conduct the research – only appropriate if time is sufficient for project completion

3. Language issues:

Is English the primary language Yes No

If yes, STOP, you do not need to complete the rest of this form.

If no, please answer the following:

1) Have you taken courses in the language (please list course numbers):

2) What is your competency: beginner intermediate advanced

3) Will your project require communication skills beyond your competency? Yes No

If yes, who will help you and how will you obtain their services/assistance?

Continue to page 3 (Budget form)

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Student Name(s): SAMPLE MINI-GRANT _____ Date: _____

List all materials, supplies, travel expenses including registration, lodging, local transportation with estimates

Item	Cost
Tissue Culture supplies	\$ 250.00
Antibodies	\$ 200.00
Collagen tubes	\$100.00
Stretch devices	\$200.00

**I have also applied for the SURF grant.

**I anticipate applying for the Magellan Voyager to assist with conference travel costs.

Grand Total

\$750.00