## Long Term Grant Application
Budget Worksheet

<table>
<thead>
<tr>
<th>BUDGET ITEM</th>
<th>Department or College Funds</th>
<th>Outside Agency Funds</th>
<th>Personal Funds</th>
<th>Undergrad Research Funds</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td></td>
<td></td>
<td></td>
<td>BDNF Sandwich ELISA Kit from Immunoassay System (4 plates $842.00 + 10% shipping) $926.20</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Disposable Gloves ($12.30/box + 10% shipping and tax) $19.43</td>
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<td></td>
<td></td>
<td>Red Top 6 ml VACUTAINERs (2 case x $22.29 each +10% shipping and tax) $49.04</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Miscellaneous and Disposable lab supplies (cryoboxes, parafilm, funnels, pipette tips, reagent reservoirs, Sigmaclean, etc.) $116.65</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Venous Catheter Kits from online medical supply (2 boxes of 20</td>
<td></td>
</tr>
<tr>
<td>Equipment</td>
<td>Hardware replacement of thumb drive between micro-plate reader and computer $250</td>
<td>Software upgrade for micro-plate reader $1153</td>
<td></td>
<td></td>
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<td>---------------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
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<tr>
<td>Research Scholarship (max request $2,500.00)</td>
<td>NA (no scholarship requested)</td>
<td></td>
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<tr>
<td>Mileage to gather Data (.38 per mile)</td>
<td>NA</td>
<td></td>
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<tr>
<td>Participation Incentives to entice people to participate. (20 x $20 gift cards to WSU bookstore)</td>
<td>$400.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>GRAND TOTAL</td>
<td>$250</td>
<td>$3387.74</td>
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</tbody>
</table>

**LONG TERM GRANT APPLICATION**

Body of Proposal
Multiple Sclerosis (MS) is thought to affect more than 2.3 million people worldwide. In the US there are approximately 250,000 to 350,000 people that have been diagnosed with MS. This estimate suggests that about 200 new cases are diagnosed each week (National Institute of Neurological Disorders and Stroke, 2014). This is of importance nationally because Healthy People 2020 includes a goal to improve health related quality of life and well-being (HRQOLWB) for all individuals (Department of Health and Human Services, 2014). Health related quality of life (HRQOL) is multidimensional and includes domains related to physical, mental, emotional, and social functioning (Department of Health and Human Services, 2014). All of these areas can be negatively affected by MS. An article in the Journal of Neurological Sciences states that based on their research, “there is potential to decrease the impact of modifiable factors on HRQOL in people with MS by identifying those with depressive symptoms and/or cognitive impairment and initiating evidence-based treatment as well as meeting the need for environmental facilitators aiming at reducing disability” (C. Chruzander et al., 2014, p.62). It is important to identify actions to help those with MS to increase their HRQOLWB. Several studies support the use of non-drug therapies combined with drug therapies for people with MS. One of these non-drug therapies is exercise which has been found to increase HRQOLWB for those who have MS (Hadgkiss, 2013).

Persons with MS face the challenge of “functional deterioration” (Mayo, Bayley, Duquette, Lapierre, Anderson, Bartlett, 2013, pg 1). Physical activity may play an important role for those with MS to combat this deterioration. Literature shows that although a person has MS they are expected to experience the many benefits from exercise (Pilutti, 2014). Some of these benefits go beyond helping slow disability but also reducing cardiovascular risk and obesity (Mayo, 2013). Another important benefit of exercise is that it induces an increase of Brain Derived Neurotrophic Factor (BDNF).

BDNF is a naturally occurring neurotrophin that is “highly involved in neuronal survival, differentiation and function as well as axonal growth, modulation of neuronal activity, and activity-
dependent synaptic and dendritic plasticity in the CNS” (Lee et al., 2012). The CNS is where it exerts most of its activity, (Brunelli et al., 2012). This is of great importance for those with MS because the disease targets the neurons in the CNS. Exercise is one way to increase BDNF.

The purpose of this correlation research experiment will be to examine the effects of varying doses (10, 20, and 30 minutes) of physical activity on levels of BDNF in people diagnosed with MS. living in a Utah Metropolitan setting in the Western United States, compared to those without MS. The study will focus primarily on the amount of physical activity required to induce a significant increase of BDNF in persons with MS.

The goal of the study is to assess if persons with MS can acquire a significant increase of BDNF with a shorter duration of exercise. The research continuum is dependent. My role is to work under the direction of Dr. Santorri, and Dr. Johnson in facilitating all aspects of this project.

I am a BIS student with emphasis in health promotion, chemistry, and nutrition. I have planned, implemented, and reviewed health promoting activities in the community. I also have experience working in the chemistry lab.

The final product will be a capstone essay that will be published in Weber State’s publication of ERGO. I will also be presenting my final project at the annual WSU Undergraduate Research Symposium.


The following steps will be followed to complete this project. The first step is to obtain IRB approval. This proposal has been submitted and we are waiting for that now. Once approval has been obtained the next step will be to find 20 volunteers. We will need 10 for the MS group and 10 for the control group.

Participants will be recruited by the primary student researcher who has MS. Recruitment will take a two pronged approach: 1) by asking persons known by the primary researcher to have MS and 2) by advertising the research opportunity at MS support meetings with a flyer.

Next will be to coordinate with all involved to come to the lab at Weber State University one time where participants will sign a consent form and fill out a survey that includes questions about their diet. A peripheral venous catheter will then be placed and will be used throughout the study to obtain blood samples. It will be placed in either the dorsum of the hand or the forearm depending on best access. The venous catheter method was chosen to minimize the risk of infection from repeat needle punctures. This procedure and all blood draws will be done by a certified phlebotomist under the direction of Dr. Spencer Hardenbrook. Participants will then ride a stationary bicycle for 30 minutes. Blood samples will be collected pre-exercise and at times, 10 minutes, 20 minutes, 30 minutes, and 10 minutes post exercise. Each blood draw will obtain about 6mL of blood for a total of 30mL. The blood will be stored in a secure locked freezer with no identifying information on the vials and all other personal information will be kept confidential. This will be completed by December 15, 2014.

Beginning in January the serum from the blood will be tested using a commercial ELISA kit from Immunoassay system, Promega, Madison WI, USA. All blood disposal protocols of the WSU EHS will be followed; as is currently done in the HPHP research laboratories. The results of the levels of BDNF will be documented.

Lastly the capstone essay will be written that will contain all research information including results. This will be completed by March 2015.
Materials-

All materials are disposable and intended for one time use. Materials listed in this application address phlebotomy (obtaining blood samples) and analysis of BDNF in the blood samples.

Equipment-

The equipment needs address the micro-plate reader located in the nutrition lab. The software is over ten years old and the hardware for interface between the reader and the computer is no longer working. The HPHP department is providing funds for hardware replacement. This proposal is asking for funding for the software replacement. It should be noted that this reader has been used for many OUR funded projects over the last ten years and would continue to receive high use for student research.

Research Scholarship-
No request is made for a scholarship.

Travel-
No travel is required
LONG TERM GRANT APPLICATION
Additional Questions

1. What funding have you received from OUR in the past? Where has your previous project been disseminated?

   None

2. Is this project part of a required course? If so, please indicate the support (monetary and in-kind) provided for this project by the academic department.

   No

3. What additional sources of funding have been solicited? Is your department willing/able to fund any equipment they will be retaining?

   No

4. Where do you plan to disseminate the results of this project?

   The results of this project will be published in Weber State’s publication of ERGO. I will also be presenting at the annual WSU Undergraduate Research Symposium.

5. If you are requesting a Research Scholarship, please list all significant time commitments (5+ hours per week) that you expect to maintain over the duration of your project including, for example, class and work schedules.

   N/A
LONG TERM GRANT APPLICATION
Faculty Recommendation Form

Student Name (last, first): Covington, Amy

Project Title: An Examination of the Relationships Between Exercise, Brain Derived Neurotrophic Factor, and Multiple Sclerosis.

1. How long and in what capacity have you known this student?

I met Amy in March 2014 and have worked with her closely since that time as she has developed her BIS Capstone proposal and IRB application.

2. Briefly describe the proposed project. Is this part of a larger research project? Is this part of a course? If so, how is the project apart from the nature and scope of activities normally taken for the course (Please attach a copy of your course syllabus)?

This project is being completed as part of Amy’s BIS Capstone. It is a stand-alone research project and consists of an examination of the correlation between exercise and BDNF in people living with MS.

3. Give an assessment of the project’s significance to the student’s discipline and of the project’s educational and/or professional benefit to the student.

This is a methodologically consistent research proposal and successfully marries the three disciplines of her BIS degree – health promotion, nutrition, and chemistry. This type of research is easily a stepping stone to graduate study for Amy, and/or, professional positions in her desired field.

4. Comment on the qualifications of the student to successfully complete this project, both in terms of the project’s scope and its time frame.

The scope and time frame of this project is appropriate and reasonable given Amy’s graduation timeline. Amy, in collaboration with her research team, is more than qualified to complete the project.

5. Comment on the justification and appropriateness of the project budget, including the necessity of a Research Scholarship (if requesting one).

Given the expenses involved with the protocol, the budget is appropriate as outlined in the project expenses.

6. Describe your role in the project.

I have helped guide the development of the BIS Capstone proposal and IRB application. I will continue to provide oversight and assistance throughout the entirety of the project, including data collection, management, and analysis, as well as the dissemination of her results through written and oral final products.
7. Include anything else that you think will be helpful to the committee in evaluating this application.

I am highly supportive of this project – this is easily going to be an exemplar BIS Capstone

This project ___X__ DOES ___ DOES NOT require review by the WSU Institutional Review Board for Human Subjects or the WSU Animal Care and Use Committee.

Project Mentor Signature

Date

2801
Campus Mail Code

x 6795
Phone Extension