



Opportunities Initiative Award 2010
*Using cardiovascular exercise to elevate levels of brain derived
neurotrophic factor and enhance cognition
in children with Fetal Alcohol Spectrum Disorders*

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| Funding Opportunity | Opportunities Initiative Award 2010 |
| Project Title | Using cardiovascular exercise to elevate levels of brain derived neurotrophic factor and enhance cognition in children with Fetal Alcohol Spectrum Disorders |
| Principle Investigator | Dr. Brian Christie (University of Victoria) |
| Institution | Division of Medical Sciences, University of Victoria |
| Co-investigators | Dr. Bruce Gooch (University of Victoria) |
| Collaborators | Dr. James Reynolds (Queen's University) Dr. Kimberly Kerns (University of Victoria) Dr. Catherine Gaul (University of Victoria) |
| Award Term | 2010-2012 |
| Award Amount | \$50,000/yr |

Project Summary

It is becoming abundantly clear that exercise is not only good for the body, but has tremendous benefits for the brain as well. Evidence from both animal models, and human studies, indicates that regular cardiovascular exercise can increase the learning and memory capacity of both the developing and the aged brain. Moreover, this increase in capacity seems to be tightly correlated to exercise induced increases in brain derived neurotrophic factor (BDNF), a chemical that helps brain cells thrive and survive. In Fetal Alcohol Spectrum Disorders (FASD), BDNF is not as abundant in the brain as it should be. The FASD brain is also characterized by impoverished structure, reduced neuronal numbers, and impairments in learning and memory. In animal models of FASD, we have been able to significantly reduce these deficits by having animals engage in regular cardiovascular exercise. The results are dramatic, and are coupled to an increase in BDNF.

In the present study we hope to take the first steps to translate this work into the human realm. We have compiled a team of neuroscientists, exercise specialists, psychologists and computer scientists to develop an engaging exercise program for children with FASD. Our goal is to first assess the learning and memory capacity of these children; then to carefully monitor them as they become involved in an 12 week exercise program (30 minutes, three times a week) that is based around engaging computer games. Our outcome measures will be to: 1) quantify changes in cardiovascular fitness; 2) to determine if this exercise program is sufficient to increase BDNF levels in these FASD children; and 3) to elucidate whether this program will help to improve their learning and memory capacity. A longer term goal is to implement this program at multiple sites (Edmonton, Victoria, and possibly Kingston and Vancouver) in the second year.