

The Center for ETHICS* at the University of Idaho offers study, intervention, outreach, consultation, and leadership in developing and advancing the theory, knowledge and understanding of character education including moral and ethical reasoning, moral development, ethical leadership, and ethical application. The Director of the Center for ETHICS* is Dr. Sharon Kay Stoll.

Ethical Theory and Honor in Competition and Sport

Bradley Dieter, PhD

Bradley Dieter, Dr. Stoll's 27th doctoral student, successfully defended his dissertation, "A Pedagogical and Physiological Approach to Treating Type 2 Diabetes." Dr. Chantal Vella, Movement Science, was co-major professor and mentored Study Two of Dr. Dieter's dissertation.

Background: Lack of exercise and sedentary behavior are primary risk factors for the development of type 2 diabetes mellitus (T2DM). Furthermore, physical activity (PA) and exercise are effective therapeutic tools for reducing diabetic complications and may reduce mortality rates. Despite this evidence, only 65% of adults and 47% of college students in the United States meet the suggested physical activity guidelines, indicating that human behavior plays a fundamental role in the increasing prevalence of T2DM. Human behaviors are formed through a reasoning process. Therefore, a reasoning-based approach may prove efficacious in improving PA. Furthermore, the mechanisms behind the beneficial effect of exercise on T2DM remain elusive. Oxidative stress plays a causal role in diabetic complications. The transcription factor, NF-E2-related factor 2 (Nrf2) protects against oxidative stress and exercise increases Nrf2 in healthy humans. Therefore, research regarding the effect of exercise on Nrf2 in T2DM is warranted. **Purpose:** The purpose of this dissertation was to conduct two separate lines of research to explore behavioral and physiological aspects of exercise and diabetes. **Methods of study one:** College-aged individuals participated in an online higher-level reasoning based educational intervention designed to increase PA. Measures of PA and social-cognitive variables regarding PA were assessed pre and post intervention. **Methods of study two:** normal and diabetic (*db/db*) mice underwent an acute exercise bout and Nrf2 activity was examined. We further explored the role of O-GlcNAcylation on Nrf2 signaling using an O-linked N-acetylglucosamine transferase (OGT) knockdown mouse and conducted *in vitro* studies in cardiomyocytes. **Results of study one:** The reasoning based intervention significantly increased the level of reasoning and leisure time PA amongst the experimental group. **Results of study two:** acute exercise increases Nrf2 protein content and mRNA expression Nrf2 transcription only in the normal mice. We also showed that protein O-GlcNAcylation is altered in the *db/db* mouse heart. Loss of the OGT enzyme resulted in drastic reduction in Catalase mRNA, indicating reduced Nrf2 transcription. Conversely, increasing O-GlcNAcylation in H9C2 cells augmented Nrf2 transcription. Lastly, we showed that Nrf2 is O-GlcNAcylated and *in silico* analysis identified Thr⁵⁹⁵ as a possible O-GlcNAcylation site near NLS and co-activation motif. **Conclusions:** The results from study one suggest that improving reasoning regarding PA improves leisure-time physical activity (LTPA) and cognitive domains associated with PA amongst college students. The results from study two suggest that and exercise-induced increase in the Nrf2 response is blunted in the *db/db* mouse heart, indicating that an acute-exercise elicits a lower Nrf2 response in diabetes. Furthermore our results demonstrate O-GlcNAc as a novel mechanism of regulation in the Nrf2 signaling cascade

Journal of Physical Education, Recreation and Dance

Dr. Stoll had an article published titled "The Play Community: A Student-Centered Model for Physical Education.

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