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How exercise influences addiction recovery: Q&A with neuroscientist

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A University at Buffalo neuroscientist whose focus is the brain's reward system and its role in addiction is helping to illuminate how exercise can aid the brain in addiction recovery. Over the past year, this research has

revealed that because exercise acts on the same areas of the brain that addiction does, it has the potential to become an important treatment tool for people with substance use disorder.

Panayotis (Peter) K. Thanos, Ph.D., senior research scientist in the Department of Pharmacology and Toxicology in the Jacobs School of Medicine and Biomedical Sciences at UB, is a lead or senior author on publications that describe his work that ranges from looking at sex differences in addiction and exercise in *Clinics and Practice* to how exercise can address alcohol use disorder in *Psychology Research and Behavior Management.*

Thanos, who also is director of the Behavioral Neuropharmacology and Neuroimaging Laboratory in UB's Clinical and Research Institute on Addictions, discusses the potential of exercise as a treatment for substance use disorders.

How did you get interested in studying the relationship between exercise and addictive behaviors? What was the first thing that made you think, 'Ok there's definitely something here that needs to be studied?'

About 15 years ago, I became aware of several recovery running programs in New York City and Philadelphia that were showing improved success in maintaining sobriety and reduced risk for relapse.

This led me to look into the mechanism of this clinical observation using animal models. The first results from this research were very supportive of the potential of exercise in curbing drug preference as a powerful adjunct tool to aid in recovery and to reduce the risk of relapse.

What are the challenges in understanding the connections between exercise and the brain?

The effects of exercise must be better characterized and understood. For instance, we don't yet understand the complexities of exercise and the individual differences in response to different types of exercise regimens. We also don't yet fully understand the concept of exercise dose. How much exercise is needed to have the desired effect? All exercise is not created equal and does not yield the same effects on all people in terms of brain signaling and behavior.

What are you working on now and are you collaborating on any clinical trials?

Yes, in collaboration with Western University of Health Sciences, we are involved in clinical research to assess exercise dose and relapse risk. We hope to have some pilot data by next spring that we will use to apply for funding. In preclinical research, we are looking at how exercise impacts endocannabinoid brain signaling as well as brain functional connectivity.

What does this research say about how effective exercise could be in treating addictive behaviors and, possibly, in enhancing mental health in general? What would you like people and policymakers and funders to know about the potential of exercise as a treatment?

More research on understanding exercise dose and regimens is needed. We cannot generalize and say that all exercise is the same in order to properly assess its impact in medicine.

We must also better understand how exercise is impacted by our individual genomic differences, similar to what we know happens with pharmacogenomics.

More information: Rania Ahmed et al, The Role of Estrogen Signaling and Exercise in Drug Abuse: A Review, *Clinics and Practice* (2024). DOI: 10.3390/clinpract14010012

Susan Sedhom et al, Potential Link Between Exercise and N-Methyl-D-Aspartate Glutamate Receptors in Alcohol Use Disorder: Implications for Therapeutic Strategies, *Psychology Research and Behavior Management* (2024). DOI: 10.2147/PRBM.S462403

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