Potential therapeutic role of resistance training in diabetes: a contribution by the 2009 recipient of the APS New Investigator Award

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AS INITIATED BY MY PREDECESSOR, Dr. Amira Klip, we will, on occasion, highlight original research and review articles authored by recipients of awards offered by the American Physiological Society (APS), in particular, the Endocrinology & Metabolism Section of the APS. While this journal is not a forum for all APS activities or meant to be a repository for research performed by Society members, collaboration toward a common goal does advance the individual goals of the APS and AJP. For example, we had the pleasure of publishing reviews by several of the past recipients of the Solomon A. Berson Distinguished Lectureship awardees (1, 10) that were based on their presentations at the annual Experimental Biology meetings. We will continue to publish such reviews because they are well received and highly cited.

 Whereas the above-mentioned Berson Award recognizes outstanding research over an extended period of time by a senior investigator, the APS also promotes junior investigators. In 2003, the APS initiated its New Investigator Award, and since that time, the Endocrinology & Metabolism Section of the APS has presented the award to seven young, deserving scientists (Table 1).

Background

In 2009, the Endocrinology and Metabolism Section presented its New Investigator Award to Nathan K. LeBrasseur, PT, PhD, for his scholarship and meritorious research. Dr. LeBrasseur received his BS in Health Sciences and MS in Physical Therapy from Boston University. After working for two years as a registered physical therapist, he obtained his doctoral degree in 2003 in the Department of Health Sciences, Boston University, under the mentorship of Roger Fielding, PhD. During that time, he studied the regulation of neuregulin/erbB in skeletal muscle. Thereafter, he began his postdoctoral training with Drs. Neil Ruderman and Douglas Sawyer at the Diabetes and Metabolism Research Unit at Boston Medical Center and the Center for Molecular Stress Response at Boston University School of Medicine. Between 2005 and 2008, Dr. LeBrasseur was an Assistant Professor of Medicine at Boston University School of Medicine in the Section of Endocrinology, Diabetes, Nutrition and Weight Management. During this time, he was also Associate Director of the Laboratory of Exercise Physiology and Physical Performance, as well as Director of the Mouse Metabolic Phenotyping Core. Changing career paths in 2008, he began work with the pharmaceutical giant Pfizer, Inc. as a Senior Principal Scientist until earlier this year. It was during his tenure at Pfizer that Dr. LeBrasseur was awarded the New Investigatory Award by the APS. He was the first recipient of the award from outside academia per se, which we believe emphasizes the excellent research and importance of science performed within the pharmaceutical industry. Currently, he is at the Mayo Clinic in Rochester, Minnesota, with appointments in the Department of Physical Medicine and Rehabilitation, Department of Physiology and Biomedical Engineering, and Robert and Arlene Kogod Center on Aging.

In broad terms, Dr. LeBrasseur’s current research focuses on elucidating the genes and cell signaling circuits that influence growth and metabolism in skeletal muscle, and how these physiological processes can be influenced by gene manipulation, diet, drugs, or exercise. His research team is striving to unravel the mechanisms by which beneficial and maladaptive alterations in muscle quantity and/or quality impact clinically relevant measurements of muscle performance, physical function, and metabolic homeostasis in humans and mouse models. Through this translational work they hope to identify effective measures to antagonize the loss of skeletal muscle mass that results from advancing age (sarcopenia) and the hyperinflammatory state produced by numerous catabolic diseases (cachexia) as a means to improve quality of life. A complete listing of Dr. LeBrasseur’s publications and a more thorough description of his research can be found at: http://mayoresearch mayo.edu/mayo/ research/staff/LeBrasseur_NK.cfm.

The Review

The review by LeBrasseur et al. (3), which immediately follows this Editorial Focus, provides a concise summary of recent literature supporting the relatively novel concept that resistance training, as opposed to the more commonly employed endurance training, might be used as adjunct therapy to treat the glucose intolerance that accompanies type 2 diabetes mellitus and obesity. The review contains a detailed description of the signal transduction pathways that are important for regulating glucose uptake and protein balance and how these various pathways are integrated and regulated. It also provides insightful commentary on the potential cellular mechanisms by which resistance exercise can have a beneficial impact on...
glucose, lipid, and protein metabolism. The most provocative sections in the review deal with data from studies in humans and genetically modified mice surrounding the metabolic benefits related to glucose tolerance and fat deposition that can be achieved by resistance exercise. Collectively, the research presented and discussed in this review demonstrates an underappreciated metabolic cross-talk between tissues. Importantly, essentially all of the final conclusions would not have been possible without the use of modern physiological approaches employing whole animals and humans. Thus, although the reductionist approach undoubtedly is important in elucidating potential cellular and molecular mechanisms, this review once again reinforces the importance of physiology as a discipline in tackling clinically relevant problems.

Conclusion

It is with great pleasure that we highlight the following review by this young scientist. In doing so, we hope to encourage and stimulate the next generation of talented young scientists to pursue their dreams and help unravel the complex physiological interactions that exist in endocrinology and metabolism. For those who find the review by LeBrasseur et al. of interest, we suggest perusing some of our recently published review articles on similar topics (2, 4–9), which focus more deeply on specific areas of muscle metabolism.

REFERENCES