

Current Understanding of Ventilatory Pump Mechanics in Health and Disease

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The focus of this talk will cover how mechanics can serve at the interface between physiology and medicine. The mechanisms that alter respiratory muscle mechanics in health and disease will be discussed. In particular, models of the mechanics of the respiratory muscles, the diaphragm, and certain determinants of diaphragm mechanics such as its unique mechanical properties and structural issues such it complex shape will be discussed. In addition, current works describing numerous approaches including measuring diaphragmatic curvature, displacement and muscle contractility will be covered. The role of specific cytoskeletal proteins such as desmin intermediate filaments in modulating muscle mechanics will be presented. Regarding mechanisms of respiratory muscle function in disease, data on key determinants of diaphragm structure and kinematics in chronic obstructive pulmonary disease will be discussed.

Biography

Aladin M. Boriek, PhD is a tenured Professor of Medicine and Molecular Physiology and Biophysics at Baylor College of Medicine, as well as Adjunct Professor of Mechanical Engineering at Rice University. Dr. Boriek received a master degree from the University of Michigan in 1984 and a PhD degree from Rice University in 1990. In 1994, he completed his postdoctoral training at Baylor College of Medicine in the area of respiratory mechanics under the mentorship of Dr. Rodarte. Dr. Boriek has been a regular member of the Respiratory Integrative Biology and Translational Research Study Section. Dr. Boriek has active NIH and NSF grant funding. Dr. Boriek has served on other NIH study sections including The Respiratory and Applied Physiology, and The Skeletal Muscle Biology and Exercise Physiology, and The Bioengineering and Physiology. He has also served as an external reviewer for the Surgery Review Board of the Department of Veteran Affairs, the Canadian Institutes of Health Research, the Canadian Lung Association /Canadian Thoracic Society, the Research Grant Council of Hong Kong. He has also served on numerous review panels for the National Science Foundation. He served as a member of the Editorial Board of the Journal of Applied Physiology and is currently a member of the editorial board of multiple journals including the American Journal of Physiology. Dr. Boriek has published nearly eighty papers in peer-reviewed journals in the areas of respiratory muscle mechanics, mechanical signal transduction, muscular dystrophy, aging, obesity and chronic obstructive disease.