Exercise physiology: future opportunities and challenges

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Knowledge regarding the benefits of regular exercise has grown rapidly in recent years based on advances in research at the molecular, cellular, organ, and whole body levels. But the question “how does exercise have so many health benefits?” is far from answered. Physical inactivity has been identified by the World Health Organization as the fourth leading risk factor for global mortality. Conversely, regular exercise is arguably the most potent medicine for the prevention and treatment of human diseases. Deciphering the molecular, cellular, and physiological mechanisms underlying the medicine of exercise is critical to advancing human health in the 21st century.

This issue of Pflügers Archiv - European Journal of Physiology provides a series of review articles and original papers to focus on exercise physiology. Knowledge of the molecular and cellular mechanisms that account for improved structure and physiological function in response

to exercise training has grown rapidly in recent years. Moreover, there is an increasing understanding of how the functional properties of cells and organs are impacted by physical inactivity and contribute to the pathophysiology of various diseases such as obesity, diabetes, cancer, sarcopenia, and cardiovascular diseases. Understanding the nature of mechanistic insights into physiological function with exercise helps to develop new interventions and therapeutic strategies to treat the diseases. We feel that this issue is timely, in view of the important foundations in the area of exercise and physical activity that have been developed over the last 20–30 years and that all our colleagues have made substantial contribution to this area. We thank all for their contribution to edit this special issue, and we appreciate all the support to publish this from Armin Kurtz and Yung E Earm.

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