Letter to editor

Exosomes and other extracellular vesicles in response to exercise intervention: Organ crosstalk in health and diseases

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Dear Editor-in-Chief

Exosomes contain regulatory signals such as growth factors, miRNAs, lipids, proteins, and nucleic acids that can be transported to adjacent or distant cells to affect the target tissue under both physiological and pathological conditions (Isaac et al., 2021). Exosomes are involved in various stages of disease control including apoptosis, immune regulation, angiogenesis, cell migration and cell proliferation. Exosomes are a ubiquitous, evolutionarily conserved mechanism of cellular communication. They play important roles in healthy physiological functions. Proteins, metabolites, and nucleic acids delivered by exosomes to recipient cells effectively modulate their biological response. Such exosome-mediated responses can promote or inhibit disease. The intrinsic properties of exosomes in regulating complex intracellular pathways have increased their potential application in the therapeutic control of many diseases, including neurological conditions and cancer.

Many agents are involved in modulating exosomes and other extracellular vesicles gene expression and release. One of these agents is the mechanical stress caused by exercise training. Exercise with its mechanical and oxidative stress can disrupt cell homeostasis and create adaptations at the molecular and cellular level to improve physiological health, which is effective in prevention of different diseases. Exercise by activation of all organs of the body, especially skeletal muscle, promotes the release of exosomes, through which it can develop organ crosstalk and have beneficial effects at the cellular level. It has been show that exercise promotes the release of exosomes without modification of its vesicle size (Estebanez et al., 2021). Little current data suggests that exosomes are released into the circulation in an intensity-dependent manner in response to acute endurance exercise. Many of the currently reported myokines/exerkines are also produced from exosomes. Finally, exosomes within skeletal muscle are depleted in response to an acute bout of endurance exercise (Safdar & Tarnopolsky, 2018).

References

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