

Letter to editor

The importance of crosstalk studies in finding mechanisms for the effect of physical activity on health

Hoseyn Fatolahi¹, Saleh Rahmati-Ahmadabad^{1*}

Dear Editor-in-Chief

New approaches to endocrinology have confirmed that every cell secretes hormones. These secreted substances are called cytokines. However, they are also named based on their origin. For example, the secretions of adipose and muscle tissue cells are called adipokines and myokines, respectively (Chait & den Hartigh, 2020).

The endocrine function of adipose tissue has been determined in some studies. It secretes substances called adipokines. Released adipokines (such as leptin, adiponectin, visfatin, resistin, omentin) act as autocrine/paracrine and endocrine (Landecho et al., 2019).

Adipokines play an essential role in regulating glucose and lipid metabolism, energy homeostasis, nutritional behavior, insulin sensitivity, inflammation, the immune system, adipose tissue production, vascular function, coagulation, and other bodily functions (Chait & den Hartigh, 2020). Leptin, for example, regulates body fat mass and obesity (when it increases in the bloodstream) through appetite and satiety receptors (in the hypothalamus). Unlike leptin, adiponectin reduces body fat mass and regulates glucose and lipid homeostasis. The resistin can be thought of as a link between obesity, diabetes, and insulin resistance. The visfatin plays an essential role in inflammatory and infectious diseases through pro-inflammatory and anti-apoptotic ability. Omentin significantly reduces the acute phase protein in endothelial cells and can be considered an anti-inflammatory adipokine (Landecho et al., 2019). In general, adipokines act as a mediator in regulating the function of tissues and other organs such as the liver, skeletal muscle, pancreas, and cardiovascular system. Adipose tissue dysfunction plays a significant role in insulin resistance, type 2 diabetes, cardiovascular disease, and metabolic disease (Balistreri, Caruso, & Candore, 2010).

Exercise promotes adaptation to skeletal muscle, adipose tissue and consequently prevents metabolic disorders. Physical activity causes these beneficial effects by altering myokines (skeletal muscle secretions) and adipokines. Adipokines and myokines play a role in facilitating tissue-to-tissue communication (tissue crosstalk) and work together to improve health. Studies show that skeletal muscle releasing myokines during a contraction may influence adipokines (Leal, Lopes, & Batista, 2018). Moreover, Shirvani et al. showed a significant positive correlation between plasma levels of irisin with the nesfatin-1 and a significant negative correlation with resistin. Therefore, physical activity could create metabolic crosstalk between skeletal muscle and adipose tissue (Shirvani & Rahmati-Ahmadabad, 2019). Doing crosstalk research by researchers is crucial to better understand the health-related molecular mechanisms (created by exercise).

References

- Balistreri, C. R., Caruso, C., & Candore, G. (2010). The role of adipose tissue and adipokines in obesity-related inflammatory diseases. *Mediators of inflammation*, 2010, 802078-802078. doi: <https://doi.org/10.1155/2010/802078>
- Chait, A., & den Hartigh, L. J. (2020). Adipose Tissue Distribution, Inflammation and Its Metabolic Consequences, Including Diabetes and Cardiovascular Disease. *Frontiers in cardiovascular medicine*, 7, 22-22. doi: <https://doi.org/10.3389/fcvm.2020.00022>
- Landecho, M. F., Tuero, C., Valentí, V., Bilbao, I., de la Higuera, M., & Frühbeck, G. (2019). Relevance of Leptin and Other Adipokines in Obesity-Associated Cardiovascular Risk. *Nutrients*, 11(11), 2664. doi: <https://doi.org/10.3390/nu11112664>
- Leal, L. G., Lopes, M. A., & Batista, M. L., Jr. (2018). Physical Exercise-Induced Myokines and Muscle-Adipose Tissue Crosstalk: A Review of Current Knowledge and the Implications for Health and Metabolic Diseases. *Frontiers in physiology*, 9, 1307-1307. doi: <https://doi.org/10.3389/fphys.2018.01307>

1. Department of Physical Education, Pardis Branch, Islamic Azad University, Pardis, Iran.

*Author for correspondence: salehrahmati@pardisiau.ac.ir

Post Office Box: 1658174583, Tel: +98-21- 76281010-11, Fax: +98-21- 76281010

Shirvani, H., & Rahmati-Ahmadabad, S. (2019). Irisin interaction with adipose tissue secretions by exercise training and flaxseed oil supplement. *Lipids in Health and Disease*, 18(1), 15. doi: <https://doi.org/10.1186/s12944-019-0960-4>