proceedings

MDPI

Proceedings

Is Irisin Anticancer Agent? †

Işıl Yıldırım

Institute of Science, Biochemistry Science, Inonu University, 44280 Malatya, Turkey; isilyld@hotmail.com

† Presented at the 2nd International Cell Death Research Congress, Izmir, Turkey, 1–4 November 2018.

Published: 5 December 2018

Abstract: Irisin is a protein, which is encoded by the FNDC5 gene. Irisin secreted as a hormone secret via Fibronectin type III domain-containing protein 5. Irisin is always provide beneficial effect of exercise on cellular metabolism as well as obesity and metabolic diseases. In addition, it plays a role in cancer. Therefore, in this study, aimed that to an overview of clinical research and explain the molecular mechanisms related to cancer of Irisin. This review will be providing a systematic analysis of recent work on Irisin and future work will provide a different perspective.

Keywords: Irisin; apoptosis; molecular mechanism

1. Introduction

Effect of Irisin on different cancers. It is known that obesity is a risk factor in the development of cancer and previous studies reported that effects of some hormones that prevent obesity related cancer. Irisin is an anti-obesity and anti-diabetes hormone that regulates fat tissue through converting white fat cells into brown cells (Figure 1) and blood sugar. Irisin, which is a novel myokine family, is generated by exercise and acts as an insulin-sensitizing hormone [1]. It has also a key role in cancer as well as obesity and metabolic diseases. It was determined that Irisin push down the migration, proliferation, and invasion of lung cancer cells via inhibition of epithelial-to-mesenchymal transition [2]. In a study reported that Irisin expression has protective role in hepatic cancer [3]. Another study identified that Irisin induced cell death of HepG2 cells by phosphorylation of AMPK and acetyl-CoA-carboxylase (ACC) via liver kinase B1 (LKB1) [4]. Other study it was reported that Irisin induced cell proliferation and invasion by targeting the PI3K/AKT pathway in HepG2 cells [5] (Figure 2).

Previous study suggest that Irisin levels are lower breast cancers [6]. Another study, it was reported that serum level of Irisin was much lower in breast cancer patients with spinal metastasis than patients without spinal metastasis [7]. A study published in 2014 year, it has been shown that the Irisin application causes a decrease in the amount of viability malign aggressive breast epithelial cancer cells MDA-MB-231, but it has no effect on immortalized breast cell MCF 10A [8] (Figure 2).

2. Conclusions

Irisin is an important substance. Because it has significantly role for a lot of metabolic process. This hormone acts in two ways Transformation of white fat tissue to brown fat tissue, which is metabolically more effective. By providing stabilization of blood glucose levels, obesity and glucose homeostasis are effective. It has significant key role on cancer. Irisin has been shown to be effective in the development and prevention of cancer formation by different pathway and signal pathways. In more detail, the study of the molecular mechanisms of this component will allow the identification of new targets for cancer treatments.

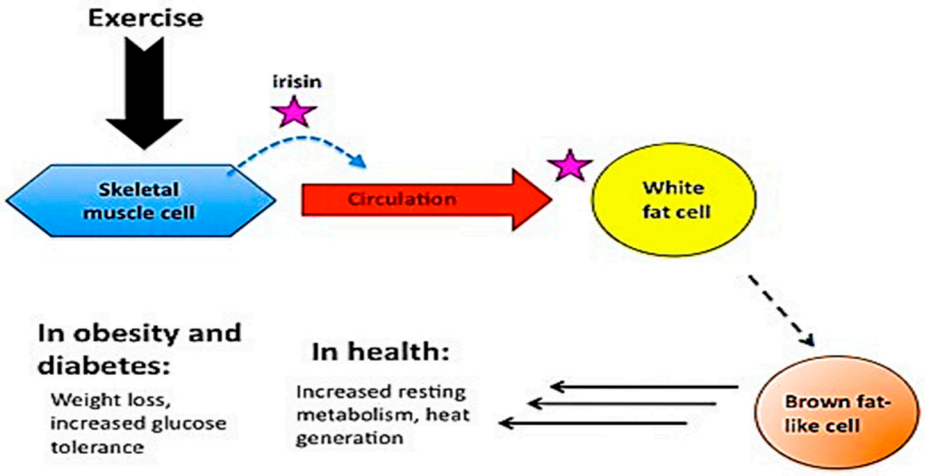


Figure 1. Effect mechanism Irisin Hormone.

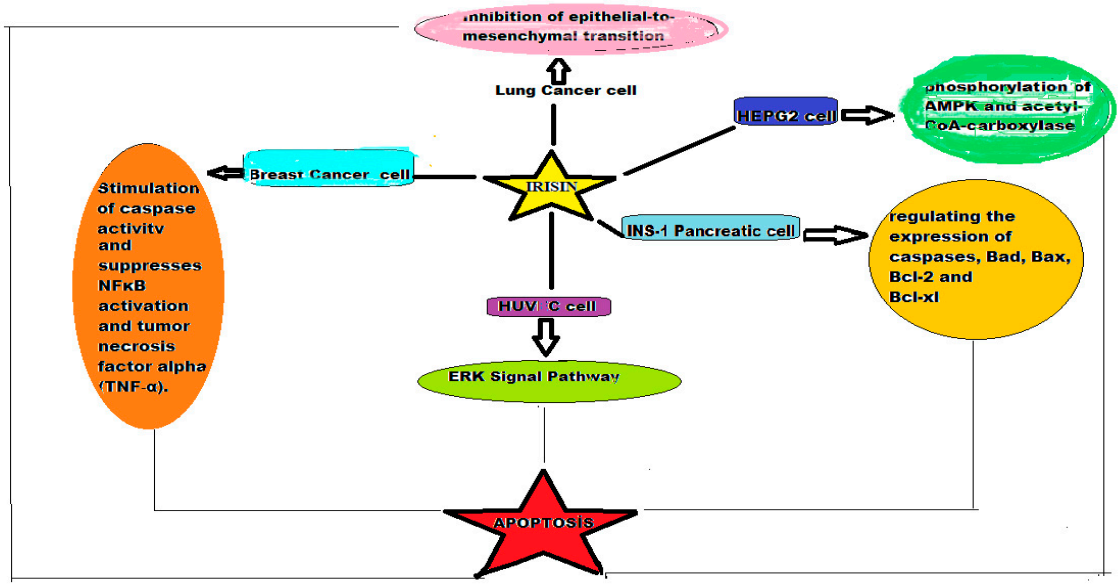


Figure 2. Apoptosis mechanisms of Irisin on different cancer cells.

Author Contributions: I.Y. solely responsible for writing this article as a writer.

Conflicts of Interest: The author declares no conflict of interest. As a corresponding author of this article, I certify that this article has not been accept for publication elsewhere, nor have I assigned any right or interest in the manuscript to any third party. I agree to publish in your journal.

References

1. Pedersen, B.K.; Akerstrom, T.C.; Nielsen, A.R.; Fischer, C.P. Role of myokines in exercise and metabolism. *J. Appl. Physiol.* **2007**, *103*, 1093–1098.
2. Shao, L.; Li, H.; Chen, J.; Song, H.; Zhang, Y.; Wu, F.; Wang, W.; Zhang, W.; Wang, F.; Li, H.; et al. Irisin suppresses the migration, proliferation, and invasion of lung cancer cells via inhibition of epithelial-to-mesenchymal transition. *Biochem. Biophys. Res. Commun.* **2017**, *485*, 598–605.
3. Gaggini, M.; Cabiati, M.; Del Turco, S.; Navarra, T.; De Simone, P.; Filipponi, F.; Del Ry, S.; Gastaldelli, A.; Basta, G. Increased FNDC5/Irisin expression in human hepatocellular carcinoma. *Peptides* **2017**, *88*, 62–66.
4. So, W.Y.; Leung, P.S. Irisin ameliorates hepatic glucose/lipid metabolism and enhances cell survival in insulin-resistant human HepG2 cells through adenosine monophosphate-activated protein kinase signaling. *Int. J. Biochem. Cell Biol.* **2016**, *78*, 237–247.

5. Shi, G.; Tang, N.; Qiu, J.; Zhang, D.; Huang, F.; Cheng, Y.; Ding, K.; Li, W.; Zhang, P.; Tan, X. Irisin stimulates cell proliferation and invasion by targeting the PI3K/AKT pathway in human hepatocellular carcinoma. *Biochem. Biophys. Res. Commun.* **2017**, *493*, 585–591.
6. Provatopoulou, X.; Georgiou, G.P.; Kalogera, E.; Kalles, V.; Matiatou, M.A.; Papapanagiotou, L.; Sagkriotis, A.; Zografos, G.C.; Gounaris, A. Serum Irisin levels are lower in patients with breast cancer: Association with disease diagnosis and tumor characteristics. *BMC Cancer* **2015**, *15*, 898.
7. Zhang, Z.; Zhang, X.; Li, H.; Liu, T.; Zhao, Q.; Huang, L.; Cao, Z.; He, L.; Hao, D. Serum Irisin associates with breast cancer to spinal metastasis. *Medicine* **2018**, *97*, e0524.
8. Gannon, N.; Garcia-Smith, R. Effects of the exercise-inducible myokine Irisin on malignant and non-malignant breast epithelial. *Int. J. Cancer* **2014**, *136*, E197–E202.



© 2018 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).