

The Impact of Irisin in Managing Obesity Related to Physical Exercise

Onur ORAL^{1*}, Zeinab REZAEI², Pinar TATLIBAL³ and George N NOMIKOS⁴

¹Ege University, Faculty of Sports Sciences, Turkey

²Department of Exercise Physiology, Ferdowsi University of Mashhad, Iran

³Dokuz Eylül University, Necat Hepkon Faculty of Sports Sciences, Turkey

⁴Chios Hospital, Department of Orthopedic Surgery, Greece

*Corresponding author: Onur Oral, Ege University Faculty of Sports Sciences, Department of Health Sciences and Sports, Izmir, Turkey



ARTICLE INFO

Received: 📅 August 15, 2022

Published: 📅 September 01, 2022

Citation: IOnur ORAL, Zeinab REZAEI, Pinar TATLIBAL and George N NOMIKOS. The Impact of Irisin in Managing Obesity Related to Physical Exercise. Biomed J Sci & Tech Res 45(5)-2022. BJSTR. MS.ID.007273.

ABSTRACT

Background: The study aims to investigate the positive effect of irisin, a newly discovered hormone, on the prevention, control and managing obesity and to evaluate the relationship of this effect with regular exercise.

Materials and Methods: This review presents a synthesis of the scientific research conducted by the authors. The search for scientific literature relevant to this review was performed across US National Library of Medicine (PubMed), MEDLINE, and SportDiscus databases, and the terms "overweight" "irisin", "physical activity", and "obesity", were used. Related literature was also adopted from searches of relevant articles using the database searches.

Results: Obesity is a worldwide epidemic and there is a strict relation with the hormones. And the studies show that some hormones like irisin as an emerging myokine have an important role in the prevention and treatment of obesity

Conclusion: There is an important consensus that the irisin hormone, which is secreted by muscle tissue due to exercise, has an important role in the prevention and treatment of obesity. And naturally, these findings are essential to be studied and analysed more in order to comprehend the physiological details of the impact of irisin in managing obesity related to physical exercise.

Keywords: Irisin; Obesity; Physical Activity; Overweight

Introduction

Obesity and metabolic disorders, for instance, chronic inflammation, certain malignancies, type 2 diabetes, and cardiovascular diseases, are mainly caused by a lack of sports and sedentary lifestyles. For this reason, the positive effects of sports

on human metabolism are studied Huh, et al. [1-4]. Numerous studies indicate a positive relationship between body mass index (BMI) and irisin Huh, et al. [1-6]. However, some researchers found no meaningful relation or a negative relation either Timmons, et al.

[7,8]. It is shown by studies that circulating irisin levels are found less in people who have Type 2 diabetes Moreno-Navarrete, et al [5-7]. while several mice and human studies showed an association between glucose metabolism and irisin levels Boström, et al [9]. Although it is known that hormonal and genetic factors have an important role in the emergence of obesity risk, it should not be forgotten that genetic and environmental effects are interconnected, because the effect of environmental factors will alter depending on individual genetic predispositions and vice versa Hill, et al. [10,11].

Discussion

Huh et al., pointed out a meaningful connection between irisin and anthropometrics. In addition, huh et al., stated that after half an hour of sprinting, irisin concentration increases. Huh et al., concluded a study that indicated an increase in irisin concentration following sprint exercises Huh, et al. [1]. The influence of prolonged training on irisin levels was investigated by another human study on men and women subjects which proved that moderate-intensity continuous treadmill training increases irisin levels in the first hour Kraemer, et al. [12]. To add to the above, comes another research targeting obese children with a study group of 65 obese boys and girls between the ages of 7 and 18. The children followed a diet and exercise program for a period of 12 months, and it was shown that after completing the program, positive outcomes were measured in terms of weight, metabolism, leptin changes, and irisin levels Blüher, et al. [13]. In a separate study, obese males were observed to have a higher irisin level than females Crujeiras, et al. [14]. Yet, it is noteworthy that the researchers evaluated irisin differences not for LBM but for BMI. In a different study, gender differences were not found in the expression of FNDC5 by adipocytes in middle-aged and healthy adults Moreno-Navarrete, et al. [5].

Conclusion

In today's world, the daily consumption rate of high calorie foods that are high in energy is increasing day by day. The number of calories taken from the daily use of the individual causes an increase in the fats called energy stored in the human body. When a sedentary lifestyle is added to this unfavourable health condition, the difference between caloric intake and expenditure ratio becomes even greater. As a result of being overweight, metabolic problems such as overweight and obesity arise. In clinical studies investigating the relationship between regular exercise habits and metabolic health, it is thought that the hormone irisin, which is found to increase in blood levels after exercise, together with the hormone's serotonin, endorphins, and dopamine, whose secretion is increased during physical activity, by regulating the metabolic functions of the organism related to the energy balance, makes important contributions to the treatment of obesity. In recent years, clinical studies investigating the importance of exercise in

the treatment of obesity and the hormonal response mechanisms related to irisin caused by regular exercise give hope in the prevention of this global health problem.

Acknowledgement

We would like to express our special thanks of gratitude to Dr. Amir Rashidlamir for his very successful contribution to the literature research process and unique academic support in the publication during the process of this review article.

Conflict of Interest

The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

Funding

The authors certify that there is no funding from any financial organization regarding the material discussed in the manuscript.

Author's Contributions

All authors read and approved the final version of the manuscript.

References

1. Huh J Y, Panagiotou G, Mougios Vs, Brinkoetter M, Vamvini M T, et al. (2012) FNDC5 and irisin in humans: I. Predictors of circulating concentrations in serum and plasma and II. mRNA expression and circulating concentrations in response to weight loss and exercise. *Metabolism: clinical and experimental* 61(12): 1725-1738.
2. Ogden CL, Carroll M D, Kit B K, Katherine M Flegal (2012). Prevalence of obesity in the United States, 2009–2010. *NCHS Data Brief* 82: 1-8.
3. Tuomilehto J, Lindstrom J, Eriksson J G, H Hämäläinen, P Ilanne Parikka, et al. (2001) Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *N Engl J Med* 344(18): 1343-1350.
4. Nocon M, Hiemann T, MullerRiemenschneider F, Frank Thalau, Stephanie Roll, et al. (2008) Association of physical activity with all-cause and cardiovascular mortality: a systematic review and meta-analysis. *Eur J Cardiovasc Prev Rehabil* 15(3): 239-246.
5. Moreno Navarrete J, Ortega F, Serrano M, Ester Guerra, Gerard Pardo, et al. (2013) Irisin is expressed and produced by human muscle and adipose tissue in association with obesity and insulin resistance. *J Clin Endocrinol Metab* 98(4): E769- E778.
6. Stengel A, Hofmann T, Goebel-Stengel M, Elbelt U, Kobelt P, et al. (2013) Circulating levels of irisin in patients with anorexia nervosa and different stages of obesity—correlation with body mass index. *Peptides*, 39(1): 125-130.
7. Timmons J, Baar K, Davidsen P, Atherton P (2012) Is irisin a human exercise gene? *Nature* 448: E9- E10.
8. Choi Y, Kim M, Bae K, Hyun Ae Seo, Ji Yun Jeong, et al. (2013) Serum irisin levels in new-onset type 2 diabetes. *Diabetes Res Clin Pract* 100(1): 96-101.
9. Boström P, Wu J, Jedrychowski M P, Korde A, Ye L, et al. (2012) A PGC1- α -dependent myokine that drives brown-fat-like development of white fat and thermogenesis. *Nature* 481: 463-468

10. Hill JO, Wyatt HR, Reed GW, Peters JC (2003) Obesity and the environment: Where do we go from here? *Science* 299(5608): 853-855.
11. Jane Wardle (2009) Current issues and new directions in Psychology and Health: The genetics of obesity–What is the role for health psychology? *24(9)*: 997-1001.
12. Kraemer R R, Shockett P, Webb N D, Shah U, Castracane V D (2014) A transiently elevated irisin blood concentration in response to prolonged, moderate aerobic exercise in young men and women. *Hormone and metabolic research = Hormon- und Stoffwechselforschung = Hormones et métabolisme.* 46(2): 150-154.
13. Blüher S, Panagiotou G, Petroff D, Markert J, Wagner A, et al. (2014) Effects of a 1-Year Exercise and Lifestyle Intervention on Irisin Adipokines and Inflammatory Markers in Obese Children. *Obesity* 22(7): 1701-1708.
14. Crujeiras AB, Pardo M, Arturo R R, Santiago Navas Carretero, M Angeles Zulet, et al. (2014) Longitudinal variation of circulating irisin after an energy restriction-induced weight loss and the following weight regain in obese men and women. *Am J Hum Biol* 26(2): 198-207.

ISSN: 2574-1241

DOI: 10.26717/BJSTR.2022.45.007273

Onur Oral. Biomed J Sci & Tech Res



This work is licensed under Creative Commons Attribution 4.0 License

Submission Link: <https://biomedres.us/submit-manuscript.php>



Assets of Publishing with us

- Global archiving of articles
- Immediate, unrestricted online access
- Rigorous Peer Review Process
- Authors Retain Copyrights
- Unique DOI for all articles

<https://biomedres.us/>