MINI REVIEW
Evaluating the Effect of Irisin on Obesity-Concerning Physical Activity

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ABSTRACT

Background: The study aims to investigate and evaluate the impact of irisin on physical activity and obesity. Materials and Methods: In the search for scientific literature related to this review the US National Library of Medicine (PubMed) used MEDLINE and SportDiscus data and the terms “irisin”, “physical activity”, and “obesity”, were used. The relevant literature has also taken its source from the research of relevant articles from reference lists derived from data studies. Results: Irisin, an emerging myokine in the scientific community, has received high attention as a potential contributor to obesity. This hormone is also associated with physical activity. Conclusions: Irisin was recently identified as a myokine known to respond to physical activity. Adequate recognition of this hormone may play an active role in the prevention and treatment of obesity.

1. Introduction

Obesity is a global public health problem in several countries. Mexico and the U.S are the countries with the highest rates of obesity [1]. Due to the positive effects of physical exercise and activities on the prevention of obesity, it is important that exercise is an indispensable part of a healthy life. The sedentary lifestyle, which occurs when children and adolescents who were born and grew up in the digital age, that is, intensively use modern age technologies such as the internet and smart phones, tablets, computers, spend excessive time on computers and information technologies, can increase the risk of obesity in children and adolescents [2-4].

Irisin was recently identified as a myokine that is known to be responsive to physical activity. In their study, Boström et al. [5] introduced irisin to the world of science as a PGC-1α-dependent myokine. Irisin affects white adipose tissue to stimulate UCP1 expression in mitochondria and enhances thermogenesis [5]. Data state that irisin causes white fat to become brown, thus provoking mitochondria to burn more of the stored fat [6,7].
Irisin is a myokine that was newly revealed in the world of science. According to the latest studies, cytokines and other peptides play important roles in multifactorial pathogenic mechanisms concerning obesity [9].

Irisin has received high interest as a potential contributing factor to obesity. Irisin, a hormone, is secreted from fibronectin type III domain-containing protein 5 (FNDC5), which is found in skeletal muscle [9,10].

Irisin is viewed as an attractive potential curative element for obesity and metabolic disorders. Nonetheless, the physiological determinants of irisin and its secretion form are not yet known exactly [11-14].

2. Discussion

In a research study of Boström et al. add further information about irisin and in particular that irisin promotes mitochondrial biogenesis which improves fat metabolism. In addition, according to the mice study, when irisin level increases, more calories are spent regardless of the physical activity level. Another result of the study is that regular physical activity increases irisin levels, suggesting an exercise period of 3 weeks for mice and 10 weeks for humans. Boström and colleagues conducted a study on mice. The research resulted in increased irisin levels measured up to 65% after 3 weeks of swimming exercise [5]. A similar human study by these investigators indicated consistent results as irisin levels increased after endurance exercise of 2.5 months [15].

The amount of irisin release from adipose tissue was determined to be lower in lean rats than in obese rats [16]. Short-term endurance exercise triggered the release of irisin by sc and visceral adipose tissue in rat studies. Similarly in a study that was conducted on human subjects, acute aerobic training increased circulating irisin but only transiently [6,17,18].

In one study targeting pigs, however, no effect of exercise on FNDC5 gene expression was found [19]. But however, another study found that exercise increased irisin release in mice and humans [5]. A study by Stengel et al. determined lower plasma irisin levels in people with anorexia and a linear association between irisin and BMI [20].

Pardo et al. claimed that for every 1kg increase in fat mass, there is a twofold increase in irisin [21]. And research on adults demonstrated that FNDC5/irisin secretion increases after short periods of endurance training [16]. And in another research in obese subjects determined an increase of irisin levels by 12% after 12 months of lifestyle change. However, they weren’t found associated with BMI alterations [22].

Irisin is a recently discovered hormone. It is reported to have an important role in energy homeostasis and obesity [23-25]. Results of a study demonstrated a positive relationship between irisin and BMI, fasting blood glucose, TG, and diastolic BP. In addition, the study indicated a negative relationship between irisin and circulating HDL cholesterol [20,26].

3. Conclusions

It is possible to come across many scientific publications that physical activity is a very effective method among many methods for the healthy regulation of energy balance in the treatment process of the obesity problem, which is increasing its impact all over the world due to a sedentary life and unhealthy eating habits. With a more comprehensive examination of this positive effect in terms of the irisin hormone, the importance of this hormone for a healthy life will be understood more clearly.

It is known that a physically active life is very important for a healthy life. The habit of regular exercise, which increases the secretion of irisin and some other hormones, especially increases muscle endurance, muscle strength, muscle flexibility, as well as prevents obesity (excessive weight), helps maintain weight, reduces the risk of cardiovascular disease, regulates sleep quality, increases bone mineral density, increases blood flow. It has been shown that it contributes to the reduction of fat and glucose levels, thus reducing the incidence of certain types of cancer and chronic health complaints that may occur with aging.

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References

nology. Article ID 857270, 9 pages.
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