

Study of Irisin Level Hormone and Some Biochemical Parameters in Iraqi Diabetic Type 2 without Hypothyroidism

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ABSTRACT

This case-control study's purpose is to investigate serum irisin levels and their role in people with type 2 diabetes mellitus (T2DM) who don't have hypothyroidism. A total of 60 patients with T2DM were chosen as the case group based on the grounds for inclusion and exclusion, and a 1:1 ratio was determined based on the patients' inclusion rate. This cohort, which was created at the Medical City / Baghdad Teaching Hospital, consisted of adults aged 30 to 60. The control group consisted of 60 healthy volunteers of the same gender and age. Clinical data on the participants was collected in order to determine their medical history, BMI, fasting blood glucose (FBS), hemoglobin (HbA1c), insulin, and serum lipid levels. An enzyme-linked immunosorbent test was used to measure the amount of irisin in the blood (ELISA). The data was analyzed using SPSS 23.0 software. The amount of irisin in the T2DM group was substantially higher than in the control group (12.77±2.236 ng/mL and 4.121±0.308 ng/mL, respectively, according to single factor analysis. BMI, fasting blood sugar (FBS), HbA1c, insulin, total cholesterol (TC), and triglyceride (TG) levels were all higher with statistically significant differences, the T2DM group outperformed the control group.

Keywords: Irisin; Type 2 diabetic mellitus

INTRODUCTION

Diabetes mellitus (DM) is a worldwide disease. epidemic of chronic metabolic disease defined by hyperglycemia [1,2]. Obesity is caused by a Positive energy balance occurs when total energy intake surpasses total energy expenditure throughout time. It has been linked to the onset of potentially fatal conditions such as type 2 diabetes. Fat storage and physiological insulation require fat buildup in adipose tissue. Obesity, on the other hand, is caused by an excess of body fat buildup. The adipose tissues major fat-storage organ and play a significant function in metabolism [3]. that irisin's ability to transform WAT (white adipose tissue) cells to BAT (brown adipose tissue) cells could be a promising therapeutic target for obesity and related illnesses Figure 1 depicts the mature peptide release of irisin from FNDC5 and its role in obesity is mediated by fat browning. Irisin is an insulin-sensitizing hormone that may enhance hepatic glucose and lipid metabolism by increasing pancreatic cell activity, hence lowering insulin resistance and type 2 diabetes [4].

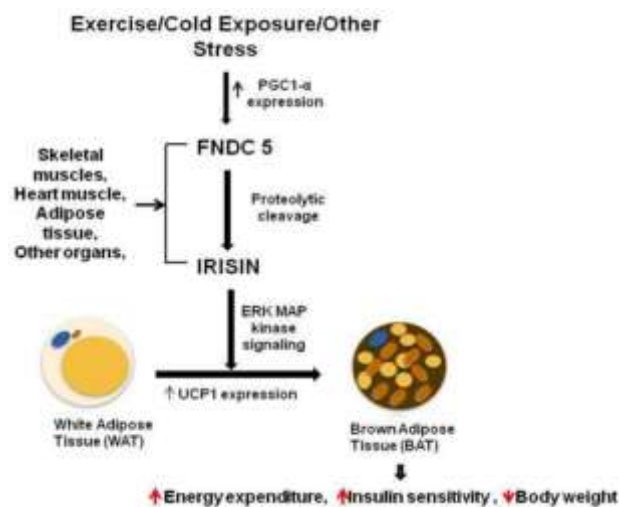


Figure 1: Irisin secretion and its role in fat browning.[5]

Arhire et al. suggest in a systematic review that irisin offers fresh promise for better understanding and managing obesity and metabolic syndrome, including diabetes. Diabetes type 2 patients have greater serum irisin levels than healthy people. [6]. A recent study found that patients with T2DM, obesity, and overweight have

significantly lower irisin levels than healthy people. [7]. We examined serum irisin levels and their function in T2DM using a case-control research technique, establishing a theoretical foundation for T2DM prevention and therapy.

MATERIALS AND METHODS

Subjects: There is a total of 60 T2DM patients were selected from a sample of 30–60-year-olds for the study. All participants (47.27.830 years old) were recruited from a single community in the Medical City / Baghdad Teaching Hospital and consented verbally. As the control group a healthy group member the same gender and age were chosen at random (47.1610.48 years old) in a 1:1 ratio. The control group did not have diabetes, hypertension, hyperlipidemia, or obesity. The Research Ethics Committee at our hospital approved this study.

Collection of Clinical Data :All of the subjects' physical examination data was gathered. They're Their height and weight, as well as their health and medical history, were recorded. BMI was determined using the following formula: BMI = body mass index (kg) divided by height (m²) squared (kg/m²) Early in the morning, peripheral blood was drawn from each subject's cubital vein (fasting and not exercising for more than 8 hours). fasting blood sugar (FBS), hemoglobin (HbA1c), insulin, and blood lipid (total cholesterol (TC), triglyceride (TG) were among the tests used. Furthermore, before centrifugation, to minimize adhesion, serum samples were kept at room temperature for 2 hours. between red blood cells and serum, as well as lowering the likelihood of hemolysis during centrifugation). Upper serum was placed in an Eppendorf tube (EP)tube and frozen at -8 °C to detect irisin levels.

Detection of serum irisin level by enzyme-linked immunosorbent assay (ELISA): An ELISA kit (Sandwich) bought from Sino Best Biological Technology Co.; Ltd. was used to determine serum irisin levels. Human irisin was shown to be extremely sensitive in this kit. The sensitivity was determined to be 0.1 ng/mL.

Statistical Analysis: SPSS 23.0 statistical software was used to examine the data. The mean standard deviation was used to calculate the measurement data (SD). To evaluate continuous variables, the t-test was utilized, (P <0.05) was deemed statistically significant.

RESULTS

Comparison of irisin level and clinical index between T2DM group and control group: Irisin concentrations in T2DM patients were greater than in controls (12.77±2.236 ng/mL vs. 4.121±0.308

ng/mL, respectively), and the variation was statistically significant. The T2DM group had significantly higher BMI, FBS, HbA1C, Insulin, total cholesterol (TC), and triglyceride (TG) levels than the control group ($P \leq 0.05$ for each comparison). (See Figure 1)

Table 1: Comparison of Irisin Level and Clinical Indices Between T2DM Group

Groups	Diabetes	Control	P values
Irisin (ng/mL)	12.77±2.236	4.121±0.308	0.000 (H. S)
BMI (kg/m ²)	29.24±4.51	23.475±2.772	0.000 (H. S)
HbA1c (%)	9.813±1.859	5.773±0.509	0.000 (H. S)
FBS (mmol/L)	158.61±35.81	90.7±10.648	0.000 (H. S)
Insulin level(μIU/ml)	21.11±7.842	11.684±3.853	0.000 (H. S)
TC (mmol/L)	190.15±31.505	156.03±45.167	0.000 (H. S)
TG (mmol/L)	167.983±53.656	120.616±46.937	0.000 (H. S)

T2DM: type 2 diabetes mellitus; BMI: body mass index; HbA1c: hemoglobin; FBS: fasting blood sugar; CHOL: total cholesterol; TG: triglyceride.

DISCUSSION

Myokines are a class of signal peptides that have been used as major regulators in recent years [8]. Myokines are secreted by the the human body's largest organ, the skeletal contracting muscles, as well as having endocrine impacts on other organs. Bostrom et al. reported irisin as one of the newest myokines in 2012 [9,10,11]. Exercise and PGC1 stimulate irisin secretion and synthesis [12]. Despite the undeniable health benefits of regular exercise, little is understood about the molecular mechanisms that control these effects [13]. Long-term exercise improves a variety of metabolic markers, AMPK activation, PGC1 phosphorylation, insulin sensitivity and signaling, and FNDC5 production are all examples. , and increases PGC1 expression mostly in the skeletal muscles and heart. [14] Since its discovery in 2012, numerous researchers have been working to understand irisin's method of action and indiscriminate effects in both animal and human trials. Irisin is thought to contribute to the positive benefits of exercise on endocrine, circulatory, and mental processes by increasing energy expenditure [15].

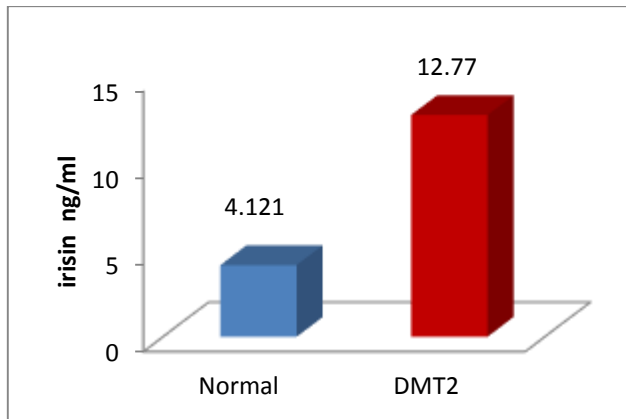


Figure 1: Comparison between different groups in regard to irisin

In this investigation, we discovered that T2DM patients had considerably higher levels of circulating irisin than non-diabetic controls. There was a positive link between irisin and fasting blood sugar (FBS) in this study, as well as a result of a positive relationship between irisin and Insulin. Although there was a positive link between serum irisin and lipid profile (total cholesterol, triglycerides), irisin and irisin had a negative connection. HbA1C and BMI. As a result of this research in Iraqi individuals with obesity and diabetes, irisin appears to be favorably linked with metabolic parameters. (See Table 2)

Table 2: correlation of irisin level with another parameter among T2DM patient

No	Factor	r	p-value	Interpretation
1	BMI	-0.027	0.836(N.S)	Weak negative correlation
2	FBS	0.390	0.002(H.S)	Weak positive correlation
3	HbA1C	-0.302	0.019(S)	Weak negative correlation
4	Insulin	0.251	0.053(N.S)	Weak positive correlation
5	Total cholesterol	0.194	0.138(N.S)	Weak positive correlation
6	Triglycerides	0.277	0.032(S)	Weak positive correlation

This research backed up a study by Yaeko, et al. [16], In Japanese people, the blood level of irisin was found to be positively related to HOMA-IR. individuals Obesity affects both men and women. This demonstrates that in the face of insulin resistance, compensatory increases in irisin production may occur. The findings were similarly consistent with those of Qiu, et al. [17], who found that patients with T2DM had higher blood irisin levels, which were related with lower FBG and HbA1c levels. The findings of this investigation matched those of Nasser M., et al. [18] SNPs in the FNDC5 gene are linked to Obesity and lipid-glucose metabolism, probably because they affect irisin levels in the blood.

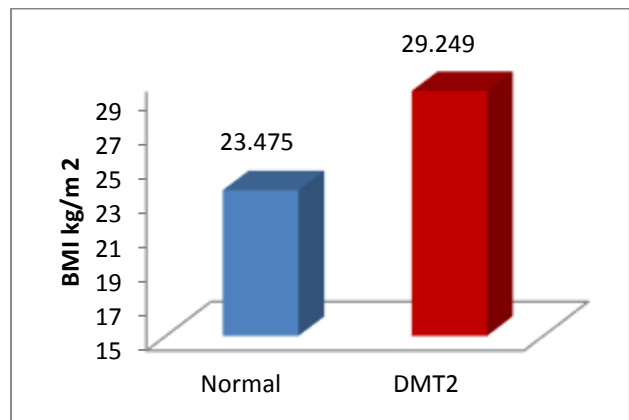


Figure 2: Comparison between different groups in regard to BMI

it is not surprising a higher BMI in patient in DMT2 because metabolic syndrome. This study was also agreeing with a study done by Studies by Saddam M Abid et as [19] which showed basic significance of, overweight and hefting especially of long length, in the advancement of sort 2 diabetes.

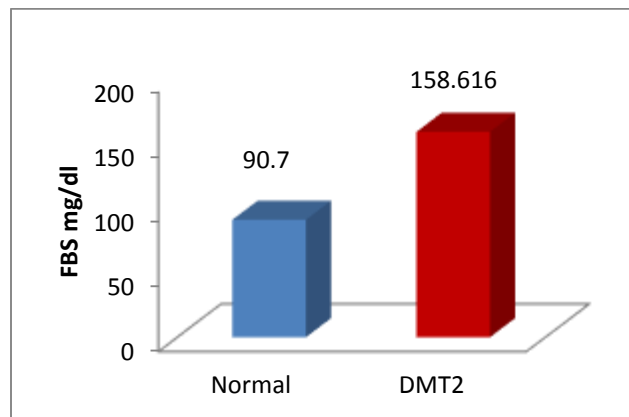


Figure 3: Comparison between different groups in regard to FBS

sure, there is increase in the FBS in patient in DMT2 in comparison to the normal group. The FBS results in this study is agreed with the results of a study done by Chandler J Tayek et al [20]. which showed that the level of fasting glucose level is higher in people with diabetes compared to normal people.

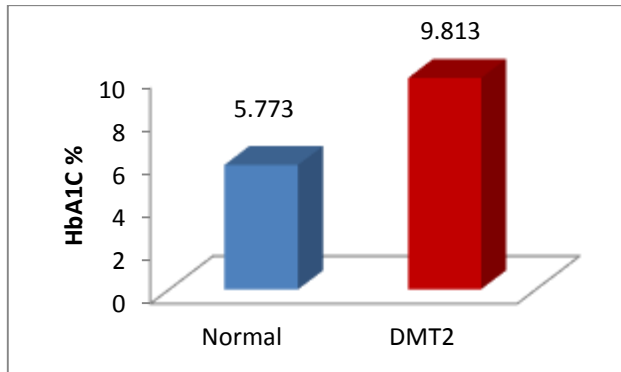


Figure 4: Comparison between different groups in regard to HbA1C

we can see this is a positive to FBS that HbA1C is higher in diabetic group in comparison to the normal group it is not strange to have a higher level of HbA1C in diabetic patient comparison to normal. The HbA1C results in this study is agreed with LIRA et al. [21] which showed the majority of people with MS had high FBS, A1C, and TG levels when they were diagnosed.

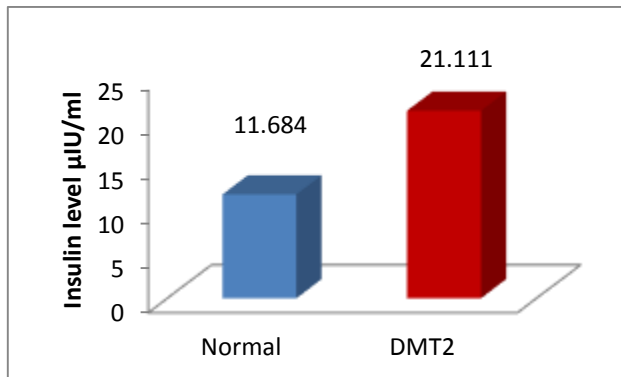


Figure 5: Comparison between different groups in regard to Insulin level

comparison between different group the insulin there will be a low insulin and perhaps this is the cause of DM where those with type 2 diabetes it is not strange to have a higher level of insulin due peripheral insulin resistance which will lead to hyper section of insulin from the pancreas in comparison to normal.

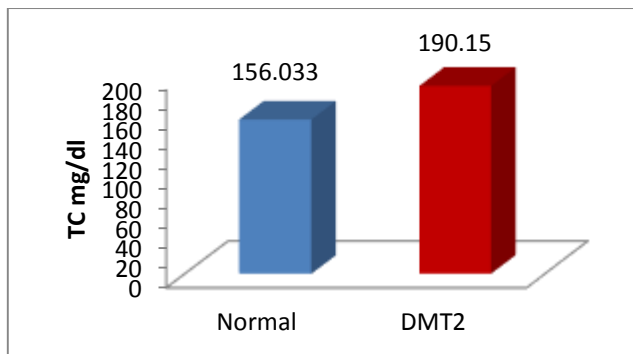


Figure 6: Comparison between different groups in regard to (TC) total cholesterol

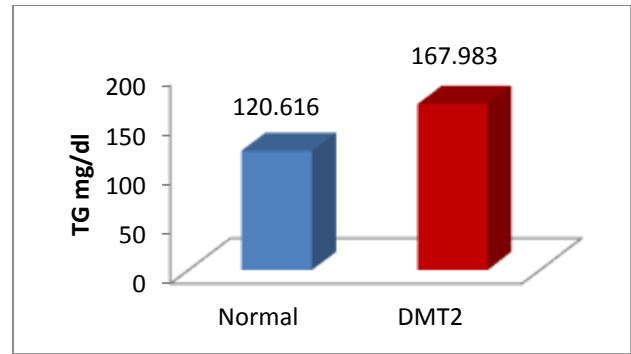


Figure 7: Comparison between different groups in regard to (TG) triglyceride

According to research and studies, these findings are backed by a study [22] explanation for the growth. Hypertriglyceridemia could be caused by the liver producing more triglyceride-rich VLDL at a faster pace [23]. In diabetes mellitus type 2, the Lipoprotein Lipase enzyme, which removes TG from VLDL, is also activated, resulting in a rise in TG levels [24]. In line with earlier research [25,26], high levels of triglycerides and total cholesterol were associated with DMT2.

CONCLUSIONS

The blood irisin level in the T2DM group was higher than in the control group, implying that irisin may be a type 2 diabetes protective factor.

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