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ORIGINAL ARTICLE

Role of Hormone Irisin in Induce Metabolic Syndrome

Hayder B. Abbas Al-Ghreaty [1] , **Ruqaih Kareem Mohammed ALkenany** [2] and **Mohammed S. Mohammed** [1]

[1] Directorate of Education in Karbala, Ministry of Education, Iraq.
[2] Clinical Laboratories Department, Applied Medical Sciences College, Karbala University, Iraq.

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Corresponding author:
Hayder B. Abbas Al-Ghreaty
Email: haider_abaas34@yahoo.com
Directorate of Education in Karbala
Ministry of Education
Iraq.

ABSTRACT

Objective: The aim of this study was examine to know effect of Irisin hormone on MetS patients.
Methods: These contain Monograph 124 patients metabolic. The working criteria developed by the NCEP: ATPIII that included blood pressure, body mass index, fasting glucose. In addition to measuring the levels of the Irisin, The data collected included age, BMI and duration of disease.
Results: Results show that significant decrease($p<0.05$) in serum levels Irisin hormone in MetS with infected diabetic patients compared between MetS is not infected diabetic patients in both sexes, Also showed in compared between male in two group and female too
The results show that significant decrease($p<0.01$) in serum levels Irisin hormone in MetS with infected diabetic patients compared between metabolic syndrome is not infected diabetic patients in both sexes, The results showed significant decrease in Irisin level accord age especially in(44-54) year group. No change significantly in hormone level accord duration of disease and body mass index group. The results display that blood pressure and BMI there is no change significantly between MetS patients (diabetic and non-diabetic) but all these parameter.
Conclusion: Low level of serum Irisin hormone obtained in this study suggested that clinical trials should be undertaken to assess the impact of reduce serum Irisin hormone as biomarker predictor the MetS that leads to risk factor in diabetic type-II patients.

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INTRODUCTION

An Irisin is a newly discovered exercise-mediated myokine which coordinate energy metabolism by stimulating browning of white adipose tissue, and thus disperse chemical energy in the form of heat. recently described hormone created and secreted by acutely exercising skeletal muscles new hormone play role in decreased weight[1] Studies find that exercise firstly promoted skeletal muscle to express peroxisome proliferator-activated receptor- gamma coactivator α 1 (PGC-1α) which can induced pyrolysis of its downstream Irisin as an exercise-stimulated hormone binding conversation between organs molecular FNDC5 (fibronectin type III domain containing ،5FNDC5)[2] Wrann (2015)[3] apprised that Irisin to promote a brown adipose tissue BAT-like phenotype upon WAT by rising cellular mitochondrial density and expression of uncoupling protein-1, leading to increased energy expenditure via thermogenesis) FNDC5/irisin in physiological situation exert a protective effect versus obesity mediated by the browning of white adipose tissue and is thus raised in compensation for increasing body mass[4]. In cases of severe obesity irisin in physiological concentration is not able to maintain the neutralize of energy storage and energy expenditure.

These findings suggest a potential function of irisin as a neurotransmitter، proposition that the brain can effect some modification on adipose tissue, Other roles of irisin as neurotransmitter could elucidate the beneficial effects of training on neurodegenerative diseases such as Alzheimer[5]. A modest increase in peroxisome proliferator-activated receptor- gamma coactivator α 1 PGC-1á levels increases mitochondrial biogenesis produce in improvement in both lipid metabolism, mainly beta-oxidation passage in the mitochondrial matrix, and arise in insulin-induced phosphorylation of insulin signaling proteins and in Glucose transporter type 4 GLUT4 protein receptor in insulin resistant muscle of obese important associations between irisin and lipid levels[4]. Recent studies suggested that circulating irisin might also be associated with kidney function in humans. Some authors reported a certain correlation between estimated Glomerular Filtration Rate eGFR and circulating irisin in diabetic patients observed that irisin is negatively associated with serum creatinine and positively correlated with eGFR in diabetic patients[5] workout in skeletal muscle suggest an association between statin-induced damage and elevated irisin expression increased. Irisin levels prospectively predict the development of Major adverse cardiovascular events MACE[6].

MATERIALS AND METHDS

Location and Duration of the Study

This study was proceeding at Al-Hussein Medical City - Al-Hussein Teaching Hospital - Karbala – Iraq from June, 2016 to March, 2017.

Samples, Age and Experimental Design and Grouping

All the 124 samples (72 female and 52 male) were randomly chosen from metabolic syndrome MetS patients attending the abdominal consultation unit. The results gained were compared diabetic patients with other Non diabetic patients. The age range for all samples used in this study was between (35 and 65) years. Patients with Mets were divided into the following groups depending upon the body mass index BMI, BP and duration of diabetes:

The research criteria developed by the National Cholesterol Education Program Adult Treatment Panel III NCEP:ATPIII[7] have been criticized a new set of criteria that included, BP, and fasting glucose. Mets was diagnosed based on clinical and/or biochemical criteria. The data collected included gender, age, blood pressure and duration of diabetes, measurement of body mass index using the formula (weight in kg/height in m2), duration of diabetes.

Bio-markers Determined

Body mass index (BMI), blood pressure, serum Irisin hormone and fasting blood sugar (FBS) were measured within 24 hours after blood withdrawal.

Serum Irisin hormone levels were measured using the new Irisin ELISA assay kit which was designed for the determination of Irisin in human serum samples (BioSite, Sweden). BMI was determined by measuring weight (in kilograms) divided by the square of height (in meters); [BMI = weight (kg) / square height (m^2)].weight and height were measured by the same scale for all the sample subjects; Blood pressure was obtained after the subject had been seated for at least 5 minutes. Systolic and diastolic pressures were measured twice, with values averaged, by the use of an automated blood pressure measurement device. Patients who thyroxin treatment, thyroid trouble, liver disease, and patients with kidney failure were except from the current study.

The mean ± Std. Error of all parameters measured from groups G1 and G2 were determined with serum Irisin, BP, FBS, BMI and other biochemical parameters measured.

RESULTS

Table 1 shows the results acquired for serum Irisin in diabetes mellitus MetS group compared with individuals of non-diabetic metabolic syndrome patients group depending age at ($p < 0.05$). Replace this with (depending on) Please.

Table 1. **Mean ± Std. Standerd values of serum (Irisin) in diabetes mellitus in MetS group compared with individuals of non-diabetic metabolic syndrome patients group depending age at ($p < 0.05$).**

AGE	Metabolic syndrome	Mean Irisin	P value
35-44 year n(31)	with Diabetic G1 (18) Without Diabetic G2 (13)	117.11±1.3 143.9±1.51	Non
45-54 year n(56)	with Diabetic G1 (26) Without Diabetic G2 (30)	*117.12±0.84 142.73±1.19	p<0.05
55-65 year n(37)	with Diabetic G1 (29) Without Diabetic G2 (8)	119.83±0.81 144.63±1.86	Non
Total n(124)	with Diabetic G1 (73) Without Diabetic G2 (51)	118.1±0.55 143.3±0.84	p<0.05

mean ± Std. Error.

Table 2 shows the results acquired for serum Irisin in diabetes mellitus in metabolic syndrome group compared with individuals of non-diabetic metabolic syndrome patients group depending duration of disease at ($p < 0.05$).

Table 2. **Mean ± Std. Error values of serum Irisin in diabetes mellitus in MetS group compared with individuals of non-diabetic metabolic syndrome patients group depending duration of disease at ($p < 0.05$).**

Gender	Virogen Rotatest					X^2 &P-value
	+ve	%	-ve	%	No.	
Male	17	77	5	23	22	X^2= 3.237 P=0.0719 No Significant
Female	9	50	9	50	18	
Total					40	

mean ± Std. Error.

Table 3 shows the results gained for serum Irisin in diabetes mellitus in metabolic syndrome group compared with individuals of non-diabetic metabolic syndrome patients group depending body mass index at ($p < 0.05$).

Table 3. **Mean ± Std. Standerd values of serum Irisin in diabetes mellitus in MetS group compared with individuals of non-diabetic metabolic syndrome patients group depending BMI at (p < 0.05).**

Age range (months)	Virogen Rotatest					X^2 &P-value
	+ve	%	-ve	%	No.	
1-10 days	11	100	0	0	11	X^2= 8.216
11-20 days	8	50	8	50	16	P = 0.0164
21-30 days	7	54	6	46	13	Significant
Total					40	

mean ± Std. Error.

Table 4 Shows the results acquired for serum Irisin and fasting serum glucose in diabetes mellitus in metabolic syndrome group compared with individuals of non-diabetic MetS patients group depending gender at (p < 0.05).

Table 4. **Mean ± Std. Standerd values of serum Irisin and fasting serum glucose in diabetes mellitus in metabolic syndrome group compared with individuals of non-diabetic MetS patients group depending gender at (p < 0.05).**

Age range (months)	Virogen Rotatest					X^2 &P-value
	+ve	%	-ve	%	No.	
1-10 days	11	100	0	0	11	X^2= 8.216
11-20 days	8	50	8	50	16	P = 0.0164
21-30 days	7	54	6	46	13	Significant
Total					40	

mean ± Std. Error.

Table 5 Shows the results obtained for systolic blood pressure, diastolic blood pressure and body mass index in diabetes mellitus in metabolic syndrome group compared with individuals of non-diabetic metabolic syndrome patients group depending gender at (p < 0.05).

Table 5. **Mean ± Std. Standerd values for systolic blood pressure, diastolic blood pressure and body mass index in diabetes mellitus in metabolic syndrome group compared with individuals of non-diabetic metabolic syndrome patients group depending gender at (p < 0.05).**

Age range (months)	Virogen Rotatest					X^2 &P-value
	+ve	%	-ve	%	No.	
1-10 days	11	100	0	0	11	X^2= 8.216
11-20 days	8	50	8	50	16	P = 0.0164
21-30 days	7	54	6	46	13	Significant
Total					40	

mean ± Std. Error.

DISCUSSION

The results show that significant decrease in serum levels Irisin hormone in metabolic syndrome with infected diabetic patients type 2 compared metabolic syndrome are not infected diabetic patients in both sexes, Agreement with[8] that found reduce level irisin in MetS Plasma irisin level in diabetes differ depending on the type of disease. May be result mention that with progression of insulin resistance levels which is also considerably associated with confusion irisin levels. The basal level of circulating irisin was significantly reduced in metabolic syndrome including type 2 diabetes patients especially in T2DM patients with heart failure and macrovascular disease[1]. Chen *et al* (2015)[11] found that circulating irisin is positively correlated with waist circumference, body mass index, while[8] not found any correlation. [15]Record circulating irisin was negatively associated with BMI, waist to hip ratio and percent fat mass. [16]The contradiction in the above aforesaid studies may be due to different populations analyzed in the studies, as some inclusive obese subjects with metabolic diseases, which may affect plasma irisin levels. In states of severe obesity, irisin in physiological concentration is not able to maintain the balance of energy storage and energy expense. In such case, along with muscle, irisin is also produced by adipose tissue responding to direct change in body fat mass. Therefore, the elevated circulating levels of irisin observed in obese patients may perform an adaptive response to oppose the metabolic disturbances associated with obesity[14] role irisin regulate diversion in white adipose tissue giving it a phenotype similar to the one of the brown adipose tissue, a process known as 'browning' or 'beigeing' of the white adipose tissue[11]. These involve increased calorie intake, decreased physical activity, inappropriate nutrient mix and conditions that are aggravated or initiated by these factors, such as diabetes type 2 and obesity[12] explained that FNDC5-Irisin was induced by both PGC-1α over expression and physical activity ,Lifestyle modification, specifically increased physical activity, has demonstrated enormous therapeutic potential to reverse skeletal muscle insulin resistance[13]. Circulating irisin correlated positively with BMI, age, fasting blood glucose, and diastolic blood pressure the variance in the above aforesaid reports may be due to different populations analyzed in the studies, as some included subjects with metabolic diseases and broad ranges of BMI, which may influence baseline irisin levels. However, it is merit noting that to date none of the studies increased irisin levels in patients with essential hypertension and without coexisting diseases in comparison with normotensive subjects[14].

REFERENCES

1. Liu, J. "Irisin as an exercise-stimulated hormone binding crosstalk between organs". European Review for Medical and Pharmacological Sciences. 2015, 19(2): 316-321.
2. Rana, S.; Arif, M.; Hill, J.; Nagel, A. ; Nevill, A, Harpal, S.; Bailey, J.; Bellary, S. And Brown, J. "Plasma irisin levels predict telomere length in healthy adults". AGE. 2014, 36(2):995–1001.
3. Wrann, C.D. "FNDC5/Irisin – Their Role in the Nervous System and as a Mediator for Beneficial Effects of Exercise on the Brain". Brain Plasticity. 2015,1(1): 55–61.
4. Lee,H.; Lee,J.; Kim,N.; Kim,J.; Kim,H.; Lee,Y.; Kim,S,; Choi,J.; Oh,Y.; Kim,J.; Suyeon-Hwang,S.; Park,S. and Kim,H. "Irisin, a Novel Myokine, Regulates Glucose Uptake in Skeletal Muscle Cells via AMPK" .Molecular Endocrinology.2015, 29(6): 873–881.
5. Zhang, W.; Chang, L.; Zhang, C. et al. "Irisin is inversely associated with intrahepatic triglyceride contents in obese adults". Journal of Hepatology, 2015,59(3): 557–562.
6. Aronis, K.N .; Moreno,M.; Polyzos, S.A .; Moreno-Navarrete, J.M .; Ricart, W .; Delgado, E .; Hera, J . ; Sahin-Efe, A .; Chamberland, J.P .; Berman, R .; Spiro, A.; Vokonas, P .; Fernández-Real, J.M . And Mantzoros, C.S. "Circulating irisin levels and coronary heart disease: association with future acute

coronary syndrome and major adverse cardiovascular". Events International Journal of Obesity. 2015,39(1): 156–161.
7. Cleeman, J. I. "Executive summary of the third report of the National Cholesterol Education Program (NCEP) expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (adult treatment panel III)". Journal of the American Medical Association.2001, 285(19): 2486– 2497.
8. Kwaśniewska, M.; Kozińska, J.; Dziankowska-Zaborszczyk, E.; Kostka, T.; Jegier, A.and Rębowska, E. "The impact of long-term changes in metabolic status on cardiovascular biomarkers and microvascular endothelial function in middle aged men: a 25-year prospective study". Diabetol. Metab. Syndr. 2015, 7:81
9. Yan, B.; Shi, X.; Zhang, H.; Pan, L. and Ma, Z. "Association of Serum Irisin with Metabolic Syndrome in Obese Chinese Adults". PLOS One.2014, 9(4):e94235. DOI: 10.1371/journal.pone.0094235
10. Ha, H. and Lee, H.B. "Reactive oxygen species as glucose signaling molecules in mesangial cells cultured under high glucose". Kidney Int. 2000, 77: S19-25.
11. Chen, J.Q.; Huang, Y.Y. and Gusdon, AM. "Irisin: A new molecular marker and target in metabolic disorder". Lipids in Health and Disease. 2015, 14: 2. DOI:10.1186/1476-511X-14-2 .
12. Kurdiova T, Balaz M, Vician M, Maderova D, Vlcek M, Valkovic L, Srbecky M, Imrich R, Kyselovicova O, Belan V, Jelok I, Wolfrum C, Klimes I, Krssak M, Zemkova E, Gasperikova1, D, Ukropec J, Ukropcova B. "Effects of obesity, diabetes and exercise on FNDC5 gene expression and irisin release in human skeletal muscle and adipose tissue: in vivo and in vitro studies". J Physiol. 2014, 592(5):1091-1107
13. Peterson. "Effect of obesity and exercise on the expression of the novel myokines, Myonectin and Fibronectin type III domain containing 5". Peer J. 2014, 2: e605. DOI:10.7717/peerj.605 .
14. Taszarek, A.; Kaczmarkiewicz, A. and Miazgowski, T. "Hypertension and beyond — does circulating irisin matter?" Arterial Hypertens.2016, 20(1): 16-20. DOI: 10.5603/AH.2016.0004.
15. Oelmann, S.; Nauck, M.; Völzke, H.; Bahls, M. and Friedrich, N. "Circulating Irisin Concentrations Are Associated with a Favorable Lipid Profile in the General Population". *PLoS One*. 2015;11:e0154319.
16. Choi Y-K, Kim M-K, Bae KH, Seo H-A, Jeong J-Y, Lee W-K. "Serum irisin levels in new-onset type 2 diabetes". Diabetes Res Clin Pract.2013, 100(1):96–101.