



Elevated Serum Irisin Level is not Related to Metabolic and Anthropometric Parameters in Obese Children

¹Ayhan Abacı, ¹Gönül Çatlı, ¹Hale Ünver Tuhan, ¹Ahmet Anık, ²Tuncay Küme, ²Özlem Gürsoy Çalan, ¹Ece Böber

¹Department of Pediatric Endocrinology, Dokuz Eylul University, Faculty of Medicine, İzmir

² Department of Biochemistry,, Dokuz Eylul University, Faculty of Medicine, İzmir

Introduction

Irisin is a newly discovered myokine which regulates energy metabolism (glucose homeostasis) and obesity. Recent studies in adults have suggested that irisin played an important role in type 2 diabetes pathogenesis. However, results of the clinical studies investigating the relation of irisin with metabolic and anthropometric parameters remain controversial, conflicting and studies in obese children are limited.

Aim

We aimed to investigate the relation of serum irisin level with metabolic and anthropometric parameters in obese children.

Methods

- The study included obese children with a body mass index (BMI) >95th percentile and healthy children with a BMI 3-85th percentile. Healthy and obese groups had similar age and gender distribution.
- For calculation of BMI-SDS, data from the CDC data were used
- Waist circumference (WC) was measured using standard techniques.
- The percentage of body fat (PBF) (%) was measured using bioelectric impedance analysis (Tanita BC-418, Tokyo, Japan).
- Fasting serum glucose, insulin, lipid profile, leptin and irisin levels were measured.
- Insulin resistance was evaluated according to the homeostasis model assessment-insulin resistance (HOMA-IR) index.
- Findings for pubertal development were evaluated according to Tanner staging

Table 1. The clinical characteristics of obese and control subjects

	Obese Subjects (n=36)	Control Subjects (n=30)	p ^a
Age (year)	11.6±3.0	11.7±3.6	0.865
Sex (M/F)	20/16	16/14	0.857
Pubertal/prepubertal	19/17	18/12	0.556
BMI (kg/m ²)	29.4±4.5	18.2±2.9	<0.001
BMI SDS	2.2±0.3	-0.1±0.9	<0.001
WC (cm)	98.4±13.1	66.5±9.8	<0.001
Fat mass (kg)	27.9±11.8	8.1±3.3	<0.001
PBF (%)	36.3±6.0	18.4±5.6	<0.001
SBP (mmHg)	123.9±14.6	103.2±14.1	<0.001
DBP (mmHg)	77.2±11.5	67.8±10.7	0.013

Results

A total of 37 obese subjects (17 males; mean age, 10.9±3.3 years) and 31 healthy subjects (10 males; mean age, 12±3.2 years) were included in this study. There were no significant differences between groups for age and gender (Table 1).

- Obese group had significantly higher BMI, BMI-SDS, WC, fat mas (kg), free body fat ratio (%), serum lipid level, insulin, and insulin resistance index by the homeostasis model assessment, systolic and diastolic blood pressure values when compared with the control group ($p < 0.05$) (Table 1).
- Serum leptin and irisin levels of the obese group were significantly higher than that of the control group ($p < 0.01$) (Table 2).
- No statistically significant difference was found when leptin and irisin levels were compared among obese patients regarding the presence of insulin resistance ($p=0.202$) (Table 3).
- In the obese and control groups, irisin level was not significantly correlated with any of the anthropometric and metabolic parameters ($p > 0.05$).

Table 2. The laboratory characteristics of obese and control groups

	Obese Subjects (n=36)	Control Subjects (n=30)	P ^a
Glucose (mg/dL)	81.9±12.9	85.5±7.7	0.173
Insulin (uIU/mL)	21.5±12.9	5.6±3.4	<0.001
HOMA-IR	4.4±2.7	1.1±0.7	<0.001
Triglyceride (mg/dL)	137.6±58.2	75.5±26.0	<0.001
TC (mg/dL)	182.7±32.9	156.0±20.7	<0.001
LDL-C (mg/dL)	109.6±30.6	87.2±17.9	0.001
HDL-C (mg/dL)	45.5±12.9	54.5±14.1	0.010
Irisin (ng/mL)	148.4±59.6	112.5±33.0	0.003
Leptin (pg/mL)	11.0±5.1	3.4±1.9	<0.001

Table 3. The clinical and laboratory characteristics of obese patients with and without insulin resistance

	IR (-) Group (n=17)	IR (+) Group (n=19)	p ^a
Age (year)	10.8±3.1	12.3±2.8	0.146
BMI (kg/m ²)	27.3±3.2	31.2±4.8	0.008
BMI SDS	2.1±0.3	2.3±0.3	0.156
WC (cm)	93.1±11.0	103.2±13.2	0.019
Fat mass (kg)	21.2±7.5	33.1±12.0	0.005
PBF (%)	32.6±4.4	39.1±5.7	0.003
Triglyceride (mg/dL)	118±32.6	155.2±70.4	0.121
TC (mg/dL)	176.5±27.4	188.3±37.0	0.471
LDL-C (mg/dL)	103.1±29.7	115.5±30.9	0.315
HDL-C (mg/dL)	49.9±16.7	41.6±6.5	0.030
HOMA-IR	2.1±1.0	6.3±2.2	<0.001
Irisin (ng/mL)	137.9±49.8	157.8±67.1	0.594
Leptin (pg/mL)	9.7±5.7	12.2±4.3	0.107

Conclusion

- This is the first study to evaluate irisin level in relation with leptin and body fat parameters in obese children, who had significantly higher irisin levels.
- We did not find any relation between irisin and anthropometric or metabolic parameters.
- We suggest that reasons for higher irisin level in obese children could be clarified with expanded studies accompanying status of the physical activity and muscle mass.

