بسم الله الرحمن الرحيم

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شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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Irisin in Relation to Anthropometric and Metabolic Parameters in Obese Children

A Thesis
Submitted for Partial Fulfillment of PhD Degree
in Child health and Nutrition
(Department of Medical Studies for Children)

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ABSTRACT

Obese children are more likely to become obese adults, and have a higher risk of morbidity including hypertension, insulin resistance, dyslipidemia, type 2 diabetes mellitus and cardiovascular diseases, many studies revealed that irisin plays a role in the pathogenesis of various compilations.

Objective: To evaluate Irisin level and its relation to anthropometric and metabolic parameters in obese children.

Methodology: The study was carried out at Child Health Clinic-National Research Centre. It included 80 children aged between 6 and 14 years, 40 obese children of both sexes with body mass index $\geq 95^{th}$ percentile for age and sex, in addition to 40 normal weight children with BMI between (15^{th} and 85^{th} percentile) with matching age and sex as control. A detailed history was taken. Full clinical examination, anthropometric assessment, laboratory investigations (including irisin, lipid profile, fasting blood sugar and insulin) and pubertal development was done for each child.

Data was statistically analyzed by SPSS version 16 and appropriate statistical analysis was performed.

Ethical approvals from the ethical committee of Faculty of Post Graduate Childhood Studies and National Research Centre were taken and an

informed consent was obtained from the parents after explanation of the aim of the study and its possible benefits.

Results:

The mean irisin concentration was significantly higher in obese group 34.07 ± 20.72 pg/ml compared to control group 15.09 ± 8.74 pg/ml; meanwhile, it showed no statistically significant correlation with anthropometric measurements including weight and BMI except for waist circumference and height in control group which showed statistically significant positive correlation.

The correlations between irisin and biochemical parameters of obese and control groups was not statistically significant with regards to all parameters studied including Insulin, HOMA-IR, LDL-C, Cholesterol, Triglycerides, HDL-C and glucose.

The mean SBP was significantly higher in obese group 101.00 ± 4.96 mmhg compared to control group 98.00 ± 5.16 mmhg, while the mean DBP in obese group 66.00 ± 4.96 mmhg compared to control group 63.25 ± 4.74 mmhg; therefore, it was significantly higher in obese group as well.

Conclusion: These results imply that irisin as well as other metabolic syndrome parameters are related to obesity.

Keywords: Irisin - obesity - children.

CONTENTS

LIST OF ABBREVIATIONS

ADP	Air-Displacement Plethysmography
BAT	Brown Adipose Tissue
BDNF	Brain-Derived Neurotrophic Factor
BIA	Bioelectrical Impedance Analysis
BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
DBP	Diastolic Blood Pressure
DXA	Dual-Energy X-Ray Absorptiometry
ELISA	Enzyme Linked Immunosorbent Assay
ERK	Extracellular Signal-Related Kinase
FNDC5	Fibronectin Type III Domain Containing 5
HDL-C	High Density Lipoprotein Cholesterol
HOMA-IR	Homeostasis Model Assessment for Insulin Resistance
IFN	Interferons
IL	Interleukins
kDa	Kilodalton
LDL-C	Low Density Lipoprotein Cholesterol
MRI	Magnetic Resonance Imaging
mRNA	Messenger Ribonucleic Acid
P38 MAPK	P38 Mitogen-Activated Protein Kinase

PGC1 α	Peroxisome Proliferator-Activated Receptor Gamma Co-Activator 1-Alpha
POMC	Pro-Opiomelanocortin
SBP	Systolic Blood Pressure
T2DM	Type 2 Diabetes Mellitus
TNF	Tumor Necrosis Factor
TV	Television
UCP1	Uncoupling Protein 1
WAT	White Adipose Tissue
WHO	World Health Organization
α -MSH	Alpha-Melanocyte Stimulating Hormone

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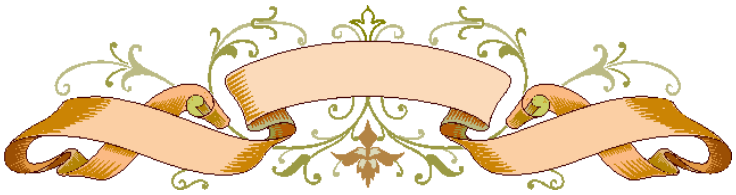
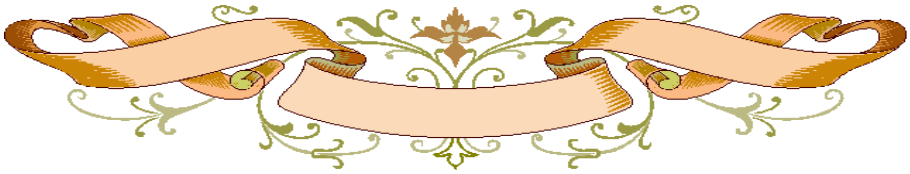


INTRODUCTION



INTRODUCTION

Childhood obesity has become a major global health problem in the recent years. It is the most important public health challenge for the 21st century, not only due to the rapidly increasing prevalence rates among children and adolescents, but also due to the consequences seen into adulthood. Children and adolescents constitute around 15 % of the 1.5 billion obese population; 75 % of them from the developing countries ***(World Health Organization., 2020).***

Obese children are more likely to become obese adults, and have a higher risk of morbidity including hypertension, insulin resistance, dyslipidemia, type 2 diabetes mellitus and cardiovascular diseases. Many of the metabolic and cardiovascular complications of obesity have their origins during childhood and are closely related to the presence of insulin resistance ***(Central Disease Control and Prevention, 2020).***

Irisin is a glycosylated polypeptide hormone derived from its precursor fibronectin type III domain containing protein 5, located in the plasma membrane, after the cleavage of its extracellular portion ***(Shim et al., 2018).***

Many studies revealed that irisin is involved in the pathogenesis of various complications of obesity including dyslipidemia, type 2 diabetes mellitus, and arterial hypertension, summarized in the definition of the Metabolic Syndrome ***(Meneck et al., 2018).***