

# **TO STUDY THE LEVEL OF IRISIN IN PATIENTS WITH POLYCYSTIC OVARIAN SYNDROME (PCOS)**

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# INTRODUCTION

- **PCOS** is the most common endocrine abnormality of reproductive age women whose prevalence in India ranges from **3.7% to 22.5%**.<sup>5</sup>
- **Irisin**, discovered **in 2012**, is one of the most studied exercise induced peptides in recent years.
- It belongs to the class of **adipo-myokines**.<sup>4</sup>
- Irisin is synthesized mainly in **skeletal muscles**, heart muscles, WAT, brain , pancreas.<sup>1,4,5</sup>
- The main physiological role of irisin to convert white adipose tissue(WAT) into brown adipose tissue , which generates heat (**thermogenesis**), increases energy expenditure and promotes weight loss. <sup>5</sup>

- Most of the studies have reported that circulating irisin is **positively associated** with body mass index (BMI) and weight.
- Irisin is found **to improve insulin resistance** by increasing sensitization of insulin receptors in skeleton and heart muscles by improving hepatic glucose and lipid metabolism.<sup>3</sup> It also promotes pancreatic beta cell functions.
- Cardiovascular disease **(CVD) patients have lower** levels of irisin when compared to controls
- Irisin levels are found **less in Type II Diabetes mellitus** patients as compared to controls but its levels are high in type 1 Diabetes mellitus<sup>5</sup>.
- Data on circulating irisin levels between PCOS women and controls are very **inconclusive**<sup>5</sup>

# Inclusion and Exclusion Criteria

## **Inclusion-**

Patients ( 18-45years) with PCOS which was diagnosed by ASRM guidelines 2018.

## **Exclusion-**

More than 45 years of age

- Thyroid dysfunction
- Endocrinopathies
- Primary ovarian insufficiency
- Type 1 or 2 diabetes
- OCP users, on hormonal medication since past 3 months
- Neoplasm

**Controls-** Healthy women with regular cycles, normal ultrasound findings and no signs of hyperandrogenism.

# Division of groups

- Total 81 patients were included in our study
- They were divided into 3 groups , each having 27 patients-
  - Group 1 – Obese PCOS (BMI>24.9)
  - Group 2 – Non-obese PCOS (BMI <24.9)
  - Group 3 – Healthy controls

- **Anthropometric measurements-**

It included weight(kg), height(meters) ,waist-hip ratio and BMI was calculated( $\text{weight}/\text{height}^2$ )

- **Sampling technique-**

2ml of Fasting blood samples were taken after overnight fasting of 8-10hrs,during early follicular phase(day 2-4 of cycle). All samples were collected in plain vials and serum was stored at -80 degree Celsius.

2ml sample was also sent for assessment of fasting blood glucose, insulin levels, hormone profile (LH, FSH, Free testosterone, TSH)

- Serum Irisin levels were measured with ELISA by using Human Irisin ELISA kit.
- Hormonal parameters were analyzed using immune chemiluminescence method

# Serum irisin concentration in PCOD patients compared with Healthy control(HC) (mean±SD)

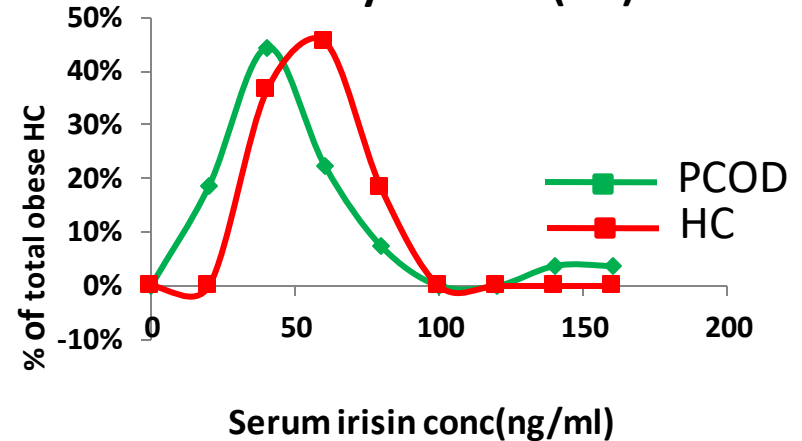
Serum irisin concentration in PCOD patients (mean±SD )	Total PCOS (n=54)	Obese PCOS (n=27)	Non obese PCOS (n=27)
Mean±SD	38.58±26.94	42.63±31.95	34.88±21.58

Serum irisin concentration in healthy control (mean±SD )	Total HC (n=27)	Obese HC (n=11)	Non obese HC (n=16)
Mean±SD	44.63±19.75	51.01±22.94	40.25±16.57

# Impaired serum irisin response in obese PCOD patients

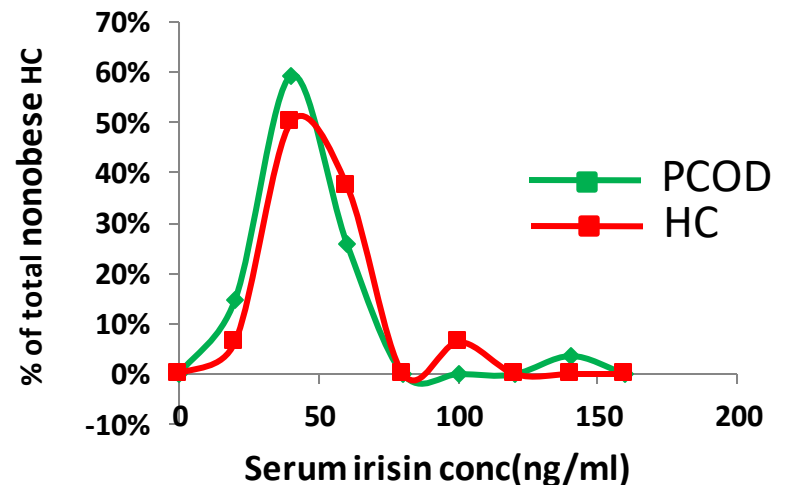
Distribution of irisin level in obese PCOD VS obese Healthy Control (HC)

Serum Irisin concentration	PCOD % (n)	HC % (n)	Fisher exact test (p < .05)
>45 ng/ml	22(6)	64(7)	0.0244*
<45 ng/ml	78(21)	36(4)	
total	100(27)	100(11)	



Distribution of irisin level in non-obese PCOD VS non-obese Healthy control (HC)

Serum Irisin concentration	PCOD % (n)	HC % (n)	Fisher exact test (p < .05)
>45 ng/ml	22(6)	12.5(2)	0.6882
<45 ng/ml	78(21)	87.5(14)	
total	100(27)	100(16)	



cut-off value : 45ng/ml



# DISCUSSION

- The results of present study showed that obese PCOS cases(mean- 42.63) had higher levels of irisin compared to non obese(mean-34.88) with p-value 0.318.
- After taking cut-off value of irisin as 45ng/ml, we found that 64% of obese healthy controls had irisin value >45ng/ml whereas only 29% of obese PCOD patients had value >45ng/ml. This difference is found to be statistically significant as p value is <0.02.
- On comparing non-obese Healthy controls with non obese PCOS patients, we did not find any statistical difference.
- Altogether, irisin levels increase in obesity. Irisin is found to be positively associated with waist circumference, waist-hip ratio and muscle mass.<sup>5</sup>

- Obese controls have higher irisin level, which can be explained by higher fat mass and higher concentration of adipose tissue.
- PCOS patients have variable hormonal imbalance which may predispose to lower irisin levels compared to controls.
- Many studies have reported higher irisin levels in PCOS women<sup>7</sup> than in controls, whereas, others studies reported similar<sup>1,2</sup> or lower irisin levels in PCOS women.
- Irisin was found higher in obese PCOS females in most of the cases<sup>1</sup>. Differences in population, ethnicity, ELISA kits for irisin may partly explain the existing controversy.
- Further studies with bigger sample size can give us more accurate idea about irisin and its role in diagnosis and management of various metabolic diseases.

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