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Positive correlation between circulating irisin concentrations and homeostatic model assessment for insulin resistance (HOMA-IR) in women with Polycystic Ovary Syndrome: a Meta-analysis

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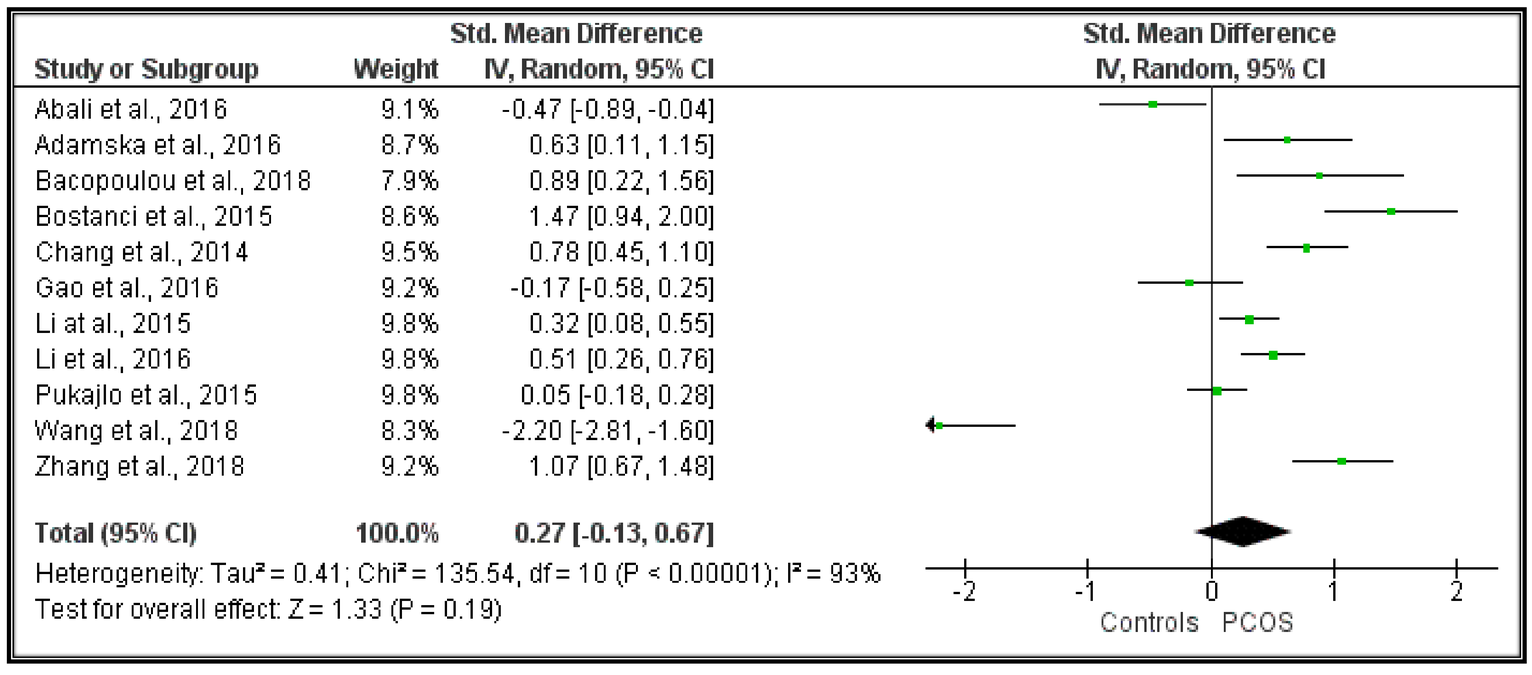
Background: Irisin has emerged as a potential mediator of energy expenditure that may improve adiposity and glucose homeostasis. Irisin's metabolic benefits in animal models are convincing, but only promising regarding humans. Irisin's secretion by and its potential roles in several tissues have been associated with insulin resistance (IR). In modern societies, health problems associated with IR are quite common. One such condition, the enigmatic polycystic ovary syndrome (PCOS) has attracted growing interest in irisin as a potential novel biomarker of the syndrome. Studies of circulating irisin in patients with PCOS have reported discrepant results.

Objective: A meta-analysis was performed to compare circulating irisin concentrations between PCOS and control women, and to explore the possible relation of irisin and IR, by associating this homone with the homeostatic model assessment for IR (HOMA-IR).



Graph 1

Methods: Following the PRISMA guidelines, an extended search of the PubMed/Medline, Google Scholar and Web of Science databases was performed to identify all articles published in English language pertaining to circulating irisin in women with PCOS. In addition, the references of selected papers were searched manually. Search terms were "irisin" and "PCOS" or "irisin" and "polycystic ovary syndrome". Retreived articles were eligible for inclusion in this meta-analysis if they included (i) women with PCOS and control women, pooled from the general population and (ii) measurements of circulating (plasma or serum) irisin concentrations in women with and without PCOS. Articles were excluded if (i) published repeatedly or (ii) data were incomplete. Statistical analysis was conducted with the use of the Review Manager software (Version 5.2, the Nordic Cochrane Centre, Copenhagen, Denmark).

Results: Eleven studies, out of 16 extracted studies, were included in the meta-analysis and involved in total 1,686 women: 1,017 PCOS patients and 669 non-PCOS controls. A random effects model revealed a moderate estimate of effect size (SMD: 0.27, 95%CI: -0.13 to 0.67), indicating that circulating irisin concentrations did not differ significantly between PCOS women and controls **(Graph 1)**. Another random effects model (four studies) revealed a moderate estimate of correlation and a statistically significant positive correlation between circulating irisin concentrations and HOMA-IR (Correlation: 0.372, 95%CI: 0.0843 to 0.603, *p*=0.012).

Conclusion: Irisin may play an important role in PCOS in relation to the inherent IR of the syndrome. This association requires further clarification in well-designed large-scale studies in women with PCOS, pending improvement of circulating irisin detection methodology.

Declarations of interest: none

References

1. Boström P, Wu J, Jedrychowski MP, et al. A PGC1-alpha-dependent myokine that drives brown-fat-like development of white fat and thermogenesis. *Nature* 2012;481:463-468.
2. Sesti G, Andreozzi F, Fiorentino TV, et al. High circulating irisin levels are associated with insulin resistance and vascular atherosclerosis in a cohort of nondiabetic adult subjects. *Acta Diabetologica* 2014;51:705-713.
3. Bostancı MS, Akdemir N, Cinemre B, et al.Serum irisin levels in patients with polycystic ovary syndrome. *Eur Rev Med Pharmacol Sci* 2015;19:4462-4468.
4. Gao S, Cheng Y, Zhao L, et al.The relationships of irisinwith bone mineral density and body composition in PCOS patients. *Diabetes Metab Res Rev* 2016;32:421-428.

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