



skeletal muscle. A potential mechanism for insulin resistance in the polycystic ovary.



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Excessive insulin receptor serine phosphorylation in cultured fibroblasts and in skeletal muscle. A potential mechanism for insulin resistance in the polycystic ovary syndrome.

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Abstract

We investigated the cellular mechanisms of the unique disorder of insulin action found in the polycystic ovary syndrome (PCOS). Approximately 50% of PCOS women (PCOS-Ser) had a significant increase in insulin-independent beta-subunit [³²P]phosphate incorporation (3.7-fold, $P < 0.05$ vs other groups) in skin fibroblast insulin receptors that was present in serine residues while insulin-induced tyrosine phosphorylation was decreased (both $P < 0.05$ vs other groups). PCOS skeletal muscle insulin receptors had the same abnormal phosphorylation pattern. The remaining PCOS women (PCOS-n1) had basal and insulin-stimulated receptor autophosphorylation similar to control. Phosphorylation of the artificial substrate poly GLU4:TYR1 by the PCOS-Ser insulin receptors was significantly decreased ($P < 0.05$) compared to control and PCOS-n1 receptors. The factor responsible for excessive serine phosphorylation appeared to be extrinsic to the receptor since no insulin receptor gene mutations were identified, immunoprecipitation before autophosphorylation corrected the phosphorylation defect

and control insulin receptors mixed with lectin eluates from affected PCOS fibroblasts displayed increased serine phosphorylation. Our findings suggest that increased insulin receptor serine phosphorylation decreases its protein tyrosine kinase activity and is one mechanism for the post-binding defect in insulin action characteristic of PCOS.

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[\[-\] Browse pages](#)

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page 801



page 802

Year	Page	doi	PMID	PMCID
2011	799	10.1093/ajph/101.11.1999	22112103	20111111
2011	800	10.1093/ajph/101.11.1800	22112104	20111111
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2011	816	10.1093/ajph/101.11.1816	22112120	20111111
2011	817	10.1093/ajph/101.11.1817	22112121	20111111
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2011	822	10.1093/ajph/101.11.1822	22112126	20111111
2011	823	10.1093/ajph/101.11.1823	22112127	20111111
2011	824	10.1093/ajph/101.11.1824	22112128	20111111
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2011	844	10.1093/ajph/101.11.1844	22112148	20111111
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2011	898	10.1093/ajph/101.11.1898	22112202	20111111
2011	899	10.1093/ajph/101.11.1899	22112203	20111111
2011	900	10.1093/ajph/101.11.1900	22112204	20111111

page 803

Figure 1

Group	Value
Control	100
100mg	80
200mg	60

Text

Background: The purpose of this study was to evaluate the effect of...

Methods: A randomized controlled trial was conducted with 100 participants...

Results: The results showed a significant decrease in the 100mg and 200mg groups compared to the control group.

Conclusion: The findings suggest that the intervention has a beneficial effect on the outcome measured.

page 804

Figure 2

Group	Value
Control	100
100mg	80
200mg	60

Text

Background: This study aimed to investigate the impact of different dosages on the study population.

Methods: Data were analyzed using statistical methods to compare the groups.

Results: The 100mg and 200mg groups showed significantly lower values than the control group.

Conclusion: The study indicates that higher dosages lead to a more pronounced effect.

page 805



page 806



page 807



page 808



page 809



page 810

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A Dunaif, *J Clin Invest*

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L J Goodyear et al., J Clin Invest

Modulation of insulin receptor, insulin receptor substrate-1, and phosphatidylinositol 3-kinase in liver and muscle of dexamethasone-treated rats.

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