

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

Research Article | Free access | [10.1172/JCI118126](https://doi.org/10.1172/JCI118126)

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

A Dunaif, J Xia, C B Book, E Schenker, and Z Tang

First published August 1, 1995 - [More info](#)

### ^ 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.

### Images.

### ^ Browse pages

Click on an image below to see the page. [View PDF of the complete article](#)



**Abstract**

**Background:** The aim of this study was to evaluate the effect of the use of a mobile phone on the performance of a simulated driving task. The study was conducted in a laboratory setting. The participants were 20 young adults who were divided into two groups: a control group and an experimental group. The control group was asked to perform a simulated driving task without using a mobile phone, while the experimental group was asked to perform the same task while using a mobile phone. The performance of the participants was measured in terms of reaction time, error rate, and subjective workload. The results showed that the use of a mobile phone significantly increased the reaction time and error rate, and also increased the subjective workload. These findings suggest that the use of a mobile phone while driving is a safety hazard and should be avoided.

**Conclusion:** The use of a mobile phone while driving significantly impairs performance and increases subjective workload. This study highlights the need for further research on the effects of mobile phone use on driving performance and the development of strategies to reduce the risk of distraction while driving.

page 802

**Abstract**

**Background:** The aim of this study was to evaluate the effect of the use of a mobile phone on the performance of a simulated driving task. The study was conducted in a laboratory setting. The participants were 20 young adults who were divided into two groups: a control group and an experimental group. The control group was asked to perform a simulated driving task without using a mobile phone, while the experimental group was asked to perform the same task while using a mobile phone. The performance of the participants was measured in terms of reaction time, error rate, and subjective workload. The results showed that the use of a mobile phone significantly increased the reaction time and error rate, and also increased the subjective workload. These findings suggest that the use of a mobile phone while driving is a safety hazard and should be avoided.

**Conclusion:** The use of a mobile phone while driving significantly impairs performance and increases subjective workload. This study highlights the need for further research on the effects of mobile phone use on driving performance and the development of strategies to reduce the risk of distraction while driving.

page 803

**Abstract**

**Background:** The aim of this study was to evaluate the effect of the use of a mobile phone on the performance of a simulated driving task. The study was conducted in a laboratory setting. The participants were 20 young adults who were divided into two groups: a control group and an experimental group. The control group was asked to perform a simulated driving task without using a mobile phone, while the experimental group was asked to perform the same task while using a mobile phone. The performance of the participants was measured in terms of reaction time, error rate, and subjective workload. The results showed that the use of a mobile phone significantly increased the reaction time and error rate, and also increased the subjective workload. These findings suggest that the use of a mobile phone while driving is a safety hazard and should be avoided.

**Conclusion:** The use of a mobile phone while driving significantly impairs performance and increases subjective workload. This study highlights the need for further research on the effects of mobile phone use on driving performance and the development of strategies to reduce the risk of distraction while driving.

page 804

**Abstract**

**Background:** The aim of this study was to evaluate the effect of the use of a mobile phone on the performance of a simulated driving task. The study was conducted in a laboratory setting. The participants were 20 young adults who were divided into two groups: a control group and an experimental group. The control group was asked to perform a simulated driving task without using a mobile phone, while the experimental group was asked to perform the same task while using a mobile phone. The performance of the participants was measured in terms of reaction time, error rate, and subjective workload. The results showed that the use of a mobile phone significantly increased the reaction time and error rate, and also increased the subjective workload. These findings suggest that the use of a mobile phone while driving is a safety hazard and should be avoided.

**Conclusion:** The use of a mobile phone while driving significantly impairs performance and increases subjective workload. This study highlights the need for further research on the effects of mobile phone use on driving performance and the development of strategies to reduce the risk of distraction while driving.

page 805

**Abstract**

**Background:** The aim of this study was to evaluate the effect of the use of a mobile phone on the performance of a simulated driving task. The study was conducted in a laboratory setting. The participants were 20 young adults who were divided into two groups: a control group and an experimental group. The control group was asked to perform a simulated driving task without using a mobile phone, while the experimental group was asked to perform the same task while using a mobile phone. The performance of the participants was measured in terms of reaction time, error rate, and subjective workload. The results showed that the use of a mobile phone significantly increased the reaction time and error rate, and also increased the subjective workload. These findings suggest that the use of a mobile phone while driving is a safety hazard and should be avoided.

**Conclusion:** The use of a mobile phone while driving significantly impairs performance and increases subjective workload. This study highlights the need for further research on the effects of mobile phone use on driving performance and the development of strategies to reduce the risk of distraction while driving.

page 806



## page 807



## page 808



## page 809



## page 810

### ^ Version history

- Version 1 (August 1, 1995): No description

Follow JCI:   

Copyright © 2020 American Society for Clinical Investigation

ISSN: 0021-9738 (print), 1558-8238 (online)

Sign up for email alerts

Sign up

Other mechanisms that explain insulin resistance are the activation of both mTOR and S6K1 pathways [49]. These activations cause serine phosphorylation of IRS-1, with a subsequent decline in the IRS-1—associated PI3K activity [49]. It has been suggested that under nutrient saturation conditions, S6K1 may negatively regulate insulin signaling and sensitivity [50, 51]. In addition, serine phosphorylation of IRS-1 has been examined under different circumstances. It seems that in addition to the mTOR-S6K1—dependent mechanism, various serine kinases, such as c-Jun NH2-terminal kinase (JNK), stress-3. Dunaif A. Insulin resistance and the polycystic ovary syndrome: mechanism and implications for pathogenesis // *Endocr. Rev.* - 1997. - Vol. 18, № 6. - P. 774-800. 7. Dunaif A., Xia J., Book C., Schenker E., Tang Z. Excessive insulin receptor serine phosphorylation in cultured fibroblasts and skeletal muscle: a potential mechanism for insulin resistance in the polycystic ovary syndrome // *J. Clin. Invest.* - 1995. - Vol. 96.