

# Metformin cuts insulin resistance and chances of kidney disease in young, obese rats

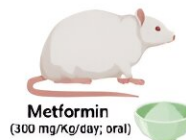
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**Metformin reduces insulin resistance and attenuates progressive renal injury in prepubertal obese Dahl salt-sensitive rats**

**Young obese  
SS<sup>LepR</sup>mutant rat**



Insulin resistance  
Hyperinsulinemia  
Elevated GFR ( $Cr_{Cl}$ ) and proteinuria  
Increased renal inflammation  
Increased glomerular/tubular injury and renal fibrosis



Improved insulin sensitivity  
Decreased plasma insulin  
Reduced GFR ( $Cr_{Cl}$ ) and proteinuria  
Reduced renal inflammation  
Decreased glomerular/tubular injury and renal fibrosis

## CONCLUSION

These data indicate that reducing insulin resistance with metformin prevents renal hyperfiltration and progressive renal injury in SS<sup>LepR</sup>mutant rats before puberty and may be therapeutically useful in managing renal injury during prepubertal obesity.

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Abstract. Credit: *American Journal of Physiology-Renal Physiology* (2023). DOI: 10.1152/ajprenal.00078.2023

Improving insulin resistance with metformin, a medication used to treat type 2 diabetes, reduced the chances of developing kidney disease in a prepubescent obese rat model, according to a new study from the University of Mississippi Medical Center. Treatment with metformin also reduced early signs of inflammation and dyslipidemia (imbalance of fats such as cholesterol and triglycerides).

Obesity and [insulin resistance](#) are [risk factors](#) for developing metabolic disease such as type 2 diabetes and play a major role in the early stages of [kidney disease](#), including protein in the urine (proteinuria). [The study is published in the \*American Journal of Physiology-Renal Physiology\*.](#)

"The major goal of this research was to determine if insulin resistance plays a role in the early progression of renal disease associated with prepubertal obesity," said Jan Michael Williams, Ph.D., lead author of the study

Studies investigating the role of childhood insulin resistance and obesity-related kidney injury are limited. This research provides evidence of an early relationship between the two conditions. Researchers gave 60 young male and [female rats](#) a constant supply of food and water during the study. A second group of obese, salt-sensitive rats ate either normal food or food containing metformin.

At the end of the study, there was a significant decrease in [body weight](#) and plasma insulin levels in metformin-treated rats compared to control rats that did not receive the medication. In addition, the metformin-treated animals had lower levels of proteinuria.

"Prepubertal obesity is currently an epidemic and is considered a major risk factor for renal injury," said Williams. "The results from our study suggest treatments that reduce insulin resistance may slow the early progression of renal disease in obese children, which may ultimately

prevent the development of chronic kidney disease in adulthood."

**More information:** Ubong S. Ekperikpe et al, Metformin reduces insulin resistance and attenuates progressive renal injury in prepubertal obese Dahl salt-sensitive rats, *American Journal of Physiology-Renal Physiology* (2023). [DOI: 10.1152/ajprenal.00078.2023](https://doi.org/10.1152/ajprenal.00078.2023)

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