

How does glucocorticoid therapy affect the developing cardiovascular system during pregnancy?

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Glucocorticoid therapy is widely used during pregnancies at risk of premature delivery to promote fetal lung maturation. While it is an effective treatment, it can also trigger heart and blood vessel problems. New research published in *The FASEB Journal* uncovers the mechanisms behind the cardiovascular-related effects of the most commonly used glucocorticoids, Dexamethasone (Dex) and Betamethasone (Beta).

When investigators treated chicken embryos with these different glucocorticoids, they found that both caused growth restriction, with Beta being more severe. At the level of the heart, both treatments promoted cellular stress and changes to the [cell cycle](#), but via different molecular pathways. Whereas Dex induced oxidative stress and lowered the activation of the glucocorticoid receptor, Beta treatment led to sustained glucocorticoid receptor activation, and it did not induce [oxidative stress](#). Beta compared with Dex induced greater cardiac dysfunction. Also, Dex triggered an increase in heart muscle cell numbers, but Beta promoted a decrease. In [blood vessels](#), Beta impaired blood vessel dilation, whereas Dex resulted in greater blood vessel constriction.

The findings indicate that Dex and Beta have different detrimental effects on the developing cardiovascular system.

"Antenatal glucocorticoid therapy to accelerate fetal lung maturation in human pregnancy threatened with [preterm birth](#) is a life-saving treatment that should be maintained. However, it can also lead to problems with

the heart and circulation in offspring that need attention," said senior author Dino A. Giussani, Ph.D., ScD, FRCOG, of the University of Cambridge, in the UK. "Here, we use a model system to isolate the direct effects of the two most common glucocorticoids used in the clinic worldwide to reveal the molecular pathways involved. Such knowledge is indispensable to improve current therapy and maintain the beneficial effects of steroids on the developing lung while weeding out [adverse side effects](#) on the developing heart and circulation—making therapy safer for the preterm infant."

More information: Molecular mechanisms underlying adverse effects of Dexamethasone and Betamethasone in the developing cardiovascular system, *The FASEB Journal* (2023). [DOI: 10.1096/fj.202200676RR](https://doi.org/10.1096/fj.202200676RR)

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