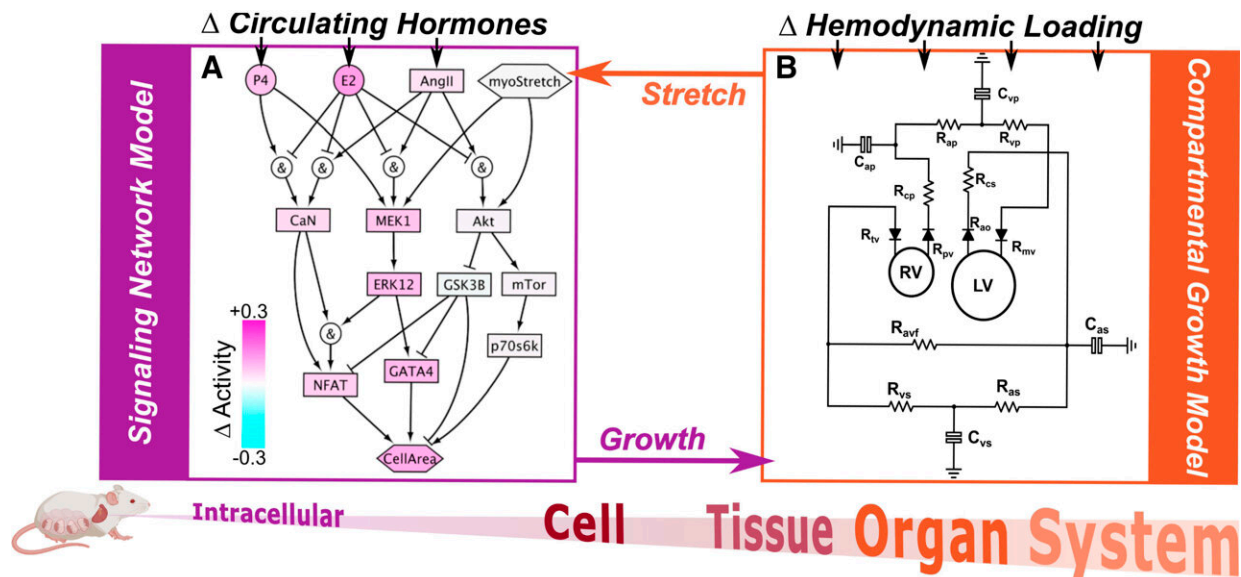


The heart grows more in pregnant rats with high blood pressure

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Multiscale model of heart growth couples. Credit: *American Journal of Physiology-Heart and Circulatory Physiology* (2024). DOI: 10.1152/ajpheart.00104.2024

The hearts of pregnant rats with high blood pressure increase in size more than rats experiencing a normal pregnancy, according to computer model predictions. The model, developed by researchers at the University of Minnesota, also forecasts two different post-delivery outcomes depending on whether the rats were allowed to nurse their offspring.

[The results of the study](#) are published in the *American Journal of Physiology-Heart and Circulatory Physiology*.

There are a lot of unknowns about how the body changes during—and after—pregnancy. This study sought to uncover what causes these complex changes, particularly in the heart, which grows throughout pregnancy to support those changes. Researchers wanted to see if their model could predict what happens after delivery or during a more complicated pregnancy, such as those affected by [high blood pressure](#).

Heart problems are the number one cause of death during pregnancy and in the year following delivery. In many cases, [heart problems](#) did not exist before pregnancy. These conditions are hard to diagnose because changes associated with high blood pressure and [heart failure](#) closely resemble changes seen in a healthy pregnancy.

This study demonstrated that a computer model could differentiate between healthy and unhealthy heart growth based on fluctuating [hormone levels](#) and blood flow patterns. These factors can be measured noninvasively during a routine exam.

When researchers didn't account for nursing, their computer model predicted the heart would shrink back to its pre-pregnancy size. However, when nursing was considered, the model predicted that the heart would keep growing to support milk production. The researchers' model simulated the heart pumping blood throughout the body.

Then it predicted how much the changes in [blood flow](#) caused the heart cells to stretch during a heartbeat. Another part of the model simulated how these cells get bigger in response to physical and key hormonal changes that occur over time during a typical [pregnancy](#).

"Our goal with this model is to be able to get this into the clinician's

office," said Molly Kaissar, MS, a doctoral candidate and the study's lead author. "Our goal is to get them a model that they can use and plug in easy, measurable biometrics and be able to detect abnormal changes earlier [so that] they can provide helpful treatment earlier."

More information: Molly S. Kaissar et al, Computational model captures cardiac growth in hypertensive pregnancies and in the postpartum period, *American Journal of Physiology-Heart and Circulatory Physiology* (2024). [DOI: 10.1152/ajpheart.00104.2024](https://doi.org/10.1152/ajpheart.00104.2024)

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