Researchers identify cause of heart failure in pregnant women

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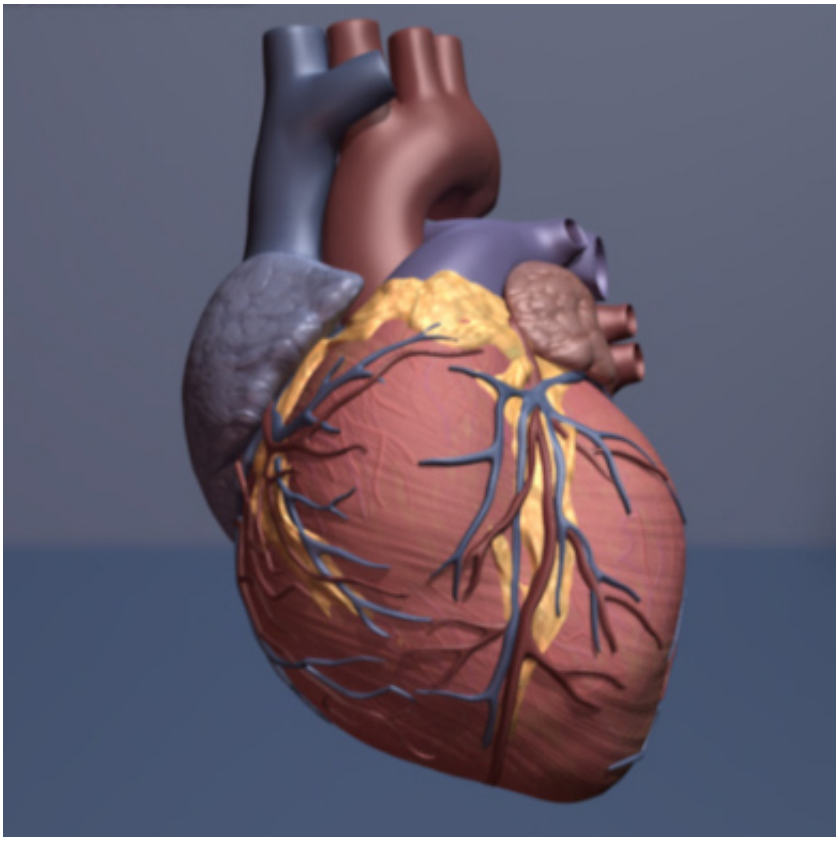

Human heart. Credit: copyright American Heart Association

Each year approximately 1 in 1,000 pregnant women will experience peripartum cardiomyopathy, an uncommon form of often severe heart failure that occurs in the final month of pregnancy or up to five months following delivery. But the cause of peripartum cardiomyopathy has

been largely unknown - until now. Researchers from the Perelman School of Medicine at the University of Pennsylvania analyzed the genetic variants that have been associated with another form of inherited cardiomyopathy, and determined that peripartum cardiomyopathy is often the result of a genetic mutation. The findings of this study are detailed in this week's *New England Journal of Medicine*.

Researchers analyzed 43 genes in 172 women who experienced peripartum cardiomyopathy, and found that 15 percent of the group had genetic mutations, usually in their TTN gene, which encodes the instructions for making the Titin protein. This protein—named after the Greek gods, Titans—is the largest protein in the body and directly affects the heart's ability to contract and relax. Of the women analyzed, 26 were identified to have mutations on the TTN gene, an effect that is significantly higher than any other reported finding for the cause of peripartum cardiomyopathy.

"Until now, we had very little insight into the cause of peripartum cardiomyopathy," said the study's senior author, Zoltan Arany, MD, PhD, an associate professor of Cardiovascular Medicine. "There had been theories that it was linked to a viral infection, or paternal genes attacking the mother's circulatory system, or just the stresses of pregnancy. However, this research shows that a mutation in the TTN gene is the cause of a significant number of peripartum cardiomyopathies, even in women without a family history of the disease."

This sizable percentage indicates that peripartum cardiomyopathy is caused by genetic mutations. The same mutations are also present in many who experienced dilated cardiomyopathy, a condition in which the heart's ability to pump blood is decreased when the main pumping chamber becomes weak and enlarged. This is similar to peripartum cardiomyopathy but most often occurs in older patients. However, the

two diseases are not the same. For example, a woman with the genetic mutation for dilated cardiomyopathy will not always experience peripartum cardiomyopathy, and women with the peripartum cardiomyopathy mutation will not always experience dilated cardiomyopathy later in life. How the same mutations can lead to different conditions in different people remains an unanswered question.

Arany added, "these findings will certainly inform future peripartum cardiomyopathy research, with possible implications on genetic testing and preventive care. Though, more research is unquestionably needed. We're continuing to follow these women and we're gathering data for hundreds of others around the world, with the goal of identifying the cause of peripartum cardiomyopathy in the remaining 85 percent of women with this condition, and ultimately using what we learn to improve the care of these women and their newborns."

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