

Poor nutrition during pregnancy can enhance the development of heart disease in children



Malnutrition during pregnancy has a strong impact on the fetal heart, increasing the risk of developing cardiovascular disease in the long term. The conclusion is from a study carried out by a team of researchers from the Center for Neuroscience and Cell Biology at the University of Coimbra (CNC-UC).

This study, which aimed to assess whether maternal malnutrition causes changes in the mitochondria (the energy-producing cell organelles) in the heart of fetuses, suggests that these babies should receive lifelong medical follow-up, given their increased risk for development of cardiovascular diseases.

According to the results of the research, carried out using an animal model, a moderate 30% reduction in the amount of food given to mothers during pregnancy produces profound changes in the function of the infant's cardiac mitochondria. It was found that these changes interfere with the way mitochondria produce energy and the way they participate in various essential cellular functions, which can promote the appearance of cardiac dysfunction earlier in adulthood.

In an innovative and controlled way, “it was possible to establish a causal relationship between the feeding of mothers during pregnancy and the cardiac function of the offspring. This work made evident a relationship that we had suspected for a long time, now it becomes essential to define the ideal nutrition during pregnancy to enhance the health of the descendants», explains Susana Pereira, first author of the scientific article and researcher at CNC-UC and at CIAFEL – Research Center in Physical Activity, Health and Leisure, Faculty of Sport, University of Porto.

It has also been observed that the effect of malnutrition during pregnancy is more pronounced on the heart of male fetuses. This difference, according to the authors, may explain the different susceptibility of men and women to heart disease during their lifetime.

This work, already published in the scientific journal *Clinical Science*, is part of a broader project, started in 2009, which aims to identify the effects of nutrition during pregnancy on the health of fetuses, namely in terms of the function of the mitochondria, and that, in addition to University of Coimbra, involves the University of Porto and two US universities – University of Wyoming and University of Texas Health Science Center in San Antonio.

Paulo Oliveira, group leader at CNC-UC and also author of the study, clarifies that, «along with other articles resulting from this project, we concluded that undernutrition and overnutrition during pregnancy have very similar effects on the mitochondrial function of the offspring, promoting changes which may explain the increased susceptibility to liver, kidney or heart diseases observed in children of mothers who are over or undernourished during pregnancy”.

Changes in cardiac mitochondrial structure and function due to maternal malnutrition are implicated in programming cardiac development and likely influence long-term cardiac health. Therefore, conclude Paulo Oliveira and Susana Pereira, the results of this study "may contribute to the development of new biomarkers for early diagnosis, allowing timely interventions to improve cardiovascular health throughout life."

The article is available [here](#).

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