

## Mothers' diet affects the health of grown-up daughters and sons differently

by Marion Korach-André, PhD<sup>i</sup>

### Original title

Maternal high-fat diet programs white and brown adipose tissue lipidome and transcriptome in offspring in a sex- and tissue-dependent manner in mice.<sup>1</sup>

### Introduction

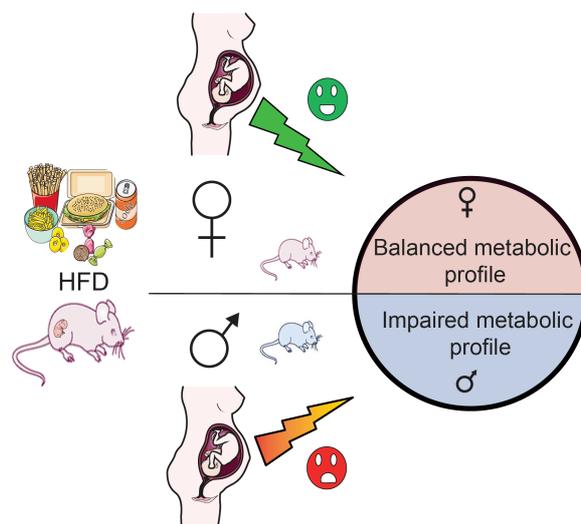
Due to a less active lifestyle and an unhealthy diet, many more women are overweight when deciding to have children. If the mother is overweight while pregnant, this will, surprisingly, affect the health of the children later in life. Specifically, the children will suffer from chronic diseases, such as heart diseases, diabetes, overweight and others.

### Findings

Our study shows that overweight mothers eating a high-fat diet while pregnant and breastfeeding is bad for their children's health. Most interestingly, we discovered that girls and boys responded differently. We found that this has harmful overall health outcomes on the children, especially in boys, affecting many organs later in life. In our previous work<sup>2</sup> we showed that although the children have a healthy diet after birth, girls' and boys' health will be affected differently. This together, suggests a sex-specific adjustment to the mother's high-fat diet while pregnant. Understanding how this adjustment is happening is thus very important to prevent any diseases that the children will develop when growing up. It may even be possible to do something when overweight mothers are pregnant.

To better understand the phenomenon, we fed mothers (mice) either a high-fat or a healthy

diet and compared how healthy the children were during the first 6 months following birth (equivalent of 45 years old in humans). To check the health status in the children, we used modern techniques in medicine, such as magnetic-resonance-imaging (MRI) and -spectroscopy (MRS) to get a detailed picture of the inside of the body in an unharmed manner, as well as gene activity measurements of every single gene that exists. We also measured sugar, insulin, fat and cholesterol content in the blood.



**Fig. 1: Graphical representation of the consequence of maternal high fat diet on daughters' and sons' metabolic health.** The pink and blue hemispheres represent the effect of maternal diet in daughters and boys, respectively. The green and red thunderstruck symbols represent respectively, a positive and negative signal on the metabolism.

*Pregnant woman was designed using Servier Medical Art "pregnancy" <http://smart.servier.com>. Open Access licensed under a Creative Commons Attribution 3.0 Generic License <https://creativecommons.org/licenses/by/3.0/legalcode>*

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## Conclusion

Overall, we found many differences in boys and girls, which further confirmed that the children adapt differently to the diet of the mother. Our results therefore suggest that sex hormones contribute to how fat is regulated in the body at a very early stage in life. It is interesting to note that girls may have specific regulators that protect them from diseases, which may not exist in boys. To use this knowledge to improve our health, it is now important to find out why girls and boys adapt so differently. However, how exactly this is working has still not been determined.

## Article info

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