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Targeted strategies needed to prevent obesity in women of child bearing age, concludes major European obesity project

A major European obesity project has concluded that, due to the long lasting consequences of maternal obesity for both mothers and their children, targeted strategies must be urgently developed to prevent obesity in girls and in women of child bearing age.

The Developmental ORIGins of healthy and unhealthy AgeiNg: the role of maternal obesity (DORIAN) consortium, funded by the European Commission's 7th Research Framework Programme, today releases results gathered from its 3-year research programme which began in January 2012.

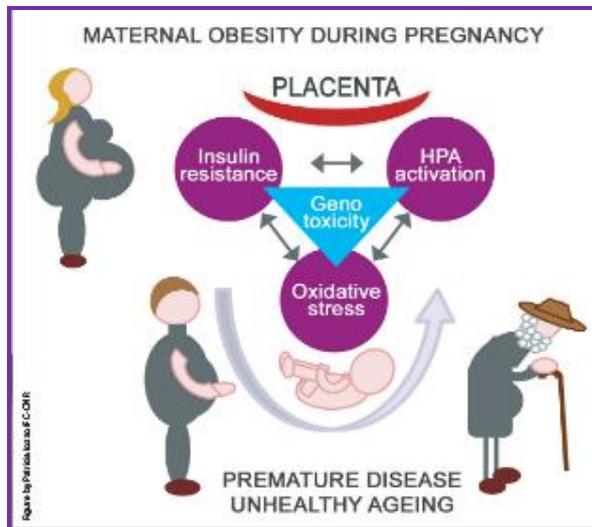
Overweight and obesity are grave concerns for the European Union. More than half (53%) of all adults are now either overweight or obese. Obesity, which presents even greater health risks than being overweight, currently affects one in six adults (17%) in the EU, an increase from one in eight a decade ago, with considerable variations between countries.*

The project aimed to generate a better understanding of the basic mechanisms of early life development and ageing, with the aim of improving health and quality of life during the entire life course. In particular, the Consortium of DORIAN investigated and analysed the impacts of maternal obesity on the process of ageing, and its effects on children throughout their lives. DORIAN was divided into various projects looking at specific questions related to this issue, with the consortium led by Dr Patricia Iozzo (Institute of Clinical Physiology, National Research Council (CNR), Pisa, Italy).

One important proof of concept came from results from more than 13000 subjects who had been followed from birth (in the 1930s-40s) until the present age of 60-70 years. Led by Professor Johan Eriksson in Helsinki (University of Helsinki and Folkhälsan Research Center, Helsinki), this important data collection showed that the likelihood to develop cardiovascular and cerebrovascular diseases, or type 2 diabetes during adulthood, was greater in people born to mothers who were overweight during their late pregnancy.

"We went on," says Dr Iozzo, "by trying to understand if signs of disease risk can be captured during the earliest phases of life. Results from 90 mothers and their children are showing that the metabolic profile, body weight, and cardiac development in children are influenced by the association of pre-pregnancy overweight combined with weight gain during pregnancy, and by maternal weight and blood glucose control at the end of pregnancy. The weight gain occurring between consecutive pregnancies (commonly observed in women) also affects these factors."

"The period of pregnancy—even the very last period—is fundamental," says Dr Iozzo. "Intensive efforts should be devoted to monitor lifestyle during pregnancy and optimise the mother's metabolic profile at the time of delivery."



A team led by Professors Rebecca Reynolds and Megan Holmes at the University of Edinburgh, UK, found that women with obesity eat a diet richer in saturated fats and poorer in micronutrients (vitamins, minerals) during pregnancy compared with lean women. In addition, using a preclinical model the investigators found that the placenta of mothers eating a high fat diet offered weakened protection to the foetus against the circulating stress hormone Cortisol; and consequently, fetal growth is reduced and these offspring are more likely to suffer mood disorders in adulthood.

Professor Holmes and Professor Reynolds say: “The two most important messages to

pregnant women from these findings are that they should have a healthy diet and lifestyle during pregnancy, and if suffering from anxiety or depression they should seek treatment to help their symptoms.”

Dr Iozzo adds: **“Policy makers must draft guidelines for diet during pregnancy, and mental health support for pregnant women must be improved.”** It is important to underline that the womb environment, and especially the maternal diet can interact with the DNA of the child during its development by so called epigenetic modifications, which alter the function of genes. All people have epigenetic modifications and they will influence our health through life.

Results from the team of Dr Paulino Gómez-Puertas from Biomol-informatics in Madrid, Spain, working in collaboration with Dr Iozzo, highlight a number of differences between children born to obese mothers and children born to lean mothers.

Some other key results from the project related to the protective caps on the end of our DNA called ‘telomeres’. “Having long telomeres,” says young investigator Maria Angela Guzzardi from Dr Iozzo’s team, “protects our DNA so that it is better able to function and repair, while shorter telomeres are markers of disease and a shorter lifespan.” The DORIAN team found that maternal overweight/ obesity combined with high weight gain during pregnancy is associated with shorter telomere length in the offspring and as they get older. However, Dr Iozzo says that even if a pregnant woman was born with shorter telomeres herself and had a high Body Mass Index, she can still reverse the situation and produce healthier offspring. “If you find yourself in this situation, you should try to avoid excess weight gain, and also be physically active as this can improve glucose metabolism and lengthen telomeres.”

In fact, the collaboration between Dr Guzzardi and Professor Johan Eriksson (University of Helsinki and Folkhälsan Research Center, Helsinki) and Professor Pirjo Nuutila from the University of Turku in Finland reveals that exercise training may have a positive effect on telomere length, glucose metabolism and insulin sensitivity, especially in adult women born to obese mothers.

Other findings from the project include:



- Results by the group of Dr Mathias Schmidt from the Max Planck Institute in Munich, Germany, demonstrating that FKBP51, a gene regulated by maternal obesity, may be a possible target for new drugs in obesity-related disorders.
- A preclinical study conducted by Dr Francesca Cirulli's team at the Istituto Superiore di Sanità in Rome showing that administration of antioxidants could be one potential method to prevent or alleviate the effects of maternal obesity on the health of the offspring.

Dr Iozzo concludes: "The DORIAN project has underlined the importance of preventing obesity in pregnancy, preventing excess weight gain during pregnancy, and also maintaining healthy diet without too much fat, all of which can have short and long term effects on the health of the mother and her child."

"In the context of maternal-offspring health, attention should be devoted to the prevention of overweight and obesity among young girls, representing 'tomorrow's mothers'. Targeted strategies are also needed to ensure pregnant women do not add excess weight and protect their physical and mental health, and that of their children."

The European Association for the Study of Obesity (EASO) is encouraged by the results of this research project and supports its recommendations: "DORIAN highlights the hugely important need to address maternal obesity and to develop solutions for policymakers and tools for EU citizens and EASO calls on all stakeholders to work together to achieve these goals," says Euan Woodward, Executive Director of EASO.

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Notes to editors: DORIAN website: <http://www.dorian-fp7.eu/>

*This information comes from a joint statement by Vytenis Andriukaitis, EU Commissioner for Health and Food Safety, and Angel Gurría, Secretary General of the Organisation for Economic Co-operation and Development: http://europa.eu/rapid/press-release_STATEMENT-14-2287_en.htm
