

Exposure to micronutrients pre-pregnancy associated with gene modifications in offspring

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The offspring of women who were given micronutrient supplements (minerals needed in small quantities, such as iron, iodine and vitamin A) before they became pregnant had gene modifications at birth as well as when they were tested at 9 months.

The changes to the genes, called methylation, have previously been associated with the development of the immune system, although this study did not provide direct evidence that the activity of these genes has changed. The research, funded by the BBSRC, was published today in the journal [Human Molecular Genetics](#) in advance online publication (DOI number DDS026).

Professor Nabeel Affara, lead author of the study from the University of Cambridge, said: "The mechanism by which micronutrients influence methylation changes is still to be worked out, but it is known from other work that the genes of the immune system undergo such changes as [immune function](#) develops, particularly in early postnatal stages and early childhood.

"These changes are part of the normal development of the immune system provided [adequate nutrition](#) is available. Where this is not the case, different patterns of methylation may occur, altering the activity of key genes and therefore potentially the effectiveness of the immune system. The result is likely to be reduced ability to fight infection and hence susceptibility to [infectious diseases](#)."

The study used [DNA samples](#) from a Medical Research Council (MRC) micronutrient supplementation trial where women attempting to get pregnant are given either a cocktail of micronutrients or a placebo until pregnancy is confirmed (approximately an 8 weeks period). The

research was conducted in The Gambia where there is [seasonal variation](#) in the availability of micronutrients with an alternation between the dry season (when they harvest and food is plentiful) and the wet season (when there is less food available and therefore poorer nutrition). Individuals born in the wet, nutritionally poor season have been found to be more susceptible to infection.

Professor Affara added: "This has huge public health implications for regions of the world where food security is an issue. If we have an improved understanding of what nutrition is important and the mechanisms by which this important environmental factor interacts with gene function, we can target nutritional intervention to improve health in later life."

More information: The paper 'Periconceptual maternal micronutrient supplementation is associated with widespread gender related changes in the epigenome : a study of a unique resource in the Gambia will be published in the April 2012 edition of *Human Molecular Genetics* and as an on line advanced publication today, 22 February 2012.

Provided by University of Cambridge

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