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P82. Parental nutrition: methyl donors and nutri-epigenomics.

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Context

The epigenetic is the study of heritable changes in gene expression that does not involve changes in the sequence of DNA. The epigenetic changes is a natural change that can be influenced by several factors like age, enviroment, lifestyle and nutrition. Parental nutrition status in the periconceptional period is one of the external factors that must be taken into account to get an optimal reproductive health.

One of the most important epigenetic mechanism is the DNA methylation, that is a labil target in response to nutritional influences.

Objective and methods

We have conducted a literature review to assess whether parental nutrition can cause epigenetic changes and alter DNA methylation patterns of offspring, by studying scientific databases.

Results

Studies confirm that particularly a balanced micronutrients intake including the group of B vitamins and folate, choline, betaine and methionine is necessary to get a correct DNA methylation pattern. Alterations in DNA methylation profiles can lead to changes in gene expression and finally critic consequences involved in the development and health of newborn.

DNA methylation profile and the epigenetic marks are established in early stage of development and they are process that depends on the dietary intake of methyl-donors in the periconceptional period. The universal donor of methyl groups is S-adenosylmethionine (SAM), an intermediate substrate in one-carbon metabolism, where it donates the reactive methyl group. Folate, betaine, choline, methionine and B vitamins act like cofactors on the enzymatic reactions in the SAM pathway, so an altered consumption of this micronutrients modify the pool of methyl groups to carry out the DNA methylation and generate one or other pattern depends on the amount of reactive methyl groups available for the DNA-methyltransferases.

Conclusions

The results of this review recommend an adequate intake of this group of micronutrients. This is essential for generating healthy offspring and a correct gene expression.

Actually, a new discipline emerges for the study of the dietary influence in gene expression, through changes in the epigenome and methylation profiles. This is the nutri-epigenomics. Future research are needed to understand the link between DNA methylation, micronutrients intake and future consequences in the development stages. Define epigenetic biomarkes can help us to indentify the risk, develop individual therapies and prevent this risk.

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