



Genetics for a healthy pregnancy

matergen™ analyzes the genetic factors that predispose women to gestational diabetes, as well as disorders of folic acid and vitamin B12 metabolism.

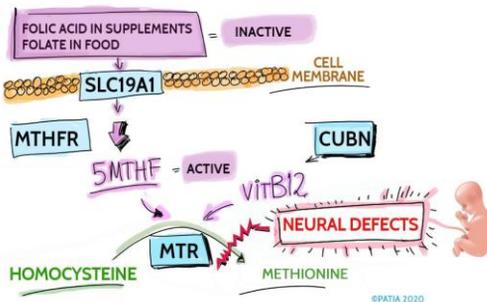
matergen™ helps pregnant women to prevent:

- Neural tube defects in baby
- Early miscarriage
- Preterm birth
- Gestational diabetes
- Intrauterine growth restriction

The future baby and folic acid

The first days of the embryo are extremely critical: Cells of the future baby are programmed and formed. Folic acid plays a crucial role during these first days by providing the carbon units required for DNA and histone methylation, and it contributes to the synthesis of amino acids, neurotransmitters, purines and nucleic acids.

Folic acid is key for the formation of the neural tube, which is an early element in the development of the brain and spinal cord.



Genes, folic acid and homocysteine

matergen™ analyzes the MTHFR gene, which encodes the MethyleneTetraHydroFolate Reductase enzyme. This enzyme metabolizes ingested (inactive) folic acid, converting it into its active form 5-MethyleneTetrahydrofolate (5-MTHF) that is required in many cell functions.

matergen™ detects MTHFR genetic polymorphisms, which may lead to a deficient folic acid metabolism capacity, an insufficient amount of the active form of folate and increased blood homocysteine levels, which is associated with a higher risk of neural tube malformations.

Women carrying these genetic polymorphisms may take the active form of folate: 5-MTHF as a preventative.

matergen™ also detects SLC19A11, MTR, and CUBN polymorphisms, which may lead to deficient folic acid and vitamin B12 transport and metabolism.

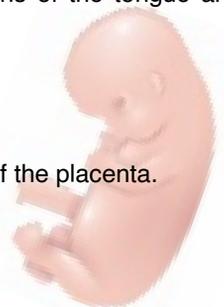
matergen™ informs the proper type of folate supplement required: folic acid or its active form, 5-MTHF.

matergen™ recommends **Vitamin B12** supplementation.

Malformations and severe complications

Many publications show that alterations in the metabolism of folic acid and vitamin B12 cause elevated levels of homocysteine that are associated with:

- Neural tube defects: spina bifida and anencephaly.
- Congenital malformations of the tongue and palate.
- Cardiac malformations.
- Miscarriages.
- Low newborn weight.
- Premature birth.
- Premature separation of the placenta.



Between 40-60% of women may lack the capacity to adequately metabolize the supplemented folic acid, and therefore expose the fetus to an increased risk of malformations.

These women would benefit from taking 5-MTHF, not folic acid, prior to conception and during pregnancy.

Gestational diabetes

Gestational diabetes affects 1 out of 8 pregnancies. **matergen™** detects genetic polymorphisms associated with a higher risk, enabling early intervention to prevent gestational diabetes and its associated complications in both the mother and her baby.

- **Macrosomia**
- **Birth by C-section**
- **Hypoglycemia and seizures**
- **Obesity and type 2 diabetes**

An algorithm facilitates the assessment of the genetic risk for gestational diabetes with high sensitivity and specificity (AUC = 0.74).

Mothers with gestational diabetes have up to 70% risk of developing type 2 diabetes in the 10 years after birth. Babies born from a pregnancy with gestational diabetes have up to 60% risk of obesity and type 2 diabetes. Preventing gestational diabetes in the mother also improves the baby's cardiometabolic future.

Results report

matergen™ provides specific genotype-based recommendations for a healthy pregnancy.



Scientifically sound

matergen™ analyzes 12 genetic variants associated with the development of gestational diabetes, as well as folic acid and vitamin B12 metabolism.

matergen™ has been validated in large cohort studies, after SNPs selection based on its predictive power and location in functionally relevant genetic loci.

Scientific references

- Van Poppel M et al. DALI Core Investigator Group. Interaction between rs10830962 polymorphism in MTNR1B and lifestyle intervention on maternal and neonatal outcomes: Secondary analyses of the DALI lifestyle randomized controlled trial. *Am J Clin Nutr*. 2021; nqab347.
- Huerta-Chagoya A et al. Genetic Determinants for Gestational Diabetes Mellitus and Related Metabolic Traits in Mexican Women. *PLoS ONE* 2015 10(5): e0126408.
- Powe C et al. Heterogeneous contribution of insulin sensitivity and secretion defects to gestational diabetes mellitus. *Diabetes Care* 2016; 39(6):1052-5
- HAPO Study Cooperative Research Group. The Hyperglycemia and Adverse Pregnancy Outcome (HAPO) Study. *Int J Gynaecol Obstet*. 2002; 78(1):69-77
- Ding M et al. Genetic variants of gestational diabetes mellitus: a study of 112 SNPs among 8722 women in two independent populations. *Diabetologia* 2018; 61(8):1758-1768
- Servy EJ et al. MTHFR isoform carriers. 5-MTHF (5-methyl tetrahydrofolate) vs folic acid: a key to pregnancy outcome: a case series. *J. Assist. Reprod. Genet*. 2018; 35: 1431-1435 (2018).
- Deng YN et al. Transcription Factor RREB1: from Target Genes towards Biological Functions. *Int J Biol Sci* 2020; 16(8):1463-1473
- De Luis DA. Dietary-fat effect of the rs10830963 polymorphism in MTNR1B on insulin resistance in response to 3 months weight-loss diets. *Endocrinología, Diabetes y Nutrición* 2020; 67 (1): 43-52
- Alvine T et al. FBMS1 methylation and mRNA expression are differentially regulated in placenta tissue from obese women. *Current Developments in Nutrition* 2019; 3(Issue Supplement_1); nzz048.P11-131-19
- Seghieri G. et al. Serum homocysteine levels are increased in women with gestational diabetes mellitus. *Metabolism*. 2003; 52: 720-3.
- Kim JY et al. Melatonin receptor 1 B polymorphisms associated with the risk of gestational diabetes mellitus. *BMC Med Genet* 2011; 12:82
- Kraja A et al. A bivariate genome-wide approach to metabolic syndrome: STAMPEED Consortium. *Diabetes* 2011; 60(4): 1329-39.

matergen™

is indicated for all women planning or in their first weeks of pregnancy

matergen™

A DNA sample is used for genetic analysis of future mothers to improve the health of both mother and baby.

Buccal swab or blood sample

patia

Patia Europe S.L. Paseo Mikeletegi 69. 20009. San Sebastián. Spain.
contacto@patiadiabetes.com Tel. +34 943324673 www.patiadiabetes.com

more information at matergen@patiadiabetes.com