

Genes-4U

Methylenetetrahydrofolatreductase (MTHFR) C677T

Methylenetetrahydrofolatreductase (MTHFR) catalyzes the synthesis of 5-methyltetrahydrofolate, the methyl donor for methionine synthesis and the precursor of S-adenosylmethionine. S-adenosylmethionine is the universal methyl donor for methylation reactions. Thus, MTHFR is a central enzyme in the remethylation of homocysteine to methionine. Its common thermolabile variant C677T possesses decreased activity. Clinically, homozygous mutations are associated with high homocysteine levels in patients with compromised or insufficient function of the kidneys – the major disposal organ for homocysteine.

DNA methylation is an epigenetic feature of DNA that influences cellular development and function, and aberrations of DNA methylation are a candidate mechanism for the development of cancer. Since S-adenosylmethionine is the methyl donor also for DNA methylation reactions, several developmental disorders like neural tube defects (spina bifida, nonsyndromic cleft lip and Down's syndrome) but also the development of cancers and leukaemia have been linked to this mutation. Also predisposition to schizophrenia, particularly the response to neuroleptics appears related to the MTHFR genotype.

References

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