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Changes in MTHFR gene; the cause for many diseases

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Many enzymes are involved in the breaking down of a common molecule in human body, called folate. The methylenetetrahydrofolate reductase (MTHFR) is one such important enzyme involved in this process. This enzyme is produced by the gene called *MTHFR*. Changes occurring in *MTHFR* gene reduce the proper functioning of the MTHFR enzyme. Faulty enzyme can affect the folate breakdown. This can disturb the biological process called DNA methylation occurring inside our body. Faulty enzyme can also produce higher levels of homocysteine in blood, which is an amino acid. This may result in many diseases. Many scientists have studied how these changes lead to diseases. Two common changes in MTHFR gene which affect the enzyme function have been found by scientists. They are named as the A1298C polymorphism and C677T polymorphism. Our aim was to get an understanding on how these changes lead to disease like autism, rheumatoid arthritis, migraine, breast cancers, psychiatric disorders and pregnancy issues. We collected and studied research done in the past about changes in *MTHFR* gene in different ethnic groups. We found that, than A1298C the C677T polymorphism is related with many of these diseases. C677T polymorphism increases the risk of autism, rheumatoid arthritis, migraine, pregnancy issues and psychiatric illnesses like depression and bipolar disorders. Both C677T and A1298C *MTHFR* polymorphisms equally increase the risk of breast cancer. The two polymorphisms lead to breast cancer by disturbing the DNA methylation and cause other afore mentioned health conditions by increasing homocysteine level. In people who have these altered MTHFR genes, additional folate intake might reduce their risk of developing these diseases. In future more research should be done on *MTHFR* gene alterations and how it is related to these health issues. This will help in developing specific and improved treatments for treating these conditions. Further research should also try to improve the activity of MTHFR enzyme in people who have altered MTHFR genes.

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