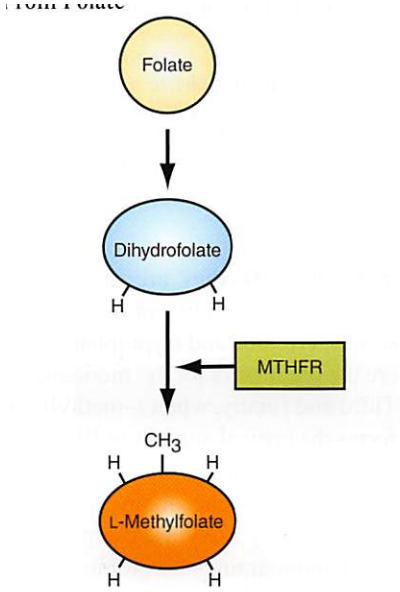
About Folic Acid, MTHFT & You

Folic Acid is a B-Vitamin (B-9). Our body absorbs it, but then in order to use it, the body must change it. This change is called Methylation.



Methylation is the process of adding one carbon and three hydrogens which are attached to it. This addition of the methyl group to the Folic Acid is accomplished by an enzyme called MethyleneTetraHydroFolate Reductase. Luckily there is an abbreviation for this MTHFR. Enzymes are made of protein and they make reactions happen easier. This enzyme is made from DNA as all enzymes are. The (chromosomal) DNA that we inherit comes 50% from our mother and 50% from our father. So each gene has two different versions one from each parent. Some people have a gene that codes for a slower enzyme. The name of this variation (Single nucleotide polymorphism) is C677T (there's also another variation called A1298T but it is less influential so we won't discuss it). Now because each of us have two genes for the MTHFR enzyme, that means we can have one of three possible combinations:

1) two normal genes
2) Two slow genes or
3) one normal and one slow.

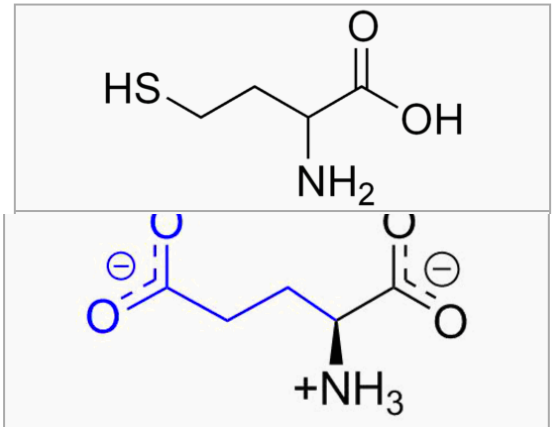
If we have one of each it is called heterozygous. If we have two normal then we can absorb folic acid and convert it into methyl folate without a problem. But people who have of one of each, only convert folic acid about 67% as fast as normal people. Those who have <u>two</u> abnormal genes process folic acid 35% as fast which is much much slower.

Now what happens if a person has two of the abnormal genes and does not process folic acid is fast as other people?

This brings up all of the uses in the body for methylFolate

1) methylFolate is used to get rid of a toxic substance that builds in the blood called Homocysteine. If we don't get rid of homocysteine and it builds up, this can cause many problems. In fact the American Heart

Homocysteine



Association now lists Homocysteine as equally important risk factor for heart disease as smoking and cholesterol. So homocysteine can create problems with the vessels in the body. Homocysteine can act as a fake neurotransmitter in the brain (imitating glutamate) creating irritability. Homocysteine can reduce the size of blood vessels constricting them which leads to a reduction in blood flow to the brain(Not a good thing).

2) methylFolate is an important factor in the production of neurotransmitters in the brain. These are the chemicals which allow communication from one brain cell to another.
The three neurotransmitters that are most affected by methylfolate are: dopamine, norepinephrine, and serotonin. Dopamine is the neurotransmitter involved in focus concentration and a feeling of reward. If dopamine is low for any reason a person may feel that life is not rewarding they may have difficulty concentrating and paying attention. Norepinephrine is the neurotransmitter that our brain uses to turn up the level of alertness. When we're sleeping norepinephrine is lower and when we're awake norepinephrine is higher. When we have anxiety that is related to sudden discharges or bursts of norepinephrine release. Serotonin is the neurotransmitter involved in confidence and good mood. If serotonin is low people feel anxiety and depression. So methylFolate has an effect on three of the most important neurotransmitters in the brain and when methyl folate is low and these three neurotransmitters are not made in sufficient quantities a person can feel very bad. This bad feeling can appear as depression, anxiety, irritability, insomnia, lack of patience and difficulty focusing or concentrating.

3) methylFolate is involved with the placement of methyl tags onto our chromosomes. These tags tell the body which genes to use and which genes not to use (epigenetic). This allows us to learn from our experience. If we don't have enough methylFolate we have a tendency to make the same mistakes over and over again. This can be as simple as missing an exit on the highway or marrying the wrong kind of person over and over again. Learning from our mistakes is a very important thing.

So if a person finds out that they have two genes for the slow version of MTHFR, what should they do? There is a version of Folic acid called methylFolate which can be prescribed for purchased over-the-counter. The prescription version is called Deplin, is a 15 mg orange capsule or tablet. The generic is a 15mg orange tablet. One can also purchase methyl folate on Amazon.com it just is a lower dosage (1mg).

After about three days taking methylFolate, a person with two of the C677T mutation will notice an improvement in mood, clarity of thought, better energy and more patience. There are also implications for that person's children. Any parent that has two of this gene will give one of them to their children so their children will either be heterozygous with one good and one bad gene, or homozygous that is 2 of the slow genes. This can be easily tested for at any lab. The doctor only needs to write MTHFR are on a lab slip and the lab will return the genetic status of the individual. This is a test that only needs to be done once because a person's genes do not change during their lifetime.