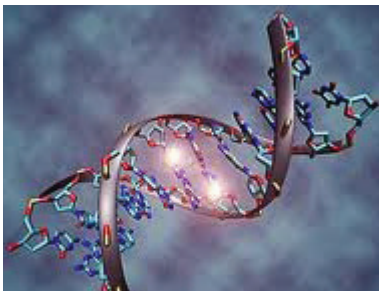

METHYLATION

WHAT IS METHYLATION?

Simply put, methylation is a chemical reaction that occurs in every cell and tissue in our body. Chemically speaking, methylation is the process of adding methyl groups to a molecule. (A methyl group is a chemical structure made of one carbon and three hydrogen atoms.) Since methyl groups are chemically inert, adding them to a protein (the process of methylation) changes how that protein reacts to other substances in the body, thus affecting how that protein behaves. Enzymes, hormones and even genes are proteins and the process of methylation affects them all.

In some ways, methylation of proteins helps the body detoxify. For example, the methylation process helps convert the toxic amino acid (homocysteine) into a beneficial amino acid (methionine). If your body cannot methylate properly, toxins build up in your bloodstream and will eventually cause disease.

Another role of methylation is to help the enzymes in our bodies work efficiently. Enzymes are proteins that act like switches for chemical reactions – they initiate very important processes in every cell and tissue. In a similar way, methylation affects our genes, which are also made up of proteins. In fact, methylation can turn genes on or off, which can be good or bad for our health, depending on the gene.

Some nutrients affect the process of methylation quite dramatically – methyl donors (nutrients like folate and choline) actually donate methyl groups to proteins and methylating factors (nutrients like vitamin B12 and zinc) helps this process along by monitoring specific methylation reactions. How well your body "can methylate" is important to your overall health.

WHAT IS MTHFR AND HOW IS IT RELATED TO METHYLATION?

MTHFR (methylenetetrahydrofolate reductase) is an enzyme that converts folic acid into usable form that our bodies need. It is a key enzyme in an important detoxification reaction in the body – one that converts homocysteine (toxic) to methionine (benign). If this enzyme is impaired, this detoxification reaction is impaired, leading to high homocysteine blood levels. Homocysteine is abrasive to blood vessels, essentially scratching them, leaving damage that causes heart attacks, stroke, dementia and a host of other problems.

Additionally, when the enzyme MTHFR is impaired, other methylation reactions are compromised. Some of these methylation reactions affect neurotransmitters, which is why impaired MTHFR activity is linked with depression. Inefficiency of the MTHFR enzyme is also linked to migraines, autism, fertility, cancer and birth defects, all of which depend on proper methylation.

WHAT IS THE MTHFR GENE?

There is a gene called the MTHFR gene that basically controls how well this enzyme works. A simple blood test can tell you if you have variant copies of this gene.

IF I HAVE VARIANT COPIES OF THE MTHFR GENE, WHAT CAN I DO?

If the MTHFR enzyme is inefficient, you can compensate for your body's inability to methylate efficiently since this biological process is dependent on several B vitamins. You may simply need more B vitamins than someone without a variant copy of this gene, such as vitamin B6, B12 (methylcobalamin) and the active form of folate (5-methyl tetrahydrofolate). Other methyl donors such as SAMe and trimethylglycine may also provide benefits. If you have a defective copy of the MTHFR gene, it is important for you to monitor your homocysteine level as well. Fortunately, lowering homocysteine can often be done with the nutrient supplements listed above.

Determining what copies of the MTHFR gene you have gives you the ability to compensate accordingly. The old paradigm that we are simply at the mercy of our genes is now challenged. Genetic testing empowers you to take control, launching you into a new age of truly individualized healthcare.

WHAT ARE THE POSSIBLE GENOTYPES?

677 - CC, CT, or TT

- CC - homozygous normal
  - Approximately 45% of the population
  - No increased risk associated
- CT - one variant copy
  - Approximately 45% of the population
  - Some reduced enzyme activity, but not alone associated with increased risk.
- TT - two variant copies
  - Approximately 10% of the population
  - Increased risk for hyperhomocysteinemia and associated complications

1298 - AA, AC, CC

- AA - normal homozygous
- AC or CC - one or two variant copies
  - Approximately 30% of the population
  - Not associated with increased risk
  - Associated with increased risk if found together with a 677 variant.

ASK YOUR DOCTOR TODAY ABOUT SPECTRACELL'S MTHFR GENOTYPING