Autism Nutrigenomics Treatment

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The Methylation Pathway

Why does methylation make you "healthy and human?" Methylation is responsible for many of the most complex and vital undertakings throughout the body. This intricate process occurs mainly in each cell as well as the liver and the fluid supplying the brain yet impacts every system in the body. It is a rare find indeed; a multi-tasking marvel. Methylation helps determine who we are, what we look like, and how we behave yet even more importantly, it is central to our physical, emotional, and mental wellbeing. Without methylation, we could not survive, which makes this pathway the perfect cycle to focus on in understanding autoimmune and neurological diseases such as multiple sclerosis, seizure disorders, dementia, Lou Gehrig's, chronic fatigue syndrome, lupus, fibromyalgia, depression, anxiety, and autism spectrum disorders.

What are methyl groups & why should I care about them?

Lets get the mind-numbing part out of the way first so we can discuss this in everyday terms. Methylation begins with a methyl group, which is stuck together with a carbon and three hydrogen atoms, although we will simply call these tags. These tags are like passes or work orders so that as "methylation" begins in any cycle, each department head passes on a work order so that each worker, such as an amino acid, DNA, and other proteins or enzymes are now methylated. Although we go on about our lives completely unaware of this elaborate process, methylation is responsible for making, maintaining, and repairing DNA, which is your genetic code. You don't need to fully understand genetic code in order to understand the implications here. If you cannot create and mend what makes you distinctively you, there are going to be serious problems. Methylation regulates the switching on and off of these genes. This is crucial for several reasons, as many of us have more than a few less than desirable variations, particularly cancer causing genes. Moreover, this system also silences virus, which is the reason your healthcare provider may tell you that stress contributed to your illness. The beauty of this system is that when optimally functioning, methylation keeps the less wanted genes switched off while it keeps the best genes switched on so that the system runs effectively. This is known as gene expression, and cancer and birth defects are an excellent example of where this process has gone awry.

What are those busy looking cycles?

There are individual points within the methylation pathway known as cycles. Each cycle has a specific duty and is designed much like a well-run Fortune 500 company. Each cycle has a chief operating officer (CEO), executives, employees, and work orders (tags), known as methyl groups. The CEO directs the cycle and delegates tasks to each department's executives as he or she makes the rounds. Oftentimes, the executives act as the cycle's enzymes and pass on work tags (methyl groups), to each team of employees whether they are chemicals, proteins, or DNA workers. However, there are times when departments or stations will provide these work tags as well. Ultimately, once the senior executive has assigned the work orders, handed over the tags, and parted with a handshake (methylation), the jobs are carried out. And just as any

company has a specific process for accomplishing tasks, the methylation cycle has specific steps necessary for beginning, carrying out, and finishing the job. Don't let the chemistry names and processes intimidate you. When you review the "simplified" diagram, remind yourself that every cycle is merely the factory or company that each CEO leads. The executives meet with the employees to pass on the work orders and once they hand them over and leave with a handshake, they are methylated. Though this is an exceedingly simplified illustration of the methylation process, it includes the major elements of this biochemical pathway.

Why is methylation so important?

Our nervous system is intimately linked with the methylation process so that nerve function is highly dependent on proper methylation. You may have all the messengers your body requires yet if the proteins making each nerve's insulation aren't methylated, you won't have proper communication between the nerves. This is similar to having frayed electrical cords with highly vulnerable, exposed wires and is the impetus for many of the symptoms of Autism, CFS, and MS. The breakdown leads to faulty or incomplete nerve transmission that leads to physical, emotional, and behavioral changes. Still, methylation goes well beyond nerve transmission and controlling the on/off switch for the genes; it strategically controls the production and break down of neurotransmitters (NT), which are the chemical messengers or "neuro talkers" in your brain and nervous system. NT's are simply chemicals that allow brain and body cells to talk to each other. They work in a synchronized fashion so that those in the nervous system are able to communicate with the immune cells, one of the most powerful defenses against infection and disease. Think of this as a smoke detector or carbon monoxide alarm that should be in every home and workplace. Just as a malfunctioning smoke alarm can lead to serious danger and even death, if neuro-talkers are unavailable or unable to transfer the messages, your nasty cold can more easily become pneumonia or meningitis. This partially explains why some catch every cold of the season when others are rarely ill. You must have an efficient communication system in place for sounding the alarm as well as sending messages throughout the body.

Methylation also mobilizes fats and cholesterol so that they can be processed and removed from the body without sticking to organs and clogging up blood vessels. Many adults will develop high cholesterol at some point in their lives but are cholesterol lowering medications always the answer? Although some would certainly require such drugs, what if we improved the ability of the methylation cycle to simply process these fats and efficiently remove them from the body? Ultimately, an effective methylation system removes fat and cholesterol that would otherwise lead to heart attacks, strokes, high blood pressure, diabetes, and a newly emerging disorder known as fatty liver disease.

What else does methylation do?

This pathway's significance is virtually endless! Methylation regulates hormone function such as estrogen and testosterone. When one considers that high estrogen levels may lead to breast cancer whereas low testosterone levels may lead to prostate cancer, this turns out to be a vital undertaking rather than simply useful for mood stability. Methylation also regulates histamine levels, a critical hormone often over-expressed in allergic reactions as well as in those with

seasonal allergies, eczema, asthma, and/or anaphylactic reactions. Outcomes may range from mild symptoms of sneezing and congestion from animal dander or pollen to life-threatening and even fatal reactions from bee stings or eating simple foods such as peanuts or shellfish. Methylation also repairs proteins throughout the body, which is critical for function. One such protein, hemoglobin, is an indispensable part of your red blood cell that delivers oxygen throughout the body while carrying waste products back for disposal. Even more importantly, the process known as DNA Methylation involves attaching work orders to our genetic code in order to gives each cell its' job description so that one cell is instructed to be a liver cell while another will become a brain cell. This is made possible due to the methylation of RNA, a chemical messenger between cells that is instrumental in cell identity and without which, we might be an amorphous blob of tissue as all of our cells would all be exactly the same. Methylation even impacts what goes in and comes out of each cell by making the shell, or cell membrane, more accessible. This allows each cell to fine-tune its needs by adjusting the flow of minerals, such as sodium and potassium, which are also crucial for sending and receiving messages. And finally, methylation provides a reason behind why identical twins, which have identical genes, may suffer from entirely different diseases. This process also explains why you might become seriously ill after a chemical exposure while your spouse or neighbor doesn't seem to have any problems at all.