Epigenetics/methylation and Metabolic Individuality

One of the most important tenets of Functional Medicine is the concept of biochemical individuality, a concept first proposed in the 1940s by Roger Williams, discoverer of Vitamin B5. Biochemical individuality, the idea that each person has a unique biochemical fingerprint, led to an understanding that common ailments such as depression and anxiety arise from multiple causes. This was a challenge to conventional medical thinking and diagnosis, which assumed that the same disease in different patients must have the same cause. It is now increasingly understood that in fact we may come to this world with certain individual predispositions toward certain ailments. Our unique predisposition is explained by the new science of epigenetics.

While our genetic material gives us the blueprint for our physical existence, it is our unique epigenetic character that determines when and how the genes are switched on and off in response to environmental cues. This innate profile would explain, for example, why identical twins living in different environments many not even look alike. Epigenetics studies alteration in gene expression without any change in genetic material across generations and within one's own life based on environmental influences such as diet, stress, and lifestyle. It is perhaps the most fundamental way by which we acquire our biochemical individuality, since we actually share more than 90% of our genetic material with the field mouse.

Methylation is one of the best studied epigenetic mechanisms. It is the action of methyl molecules on our genes, proteins, fatty acids, and other macromolecules. At our conception we inherit our genetic material from our parents. But what happens to our genetic inheritance is not fixed in stone. Our global methylation status is already determined when we are born, but it continues to be affected by our life history. It is now known that our methylation status could predispose us to diverse range of diseases such as cancer, PTSD, depression, autoimmunity, schizophrenia, migraine, addiction, and many more.

Our epigenetic status is a dynamic process subject to modification by environmental influences. Even if we are lucky to have good genes that potentially are protective of our health, such factors as diet, stress, and toxins can influence how our genes are expressed. That influence is mediated via methylation and some other epigenetic mechanisms that are not yet well understood.

We can now test our methylation status by simple blood work that shows if we are high (hypermethylator) or low (hypomethylator), or normal. It allows us to better design diets that would fit our genetic needs. It can help us by unraveling what is the best type of diet for nourishing our genes. It can tell us what kind of mechanism is underlying our unique form of depression or anxiety disorder. It can tell us why some of us are more prone to alcohol addiction than others. It can tell us why someone with depression could tolerate Prozac, while the next person could become suicidal on it.

Once it is decided what our global methylation status is, not only our preferred diet could be decided, but also what kind of supplements we should avoid or take in order to better support our health and longevity. The right choice depends not only on diagnosing an illness, but also on knowing whether the patient is a hyper- or hypomethylator.

For more information about methylation see:

https://www.youtube.com/watch?v=_nMcXIoV1VM

https://www.youtube.com/watch?v=W14kkO61Ano&list=PL6eIKiNedVsdgXK_U5BeccDZ9VeExEV4O