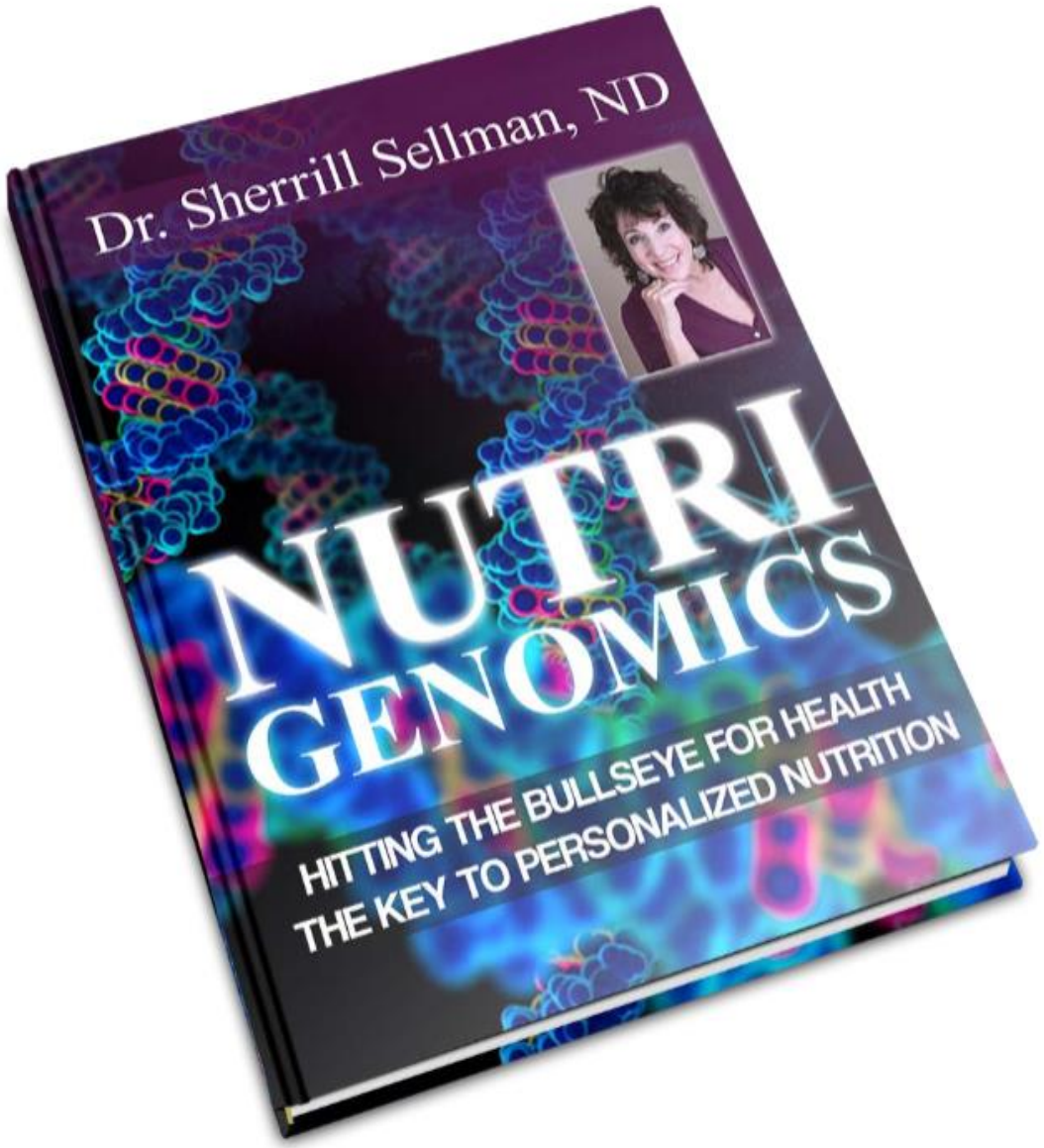
Dr. Sherrill Sellman, ND

NUTRI GENOMICS

HITTING THE BULLSEYE FOR HEALTH
THE KEY TO PERSONALIZED NUTRITION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CONTENT

NUTRIGENOMICS:

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by **Dr. Sherrill Sellman, ND**

Blame it on the genes! For the past 50 years we have been told that our inherited genetic blueprint was the ultimate dice game that Life randomly rolled out for us. For better or worse, we were stuck with those genes.

We have all heard people say: "Cancer [or diabetes or depression or heart disease, etc.] is in my family genes." We believed that our genetic inheritance put the final stamp not only on our height, eye colour, disposition, habits, weight and predisposed illnesses but even the length of our life.

The gene theory taught us that organisms are hardwired in their genetic make-up, and that the environment has little if any influence on the structure and function of the genes. It has been an impressive and revered scientific theory. Fortunately for us, however, there is more to the story.

Rewriting Your Genetic Expression

The new revelations in science reveal that, in fact, we, influence and alter the expression of many of our genes in very profound ways. Rather than being hostage to our gene pool inheritance, we actually have the power to alter our genetic destiny in many ways.

This new buzzword in the field of genetic science is called epigenetics. It is now acknowledged that genes and DNA are not the final arbiters of our biology. The startling message of epigenetics is that our DNA is actually controlled by signals from outside the cell.

New discoveries have found a major flaw in what was once considered an immutable scientific truth. Dr Bruce Lipton, a world-renowned leader in cellular biology and quantum physics research, proved that our environment not our DNA shapes the development of our cells.

This new field of epigenetics allows each of us to influence how specific genes can be expressed. Although people enter the world with a particular genetic code, the epigenetic theory states that environmental influences determine whether gene expression is either activated or silenced.

According to Dr Lipton: "Recent advances in cellular science are heralding an important evolutionary turning point. For almost fifty years we have held the illusion that our health and fate were pre-programmed in our genes, a concept referred to as Genetic Determinacy. Though mass consciousness is currently imbued with the belief that the character of one's life is genetically predetermined, a radical new understanding is unfolding at the leading edge of science.

"Cellular biologists now recognize that the environment the external universe and our internal physiology and, more importantly, our perception of the environment directly control the

activity of our genes. The quantum physics behind these mechanisms provides insight into the communication channels that link the mind-body duality of our body and the external world."[1]

Epigenetic changes can be transmitted from one generation to another, which is rather faster than the evolutionary changes resulting from natural selection. Epigenetics turns on its head the conventional wisdom of genetic determinism, the belief that genes predetermine biological and behavioural traits.

The Environment and Our Genes

When it comes to our genes, we are all unique. The Human Genome Project tells us that we are 99 per cent different due to a number of gene variations. Simple genetic variations in humans account for three million changes alone.

What kind of signals can have an impact on our gene expression? They can include influences such as dietary choices, lifestyle factors, environmental exposures and even our thoughts and feelings. For instance, even though the common observation is that obesity runs in families, genetic research actually shows that the habits you inherit from your family are more important than the genes you inherit. Obesity genes account for only five per cent of all weight problems. So we have to wonder what causes the other 95 per cent of weight problems.

These are really important questions. The world of epigenetics empowers us with the answers, allowing us to alter our life and our world profoundly.

As it turns out, diet is one of the most studied environmental factors producing epigenetic change. Nutrients in food enter metabolic pathways and are transformed into molecules, which can "talk" to the body.

Dean Ornish, MD, Clinical Professor of Medicine at the University of California, San Francisco, and his colleagues recently published a landmark study, which demonstrated that comprehensive lifestyle changes would alter our genes. The results showed that a combination of improved nutrition, moderate exercise, stress management techniques and increased social support caused the expression of over 500 genes to be changed in only three months in effect, up-regulating or "turning on" health-promoting genes and down-regulating or "turning off" genes that promote heart disease, cancer, inflammation and oxidative stress.[2]

The study proved that not all the genes we are dealt are necessarily the genes we're stuck with. And, may I emphasise that all these changes occurred in just three months!

Another impressive study assigned two groups of adults; one ate a low glycaemic index (GI) diet, and the other ate a high glycaemic index diet.[3] (Carbohydrates which break down quickly during digestion and release glucose rapidly into the bloodstream have a high glycaemic index; carbohydrates which break down more slowly and release glucose more gradually into the bloodstream have a low glycaemic index.) The study found that, in just 12 weeks, the high GI diet group increased the activity of 62 genes that lead to disease. These genes activate your stress response, which lowers your immunity and causes damage to your cells. However, those on the low GI diet were found to have some rather astounding results. The low-carbohydrate diet decreased the activity of 71 disease-causing genes, including hormone-sensitive lipase, which is associated with a resistance to obesity.

One of the telltale signs of ageing is the length of our telomeres. They are found on the ends of our chromosomes and control how long we live. Older people with shorter telomeres have between three and eight times increased risk of dying from heart diseases and infectious diseases respectively. The rate of telomere shortening is therefore critical to an individual's health and pace of ageing.[4]

One study found that telomerase, an enzyme that repairs and lengthens damaged telomeres, was affected by lifestyle changes. Smoking, exposure to pollution, a lack of physical activity, obesity, stress and an unhealthy diet increased oxidative burden and accelerated the rate of telomere shortening. To preserve telomeres and reduce cancer risk and the pace of ageing, the opposite was also discovered. The study found that a diet which included antioxidants, fibre, soy protein and healthy fats (derived from avocados, fish and nuts) as well as staying lean, active, healthy and stress-free through regular exercise and meditation preserved telomere length.[5]

This was the first study proving that an intervention can increase telomerase and thus telomere length. This stunning discovery proved that we have the power literally to turn back the clock.

It turns out that every forkful of healthy food, every step on the treadmill and even every positive emotion will optimise a gene expression, turning up the good genes and turning down the bad ones!

A Strange Tale of Two Mice

In a classic experiment, scientists set out to see if they could change the fate of a genetically altered breed of mouse, known as the agouti mouse, so called because it carries a particular gene, the agouti gene. This gene gives the rodents yellow-coloured fur and makes them ravenous and prone to obesity, cancer and diabetes. The offspring of agouti mice are always identical to their parents. They are also yellow, obese and susceptible to life-shortening diseases.

However, in this experiment, the progeny looked very different. These young mice were slender and brown. Moreover, they did not display their parents' susceptibility to cancer and diabetes and lived to a ripe old age. The effects of the agouti gene had been virtually erased.

Remarkably, this transformation was achieved without altering a single letter of the mouse's DNA. The only thing that changed was the diet fed to the mothers. Starting before conception, a test group of mother mice was fed a diet rich in methyl donors, small chemical clusters that can attach to a gene and turn it off. These molecules are common in the environment and are found in many foods, including all cruciferous vegetables, onions, garlic and beets, as well as supplements containing folate. The methyl donors influenced the developing embryos' chromosomes and worked their way onto the critical agouti gene. The mothers passed along the agouti gene intact to their children, but due to their methyl-rich diet they had added a chemical switch that silenced the gene's deleterious effects.

Genes themselves need instructions for what to do, and where and when to do it. These instructions are found not in the letters of the DNA itself but on it, in an array of chemical markers and switches known collectively as the epigenome which lie along the length of the double helix. These epigenetic markers and switches in turn

help switch on or off the expression of particular genes. Think of the epigenome as a complex software code, capable of inducing the DNA hardware to manufacture an impressive variety of proteins, cell types and individuals.

More and more, researchers are finding that an extra bit of a vitamin, a brief exposure to a toxin, even an added dose of mothering can tweak the epigenome and thereby alter the software of our genes in ways that affect an individual's body.

According to Dr Randy Jirtle, the scientist who designed the landmark agouti mice experiment: "Epigenetics is proving we have some responsibility for the integrity of our genome. Before, genes predetermined outcomes. Now everything we do everything we eat or smoke can affect our gene expression and that of future generations. Epigenetics introduces the concept of free will into our idea of genetics."[6]

The new science of epigenetics rewrites the rules of disease, heredity and identity. In order to learn the language of this new science of epigenetics, it is important to learn a few key terms.

UNDERSTANDING GENES 101

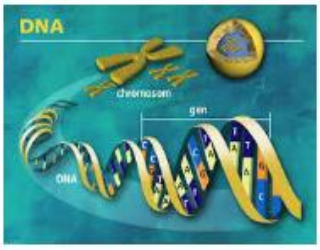
Genes determine what features or qualities we have, and these are called traits. Each person has the same set of genes—about 20,000 in all. However, we all have a different combination of traits that make us unique. Traits can be physical, such as our height or eye colour. They can also be behavioural or relate to our chances of developing certain health conditions.

The differences between people come from slight variations in these genes. For example, a person with red hair doesn't have a "red hair gene" and a person with brown hair doesn't have a "brown hair gene". Instead, all people have genes for hair colour, and different versions of these genes dictate whether someone will be a redhead or a brunette.

Your body contains 50 trillion tiny cells, and almost every one of them contains the complete set of instructions for making you. These instructions are encoded in your DNA, deoxyribonucleic acid.

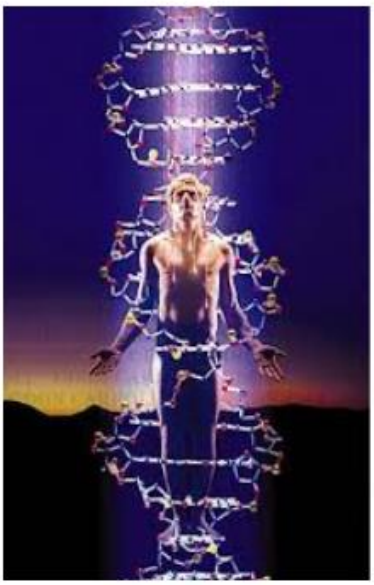
DNA is a long, ladder-shaped molecule. Each rung on the ladder is made up of a pair of interlocking units, called bases, that are designated by the four letters in the DNA alphabet: A, C, G and T (adenine, cytosine, guanine and thymine). A always pairs with T, and C always pairs with G.

The long molecules of DNA in your cells are organised into pieces called chromosomes. Humans have 23 pairs of chromosomes in every cell. Each parent contributes one chromosome to each pair.



Chromosomes are further organised into short segments of DNA called genes. If you imagine your DNA as a cookbook, then your genes are the recipes. Written in the DNA alphabet—A, C, G, T—the recipes tell your cells how to function and what traits to express. For example, if you have curly hair it is because the genes you inherited from your parents are instructing your hair follicle cells to make curly strands.

The combination of all your genes together is called your genotype. Your genes interact with the environment to affect your physical appearance, and this outward expression of your genes is known as your phenotype. For example, identical twins share exactly the same genotypes but they may appear phenotypically different, looking less and less identical if they experience different environmental factors such as diet, climate or stress.



THE LANGUAGE OF SNPS

Your body is constantly making new cells. To do this, cells must make a copy of the DNA contained in them. Sometimes they make small errors during this process, similar to a typographical error. These errors are called single nucleotide polymorphisms, or SNPs (pronounced "snips"), and they lead to variations in the DNA sequence at particular locations.

SNPs are the most common type of genetic variation among people. While many SNPs don't seem to have any obvious effects, there are others that can influence significant differences in your health or physical appearance. They may also help predict your risk of developing certain diseases, your response to different medicines and your susceptibility to environmental factors such as toxins. Specific SNPs can be modified through diet, nutritional supplementation and lifestyle.

So, how can the average person learn more about which of their SNPs are potentially increasing their risk of disease? And, even more importantly, how can they know what foods, supplements and other lifestyle factors will optimise their health and rejuvenation?

The answer lies in the emerging science of nutrigenomics and nutrigenomic testing.

Nutrigenomics and Nutrigenomic Testing

The future of health care will be determined by personalised medicine. A one-size-fits-all diet or lifestyle no longer makes sense in the light of epigenetics. As it turns out, it depends on how you learn to talk to your unique genes through the language of diet, nutrition, exercise and other lifestyle factors. This is the science of nutritional genomics nutrigenomics.

According to the Center of Excellence in Nutritional Genomics: "The science of nutrigenomics seeks to provide a molecular understanding for how common dietary chemicals (i.e., nutrition) affect health by altering the expression and/or structure of an individual's genetic makeup. Just as pharmacogenomics has led to the concept of 'personalized medicine' and 'designer drugs', so will the new field of nutrigenomics open the way for 'personalized nutrition'? In other words, by understanding our nutritional needs, our nutritional status, and our genotype, nutrigenomics should enable individuals to manage better their health and well-being by precisely matching their diets with their unique genetic makeup."[7]

Learning the language of your specific gene expressions will provide the insight into how you can best support and optimise your health with gene-targeted nutrition, diet and key lifestyle factors.

Following our own personalised nutrigenomic road map has been made possible through nutrigenomic testing. This 21st-century diagnostic test actually looks at a number of genetic variants (SNPs) that can have an impact on how effectively your genes are able to receive and carry out vital instructions that affect key physiological functions.

Nutrigenomic testing looks at your genes in a number of important categories. The following areas are commonly available in most nutrigenomic tests:

Lipid Metabolism: The selection of the genes involved in lipid metabolism is targeted at genes involved in fat absorption and fat transport as well as fat conversion and degradation. Dyslipidemia can have various genetic causes which are influenced by nutrition, alcohol, smoking and also gender-specific effects. A practical example from this profile allows a person to "turn down" the TNF-alpha gene involved in inflammation with omega-3 fatty acids.

High Blood Pressure Risk: High blood pressure or hypertension is the leading cause of strokes and heart attacks. Dietary interventions to control high blood pressure are beneficial when they match your gene variant.

Phase I and Phase II Liver Detoxification: Having an efficient detoxification system, which removes harmful toxins and compounds, is essential to gene repair. This detoxification process occurs in two phases, I and II, whereby harmful molecules are converted to less-dangerous ones, which can be removed from the body. Looking at the genes in this panel will provide critical guidance regarding how well your detoxification pathways are functioning, especially if you have the SNPs which show impaired clearance of oestrogens (a risk factor for breast and prostate cancer) and other environmental carcinogens.

Oxidative Stress: Oxidative stress is a major cause of premature ageing and cell death. This panel assesses the major enzymes involved in anti-oxidative defence and thus protection from DNA damage.

Methylation and Homocysteine Risk: The ability to metabolise folic acid properly is critical for prevention of strokes, blood clots, migraines, autism, infertility, cancer, birth defects, schizophrenia, etc. It directly affects DNA repair and the immune system. Many people have up to a 50 to 70 per cent impaired ability to metabolise folic acid properly, which increases their vulnerability to many physical and mental health conditions.

Osteoporosis Risk and Vitamin D: The prevention of osteoporosis involves making changes to lifestyle and nutrition as well as reducing inflammation. This panel identifies the capacities of calcium uptake, the ability to metabolise vitamin D, and the predisposition to enhanced inflammatory response.

Inflammation: Your genes are a source of inflammation. This panel addresses specific genes that can induce inflammation, a significant risk factor for most chronic illnesses.

Diabetes Risk: This analysis covers your personal genetic risk assessment for diabetes type II.

Weight Management: This is a panel of genetic variants whose activities are modifiable by nutrition. This enables a gender-specific diet targeted either to suppress or to enhance gene or enzyme expression.

Heavy Metal Binding: There are genetic variations determining how effective the body is in releasing heavy metals. Some gene types tend to bind heavy metals, which pose a great risk to your health and requires specific detoxification protocols for the long term to ensure proper removal of heavy metals from the body.

The test itself is incredibly simple. It requires only about of saliva, which is collected in a vial or as a swab provided in the collection kit. The kit is then sent to the lab for testing. This test is only available through qualified health practitioners who are trained to interpret the results and design a gene-appropriate health protocol for each patient.

Who can benefit from nutrigenomic testing? The truth is, just about anyone at any age. For someone healing a chronic illness such as cancer or diabetes, this test offers invaluable clues to support your body's healing processes. Children, even infants, can be tested so that their parents can understand how best to support

their children nutritionally. Athletes also use this test to get the edge in their performance.

If your goal is to design a rejuvenation protocol, this test is certainly one of the most important tests you could ever have to learn the specific pieces of your health puzzle.

A Personal Journey With My Genes

Curious about nutrigenomics, I decided to do the test myself. The test showed me how to incorporate specific nutrition to up-regulate my particular genes that were in need of some nutritional fine-tuning. For example, in my case, one of my gene variations has an impact on the production of an enzyme that plays a role in my body's ability to do DNA repair. I learned that I was 70 per cent deficient in the important enzyme. Without proper DNA repair, I would be at serious risk for numerous diseases, especially heart disease and cancer. With this information, I now take a special form of folic acid called 5-methylfolate (my body cannot metabolise the common form of folic acid).

My test revealed that I needed to be on a low-carbohydrate diet to maintain my ideal weight. With my SNP profile, I would be piling on the extra fat in no time if I included many carbohydrates in my diet. So, following a low-carbohydrate diet is essential if I want to keep my girlish figure and steer clear of metabolic syndrome and diabetes. My gene profile also revealed that a low-carb diet would help to silence my diabetes genes.

I discovered that the best support for my lipid metabolism was a diet containing about 25 per cent of my daily caloric intake from olive oil and coconut oil. That was a revelation, since my diet usually was mostly polyunsaturated oils from plant-based oils such as flax seed oil and sesame seed oil. While these oils are appropriate for some gene types, for my type they can increase inflammation and cause a high LDL profile.

Another critical piece information revealed the ability of my cells to make glutathione. Glutathione, a molecule made by every single cell, is critical for liver detoxification and for combating inflammation and free radical damage. I learned that several of my glutathione gene variants were impaired. Low glutathione levels are a risk factor for cancers, diabetes, cardiovascular disease, autism, Parkinson's disease, Alzheimer's disease and heavy metal toxicity. I now know that I must add a glutathione support to my daily regime.

Vitamin D is certainly a superstar nutrient these days. The nutrigenomics test revealed that I had several SNPs, which actually make it more difficult for me to make my vitamin D hormone. With this knowledge, I now test my vitamin D levels regularly and take adequate vitamin D to ensure that I stay in optimal range. Low vitamin D levels have been associated with many types of cancer, low bone density, weakened immunity, depression, dementia and insulin resistance.

When it comes to the most effective exercise routine, the test clearly showed that my body does best with resistance training, not excessive aerobic exercise which exacerbates free radical production. So, marathons are clearly not in my future!

Another profound discovery was that fact that I was only 50 per cent efficient in releasing heavy metals from my tissues. Heavy metal toxicity contributes to a wide variety of chronic illnesses. I must support detoxification of heavy metals as an ongoing part of my nutritional program, which I had not been doing beforehand.

Precision for Your Health Choices

Through nutrigenomic testing, I found the specific nutritional and lifestyle road map to guide me along my highway of good health. It has taken all the guesswork out of designing my nutritional program. Rather than being confused with the latest diet or workout fad, I now know exactly the kinds of foods, supplements and even exercise that will support me to achieve my goal of getting younger and healthier as I get older.

I truly believe that the knowledge I gained from this test has profoundly altered my health destiny. Without this knowledge, I was heading for serious trouble, even though I thought I was doing everything just right.

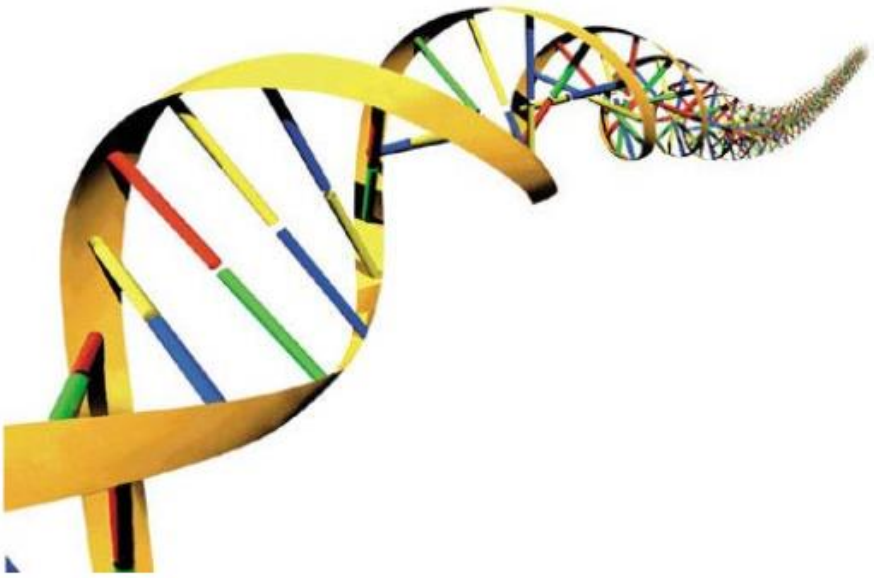
My health is now the best it have ever been. I really attribute this to implementing the information I learned from my Nutrigenomic test. I am so grateful that I committed to this test. (By the way, it is only necessary to do this test once in a lifetime.)

We live in a world with competing theories of diet, exercise and supplementation. There is no one size that fits all. The power of Nutrigenomic testing is that is goes beyond theories and fads to provide a very specific and individualised plan that will become the roadmap to good health for the long term.

There is no doubt that nutrigenomic testing allows each of us to hit the bull's-eye when it comes to designing our unique dietary and nutritional program. When you live in harmony with your genomic potential, you can optimise your health and longevity and minimise your risk of disease for a lifetime. The future of personalised nutrition is here now!

Dr. Sherrill Sellman, ND, a Naturopathic doctor (Board Certified in Integrative Medicine) is a best-selling author, international lecturer, health journalist, psychotherapist, host of a weekly radio show and contributing write for numerous health publications. www.whatwomenmustknow.com

Dr. Sherrill Sellman offers her Nutrigenomic Program which includes a comprehensive nutrigenomic test, a 90 minute follow-up phone consultation and a recommended nutrigenomic-specific supplement and dietary protocol.
https://whatwomenmustknow.com/products-page/consultations/nutritional-genomic-testing/



Each individual analysis contains:

- Recorded MP3 file of consultation
- Colored presentation of genetic results
- Explanation of genetic results
- Individualized dietary recommendations and recommendations on lifestyle, based on the individual's genetic makeup.
- Additional points of interest and information
- Graphs and data indicating the role of heritability
- Evaluate individuals response to the basic types of nutrients carbohydrates, saturated, monounsaturated and polyunsaturated fatty acids)
- Review of a number of important health factors, such as genetic predisposition to obesity, inadequate cholesterol, triglyceride and blood sugar levels, bone density, etc.
- Based on your genetic makeup, an assessment of many other features, such as metabolic characteristics, exposure to oxidative stress, and other factors that influence diet and lifestyle.
- Establishment of dietary guidelines and lifestyle guidance based on the findings from personal genetic makeup

Endnotes

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