

Genetic Biosciences For Improving the Quality of Life.

Healthy Aging Assessment for Robert Hoekstra

Bar Code #: 010300027435

What Does Your GeneLink's Healthy Aging DNA Assessment Measure?

GeneLink's Healthy Aging DNA Assessment looks for variations (SNPs) in 12 key genes that are very important in your body's overall health: specifically your genetic propensity for: Oxidative stress; Environmental challenges; Cardiovascular health; Detoxification; Immune health; Neurological health: Pulmonary health, Eye/Vision health & Bone health.

Understanding SNPs

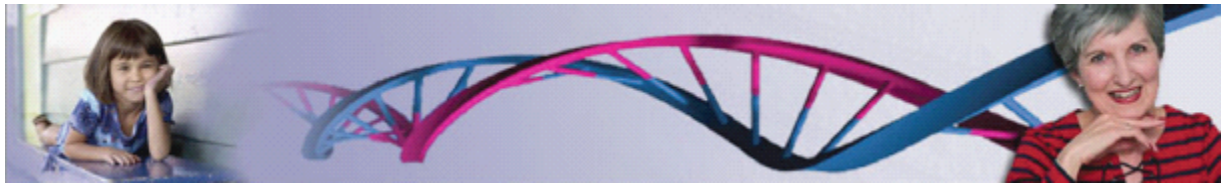
Small variations in DNA, called single nucleotide polymorphisms, or SNPs (pronounced "snips"), account for all human genetic differences - including how efficient we are at key biological processes. The GeneLink scientific and medical advisory board has developed tests for 12 different SNPs that are known to have an impact on the functioning of the body and that may lead to diminished health and wellness.

Gene Analyzed	General Description	Recommended Support Level
SNP: VDR (VITAMIN D RECEPTOR)	The strength of our bones is influenced by the VDR gene. In fact, among healthy people this one gene accounts for 75% of the entire genetic influence on bone density. ⁱ People with SNPs in the VDR gene tend to have lower bone mineral density than do those without these variations. ^{ii,iii,iv} SNPs in this gene may also influence young adult growth, ^v parathyroid hormone production, ^{vi} normal cell division, ^{vii} and blood sugar regulation. ^{vii}	ADDED SUPPORT + -
SNP: EPHX (MICROSOMAL EPOXIDE HYDROLASE)	Epoxides are toxic, highly reactive foreign chemicals present in cigarette smoke, car exhaust, charcoal-grilled meat, smoke from wood burning, pesticides, and alcohol. The body's way of dealing with epoxides is through the enzyme microsomal EPHX, which detoxifies these foreign compounds. Due to a SNP on the EPHX gene, people with lowered EPHX activity will have difficulty detoxifying harmful substances and thus be particularly vulnerable to their effects. ^{viii}	MAXIMUM SUPPORT + +
SNP: NQO1 (COENZYME Q10 REDUCTASE)	Free radicals are considered by many scientists to be involved in the aging process. The coenzyme Q10 reductase (NQO1) enzyme converts coenzyme Q10 (ubiquinone) to its reduced form, ubiquinol, which scavenges free radicals in the mitochondria and lipid membranes. ^{ix} Some individuals have a SNP in the NQO1 gene that slows the reduction of ubiquinone to ubiquinol, resulting in very low blood levels of this key antioxidant. Consequently, people with this SNP are at high risk of free radical attack. ^x Because NQO1 is also involved in the detoxification of compounds foreign to the body, a SNP in the NQO1 gene may cause aberrant cellular changes.	OPTIMUM GENETIC FUNCTION - -
SNP: SOD2 (MANGENESE SUPEROXIDE DISMUTASE)	The SOD2 enzyme is also involved in scavenging free radicals. However, SOD2 is focused on one particularly toxic type of free radical: superoxide. ^{xi} Since the superoxide radical is produced in abundance in all cells, it is the starting point for the free radical chain of production. SOD2 has the distinction of being the only enzyme in the mitochondria that can neutralize superoxide. ^{xii} Individuals with a SNP in this gene therefore, have a weak first line of defense against free radicals.	MAXIMUM SUPPORT + +
SNP: GPX1 (GLUTATHIONE PEROXIDASE 1)	The GPX1 antioxidant enzyme specifically scavenges hydrogen peroxide, a reactive oxygen species. GPX1 is a selenoprotein, meaning it incorporates selenium into its protein structure. ^{xiii} Therefore, how much GPX1 a person produces is dependent on his or her selenium level. ^{xiii} A SNP on the GPX1 gene can reduce a person's ability to utilize selenium. ^{xiv,xv} That means higher than normal selenium intake is needed to afford protection to hydrogen peroxide-sensitive tissues, particularly lung ^{xvi, xvii} and breast tissues. ^{xiv}	ADDED SUPPORT + -
SNP: MMP-1 (MATRIX METALLOPROTEINASE)	Collagen is the main component of cartilage, ligaments, tendons, and bone. It is constantly synthesized and broken down in an on-going cycle. MMP1, also known as collagenase, is an enzyme that breaks down collagen. People with a SNP in the MMP1 gene produce collagenase at an increased rate, which means their bodies may break down collagen faster than they can rebuild it. ^{xvi,xvii} These individuals will likely benefit from added support for collagen-rich structures such as the bones and joints.	ADDED SUPPORT + -

SNP: MTRR (METHIONINE SYNTHASE REDUCTASE)	<p>Homocysteine is a metabolite of the amino acid methionine. Research has shown it is important to control homocysteine levels in order to preserve cardiovascular health. ^{xx,xxi,xxii} One of the body's methods for keeping homocysteine levels in check is the MTRR enzyme, which transforms homocysteine back to methionine. ^{xxiii} When an individual has a SNP in the MTRR gene, their ability to clear homocysteine from the blood may be hindered. However, only certain population groups appear to be negatively affected by this SNP. ^{xxiii,xxiv,xxv}</p>	ADDED SUPPORT + -
SNP: MTHFR (METHYLENE TETRAHYDROFO LATE REDUCTASE)	<p>Like the MTRR enzyme, the MTHFR enzyme is responsible for reducing blood levels of homocysteine. People with a SNP in the MTHFR gene manufacture defective enzymes that can't clear homocysteine from the blood efficiently. Research has shown there is a direct association between a SNP in the MTHFR gene and elevated levels of homocysteine, ^{xviii} particularly in those with low levels of folate.^{xi}</p>	ADDED SUPPORT + -
SNP: TNF-ALPHA (TUMOR NECROSIS FACTOR-A)	<p>Inflammation is a response of the immune system to a perceived attack. While it is a helpful response in the short-term, if inflammation continues unabated, it can negatively affect the cells, tissues, and ultimately, the organs. TNF-ALPHA is a cytokine (a chemical messenger of the immune system) that plays a role in inflammatory processes. Individuals with a SNP on the TNF-ALPHA gene may have an over-reactive inflammation mechanism, which can negatively affect the joints, ^{xxvi} brain, ^{xxvii} lungs, ^{xxviii} and heart. ^{xxix}</p>	OPTIMUM GENETIC FUNCTION - -
SNP: PON-1 (PARAOXONASE 1)	<p>While it used to be thought that high cholesterol posed a health issue, in and of itself, it is now believed that cholesterol only becomes a problem once the cholesterol carrier, low-density lipoprotein (LDL), becomes oxidized (attacked by free radicals). The PON-1 enzyme attaches itself to high-density lipoprotein (HDL), which protects both HDL and LDL from oxidation. ^{xxx} Due to common SNPs in the PON-1 gene, blood levels of PON-1 can vary by a factor of 10 to 40-fold among different individuals. ^{xxxi,xxxii} Those with low levels of PON-1 have higher levels of oxidized LDL, which can lead to diminished cardiovascular health. ^{xxxiii,xxxiv}</p>	ADDED SUPPORT + -
SNP: CYP11B2 (ALDOSTERONE SYNTHASE)	<p>Maintaining blood pressure within the normal range is essential to a healthy heart. The CYP11B2 gene encodes an enzyme called aldosterone synthase, which plays a role in regulating blood pressure. A SNP on the CYP11B2 gene can decrease the ability of blood vessels to relax and constrict in response to changing demands for blood flow. ^{xxxv} (For example, extra blood flow is needed during exercise.) That inability of the vessels to respond properly can set the stage for cardiovascular issues down the road. ^{xxxvi}</p>	ADDED SUPPORT + -
SNP: APOB (APOLIPOPROTEIN B)	<p>Cholesterol is carried through the bloodstream on various lipoproteins: low-density lipoprotein (LDL), high-density lipoprotein (HDL), and very low-density lipoprotein (VLDL). Apolipoproteins make up the protein part of lipoproteins. One of the more researched apolipoproteins is apolipoprotein B (ApoB); it constitutes the protein component of LDL, the "bad" kind of cholesterol carrier. In fact, without ApoB, LDL cannot form. Because people with SNPs on the ApoB gene have higher ApoB levels, they experience moderate increases in total cholesterol, LDL cholesterol, and triglycerides, ^{xxxvii,xxxviii,xxxix,xl} as well as impaired glucose tolerance ^{xli} and increased blood lipid response after meals. ^{xlii}</p>	ADDED SUPPORT + -

Interpreting your Healthy Aging DNA Assessment results support level.

<p>No disadvantaged gene SNPs in this nutritional health area</p> <p>A GREEN test result (Homozygous Negative) predicts that you do not have the variant SNP and that the gene is functioning optimally to produce its specific enzyme, hormone, cytokine or structural protein. A comprehensive BASIC nutritional support for this area is added to keep the body functioning optimally.</p> <p>Optimum Genetic Function - -</p> <p>Homozygous Negative Neither chromosome carries the SNP</p>	<p>One disadvantaged gene SNP from one of your parents in this nutritional health area</p> <p>A YELLOW test result (Heterozygous Positive) indicates that you have one variant SNP and that the protein molecule expressing a specific enzyme, hormone, cytokin or structural protein is functioning less than optimally. ADDED nutritional support (SNPNutri nts™) for this ar a is added to keep the body functioning optimally.</p> <p>ADDED SUPPORT + -</p> <p>Heterozygou Positive One chromosome carries the SNP</p>	<p>Two disadvantaged gene SNPs from both of your parents in this nutritional health area</p> <p>A RED test result (Homozygous Positive) indicates that you have two variant SNP and that protein molecule expressing a specific enzyme, hormone, cytokine or structural protein is functioning minimally. As a result, it is important to have MAXIMUM nutritional support (SNPNutri nts™) for this area to keep the body functioning optimally.</p> <p>MAXIMUM SUPPORT + +</p> <p>Homozygous Positive Two chromosomes carry the SNP</p>
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