Practitioner Detailed Appendix

TOOLBOX GENOMICS

Nutrition Optimization

October 1, 2019

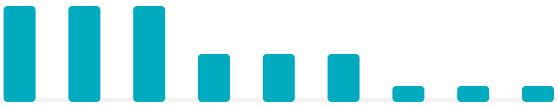
Demo Client

Kit #1234ABCD5678

Practitioner Report Key

1 Trait Impact Summary

A high level overview of which traits have the biggest impact based on our proprietary algorithm.



Impact Score	A potential impact of a variant type.
HIGH	Likely a large clinical impact
MEDIUM	Likely a slightly elevated clinical impact
LOW	Likely a low clinical impact

2 Variant Type

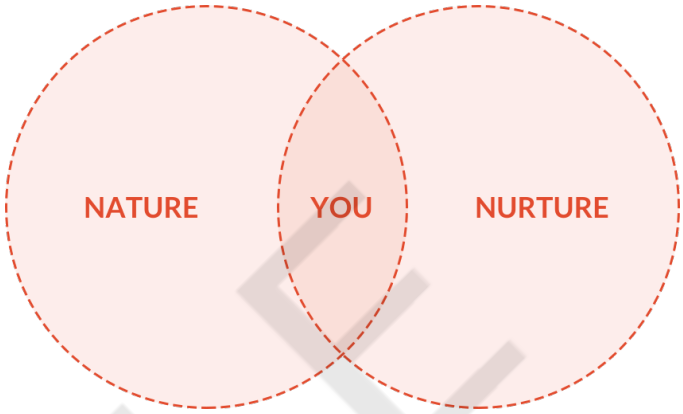
Genetic variants are the differences that make each person unique. In this report, variant refers to Single Nucleotide Polymorphisms (SNPs). + is the risk allele and - is the non-risk allele.

Variant Type	Definition
+/+	Both risk alleles present
+/-	One risk allele present
-/-	No risk allele present
+/U or -/U	Indeterminable allele
NR	Not Reportable, unable to determine variants present in the sample

3 Research Grade

The strength of the research after assessing for number of published studies, sample size of the population studied, degree of study replication, biological mechanism, and other factors.

Research Grade	Definition
***	High Research Validity
**	Medium Research Validity
*	Low Research Validity



UNDERSTANDING THE GENES

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, T, G and C. 'A' always pairs with 'T', and 'G' always pairs with 'C'.

Basic unit of heredity that is made of DNA and acts as instructions to make all body proteins. Humans have between 20,000 - 25,000 genes, half of which come from one's mother and the other half from one's father.

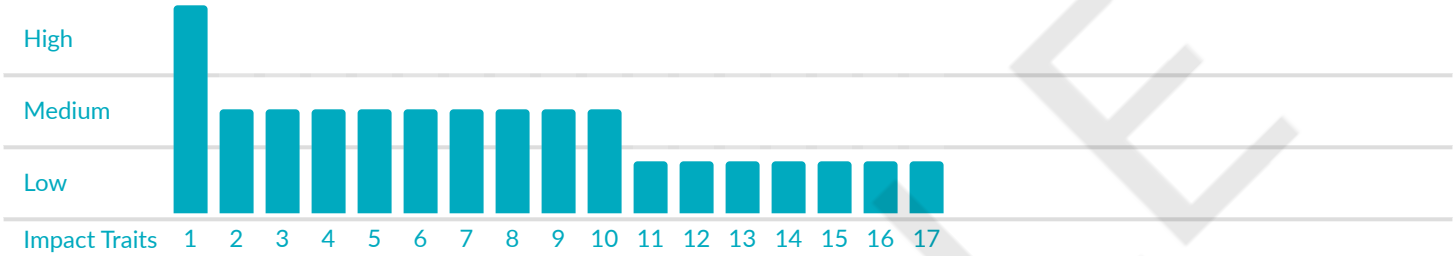
A SNP is a Single Nucleotide Polymorphism. DNA consists of 4 main building blocks (Adenine (A), Thymine (T), Guanine (G), and Cytosine (C)). In certain locations within DNA, one person may have an A, whereas another may have a G. This difference is often called a variant. This variant is a SNP. The rs number is a unique identifier used by researchers and databases to refer to specific SNPs. It stands for Reference SNP cluster ID.

Clinical Significance is the clinical or practical importance of a given SNP. Having a risk variant (+) for a particular SNP, increases one's predisposition to this clinical significance.

Disclaimer - This test is performed via DNA sequencing. As with all genetic testing with the highest possible standards, the data generated during the laboratory process will have a <99% sensitivity and specificity.

How These Traits Affect Your Client

This page provides a high-level snapshot of the clinical significance of each trait within this panel. The results are in two categories: traits that are ranked high, medium or low impact as well as traits for which there is an explicit result (i.e. categorical such as "yes" or "no"). At the end of this page are a summary of any non-reportable (NR) traits. The results for these traits are unable to be determined from the sample submitted. Recommendations are made for traits with high or medium impact only.



Impact Traits	Impact
1 Calcium	HIGH
2 Alcohol Metabolism	MEDIUM
3 Choline	MEDIUM
4 Folate	MEDIUM
5 Saturated Fat Response	MEDIUM
6 Vitamin A	MEDIUM
7 Vitamin B12	MEDIUM
8 Vitamin B6	MEDIUM
9 Vitamin C	MEDIUM
10 Vitamin D3	MEDIUM
11 CoQ10	LOW
12 Gluten Sensitivity	LOW
13 Lactose Intolerance	LOW
14 Magnesium	LOW
15 Omega 3	LOW
16 Selenium	LOW
17 Zinc	LOW

	Categorical Traits	Result	Learn More
1	Caffeine-Related Anxiety	Increased	
2	Iron	Normal	
3	Caffeine Metabolism	Slow	

Practitioner Detailed Appendix: Nutrition Optimization

Below is a summary of the genetic data that we test for in this Health Action Plan. Recommendations are given for traits with Medium and High Impact.

Traits are listed in order of trait impact. Please look at the Trait Impact Summary Report for more information.

Trait	Gene	SNP/RSID	Clinical Significance	Variant Type	SNP Impact Score	Research Grade	References (PMID)
Calcium	CASR	rs1801725	*Increased risk of calcium deficiency*	+/+	High	***	20705733, 25886283
Calcium	CASR	rs17251221	*Increased risk of calcium deficiency*	+/+	High	**	20705733
Alcohol Metabolism	ADH1B	rs1229984	*Increased risk for impaired alcohol metabolism*	+/-	Medium	***	28485404, 29972609
Alcohol Metabolism	ALDH2	rs671	*Increased risk for impaired alcohol metabolism*	-/-	Low	***	28485404, 28540979
Choline	PEMT	rs7946	*Increased risk of choline deficiency*	+/+	High	**	16816108, 28134761
Folate	FOLH1	rs61886492	*Increased risk of impaired folate metabolism*	+/+	High	**	18842806, 22918695
Folate	MTHFR	rs1801133	*Increased risk of impaired folate metabolism*	+/-	Medium	***	7647779, 19759169
Folate	MTHFR	rs1801131	*Increased risk of impaired folate metabolism*	NR	Not Reportable	***	20078877, 29644956
Saturated Fat Response	FTO	rs9939609	*Increased risk for higher BMI or obesity with high fat diet*	+/+	High	***	22049296, 22457394
Saturated Fat Response	FTO	rs1121980	*Increased risk for higher BMI or obesity with high fat diet*	+/+	High	***	22049296, 30021629
Saturated Fat Response	TCF7L2	rs7903146	*Increased risk for higher BMI or obesity with high fat diet*	+/-	Medium	***	21543200, 23497168
Saturated Fat Response	STAT3	rs8069645	*Increased risk for higher BMI or obesity with high fat diet*	-/-	Low	**	19776189

Trait	Gene	SNP/RSID	Clinical Significance	Variant Type	SNP Impact Score	Research Grade	References (PMID)
Saturated Fat Response	STAT3	rs744166	*Increased risk for higher BMI or obesity with high fat diet*	-/-	Low	**	19776189
Saturated Fat Response	APOA2	rs5082	*Increased risk for higher BMI or obesity with high fat diet*	-/-	Low	***	19901143, 24108135
Saturated Fat Response	STAT3	rs1053005	*Increased risk for higher BMI or obesity with high fat diet*	-/-	Low	**	19776189
Saturated Fat Response	MC4R	rs12970134	*Increased risk for higher BMI or obesity with high fat diet*	-/-	Low	***	27186233, 28081251
Vitamin A	BCMO1	rs7501331	*Increased risk of vitamin A deficiency*	+/-	Medium	**	19103647, 22113863
Vitamin A	BCMO1	rs12934922	*Increased risk of vitamin A deficiency*	+/-	Medium	***	22113863, 24346170
Vitamin A	BCMO1	rs6564851	*Increased risk of vitamin A deficiency*	+/-	Low	***	22113863, 24346170
Vitamin A	BCMO1	rs11645428	*Increased risk of vitamin A deficiency*	+/-	Low	***	19185284, 22113863
Vitamin B12	FUT2	rs1047781	*Increased risk of vitamin B12 deficiency*	+/+	High	**	22367966
Vitamin B12	FUT2	rs602662	*Increased risk of vitamin B12 deficiency*	+/-	Medium	***	28334792, 29445423
Vitamin B12	FUT2	rs601338	*Increased risk of vitamin B12 deficiency*	+/-	Medium	***	19744961, 28334792
Vitamin B12	TCN1	rs526934	*Increased risk of vitamin B12 deficiency*	+/-	Medium	***	25948668, 27901035
Vitamin B12	CUBN	rs1801222	*Increased risk of vitamin B12 deficiency*	-/-	Low	**	25948668
Vitamin B6	ALPL	rs1697421	*Increased risk of vitamin B6 deficiency*	+/+	High	**	25147783
Vitamin B6	ALPL	rs4654748	*Increased risk of vitamin B6 deficiency*	+/-	Medium	***	19744961, 21115529

Trait	Gene	SNP/RSID	Clinical Significance	Variant Type	SNP Impact Score	Research Grade	References (PMID)
Vitamin B6	ALPL	rs1780316	*Increased risk of vitamin B6 deficiency*	-/-	Low	**	25147783
Vitamin C	GSTM1	rs366631	*Increased risk of vitamin C deficiency*	+/+	High	**	19710200, 21813807
Vitamin C	SLC23A1	rs33972313	*Increased risk of vitamin C deficiency*	-/-	Low	***	20519558, 23737080
Vitamin C	SVCT1	rs4257763	*Increased risk of vitamin C deficiency*	-/-	Low	**	20588054
Vitamin D3	CYP2R1	rs10741657	*Increased risk of Vitamin D3 deficinecy*	+/+	High	***	20541252, 30120973
Vitamin D3	GC	rs4588	*Increased risk of Vitamin D3 deficinecy*	+/-	Medium	***	20541252, 27625044
Vitamin D3	GC	rs2282679	*Increased risk of Vitamin D3 deficinecy*	+/-	Medium	***	20541252, 29937467
Vitamin D3	DHCR7	rs12785878	*Increased risk of Vitamin D3 deficinecy*	-/-	Low	***	20541252, 29937467
CoQ10	NQO1	rs1800566	*Increased risk of CoQ10 deficiency*	-/-	Low	**	21774831, 28883796
Gluten Sensitivity	HLADQ2.5	rs2187668	*Increased risk for gluten sensitivity*	-/-	Low	***	24876751, 27449795
Gluten Sensitivity	HLADQ8	rs7454108	*Increased risk for gluten sensitivity*	-/-	Low	***	24876751, 27449795
Lactose Intolerance	MCM6	rs4988235	*Increased risk for lactose intolerance*	-/-	Low	***	11788828, 15114531
Lactose Intolerance	MCM6	rs182549	*Increased risk for lactose intolerance*	-/-	Low	**	11788828, 15114531
Magnesium	CNNM2	rs3740393	*Increased risk of magnesium deficiency*	-/-	Low	**	20700443
Omega 3	FADS1	rs174537	*Increased risk of low Omega-3 fatty acid levels*	-/-	Low	***	21829377, 28598979
Omega 3	FADS2	rs174576	*Increased risk of low Omega-3 fatty acid levels*	-/-	Low	***	21829377, 24936800
Selenium	DMGDH	rs921943	*Increased risk of selenium deficiency*	+/-	Low	**	26675765

Trait	Gene	SNP/RSID	Clinical Significance	Variant Type	SNP Impact Score	Research Grade	References (PMID)
Selenium	GPX4	rs713041	*Increased risk of selenium deficiency*	-/-	Low	***	18400727, 21459128
Selenium	SELENOP	rs3877899	*Increased risk of selenium deficiency*	-/-	Low	***	22139612, 30008961
Selenium	GPX1	rs1050450	*Increased risk of selenium deficiency*	NR	Not Reportable	***	25988760, 29609868
Zinc	SLC30A8	rs13266634	*Increased risk of zinc deficiency*	+/-	Medium	**	25348609, 28352089
Zinc	SLC30A3	rs11126936	*Increased risk of zinc deficiency*	+/-	Low	**	24338343, 25249019
Caffeine-Related Anxiety	ADORA2A	rs5751876	*Increased risk of anxiety with caffeine consumption*	+/+	High	***	21876539, 22012471
Iron	TMPRSS6	rs855791	*Normal risk of iron deficiency*	+/+	High	***	19820699, 29167213
Iron	HFE	rs1800562	*Normal risk of iron deficiency*	+/+	High	***	15858186, 29167213
Iron	HFE	rs1799945	*Normal risk of iron deficiency*	+/-	Medium	***	15858186, 26597663
Caffeine Metabolism	CYP1A2	rs762551	*Decreased rate of caffeine metabolism, may be more sensitive to caffeine*	+/-	Medium	***	10233211, 23167834