TOOLBOX GENOMICS

Cognitive Panel

Health Action Plan

May 9, 2019

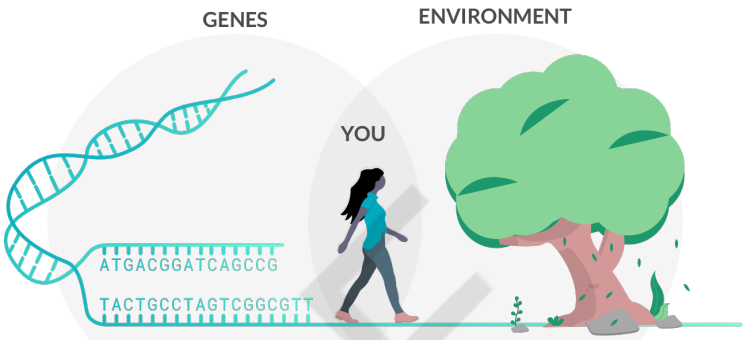
Demo Client

Kit #1234ABCD5678

Table of Contents

Understand Your Genetics

This report is broken down into three main sections: Trait Impact, Recommendations and Trait Detail. Depending on the number of traits being reviewed, your report will contain multiple trait and recommendation detail sections. Terms and sections of the report are defined below.



DNA

DNA is a long, ladder-shaped molecule. The rungs of the ladder are made of two amino acids pairing together, these are called bases. They always pair the same way, A (Adenine) with T (Thymine), and C (Cytosine) with G (Guanine). The body is constantly replicating DNA strands.

GENE

Genes are the basic units of heredity (passed down from generation to generation). They are made of DNA and provide the instructions for how our body works, what we look like, etc. Humans have between 20,000 - 25,000 genes. We inherit half of them from our mother and half from our father.

SNP

A SNP is a Single Nucleotide Polymorphism. SNPs occur when the amino acids making up the base pair do not come together in the same way as the original DNA strand. For example, the original strand may have had an A but the replicated strand has a G. SNPs are common and many of them have no impact to the individual, however, some can change how our body works.

VARIANT

Variants are how SNPs are referred to in this report. When the amino acid in the copied strand is different from the original, it is called a variant - it varies from the original. Variants are not necessarily 'good' or 'bad' they are simply different from the original. The depiction of variants is shown as: +/+ (both copies have different amino acids), +/- (one copy has a different amino acid), -/- (both copies have the same amino acid as the original) or U (one copy is indeterminate).

Reading This Report

Trait	Impact Score
Trait Name	

Gene	SNP/RSID	Varient
SMPL	ex1234567	+ −

Trait Recommendations

1 Trait Impact

This report focuses on traits. These are typically groups of SNPs that have a similar impact on the body's function. We use a proprietary algorithm to determine the impact a group of SNPs may have on a specific function in the body based on your individual test results.

2 Traits

The traits in our reports are typically grouped by body function, a symptom type, a disease, a nutrient need, or a response to environment. Within the trait pages, you will see the SNPs that are looked at for that trait, your variant type and recommendations to optimize health and minimize risk based on your individual results.

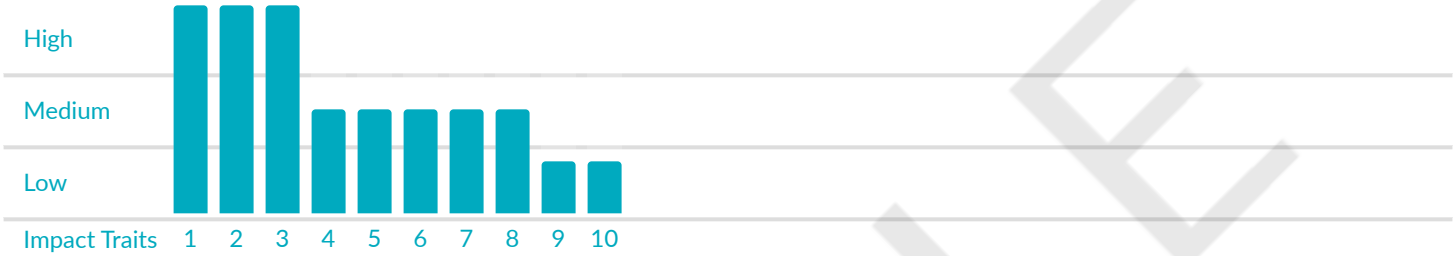
3 Recommendations

Your genes, and therefore your SNPs, will not change during your life. However, this report focuses on SNPs whose impact can be influenced by external factors like diet, exercise, supplements, and lifestyle changes.

Disclaimer - The recommendations in this report have been carefully prepared and reviewed for you by your health and wellness provider, based on his or her reasoned medical judgment about your personal health needs. Be sure that you have shared with your health and wellness provider all relevant information about your health, including any medications or dietary supplements you may be taking, and any medical conditions you may be experiencing, before you adopt any of these recommendations. 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 You

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	Learn More
1 Depression	HIGH	Page 17
2 Inflammation	HIGH	Page 19
3 Oxidative Stress	HIGH	Page 20
4 Alzheimer's Disease	MEDIUM	Page 21
5 Anxiety	MEDIUM	Page 23
6 Dementia	MEDIUM	Page 25
7 Mild Cognitive Impairment	MEDIUM	Page 26
8 Parkinson's Disease	MEDIUM	Page 27
9 Concussion with TBI	LOW	
10 Omega 3	LOW	

Supplements

Below is a list of recommended supplements curated specifically for you based on the Supplement sections found within your report. Supplement recommendations are listed in order of importance based on your individual genetic results. The traits generating each recommendation are listed just below them. These recommendations have been reviewed by your healthcare provider. Please contact your provider if you have any questions.

Supplement Recommendation & Linked Traits	Details	Comments
1 **Vitamin C** Alzheimer's Disease, Anxiety, Depression, Oxidative Stress, Parkinson's Disease	Supplement with 500 - 1,000 mg of vitamin C per day.	
2 **Vitamin D3** Alzheimer's Disease, Depression, Inflammation, Parkinson's Disease	Supplement with 3,000 IUs of vitamin D3 per day.	
3 **Folate** Depression, Inflammation, Mild Cognitive Impairment	Supplement with 400 - 800 mcg of methyl-folate per day.	
4 **Magnesium** Anxiety, Depression, Mild Cognitive Impairment	Supplement with 300 - 500 mg of magnesium per day.	
5 **Omega-3** Alzheimer's Disease, Anxiety, Depression	Supplement with 2 - 5 g of omega-3 fatty acid supplement that contains essential fatty acids DHA and EPA.	
6 **Probiotics** Anxiety, Depression	Supplement with a 10 - 50 billion CFU probiotic per day.	
7 **Resveratrol** Alzheimer's Disease, Mild Cognitive Impairment	Supplement with 150 - 2,000 mg of resveratrol per day.	

8	**Vitamin E** Oxidative Stress, Parkinson's Disease	Supplement with 100 - 400 IUs of vitamin E per day.
9	**Zinc** Depression, Oxidative Stress	Supplement with 10 - 40 mg of zinc per day.
10	**Antioxidants** Dementia	Consider taking 1,000 - 5,000 mg of an antioxiant supplement daily.
11	**Ashwagandha** Anxiety	Supplement with 250 - 300 mg of ashwagandha per day.
12	**Betaine Hydrochloride (HCl)** Inflammation	Supplement with 1 - 2 g of betaine hydrochloride (HCl) with meals for at least 6 months.
13	**Choline** Dementia	Supplement with 250 - 500 mg of choline per day.
14	**Combined Nutraceutical** Dementia	Consider supplementing a nutraceutical containing: 320 mg Bacopa monner extract, 100 mg L-theanine, 30 mg saffron extract, 9.5 mg vitmain B6, 450 mcg biotin, 400 mcg folic acid, 33 mcg vitmain B12, and 25 mcg vitamin D3 each day for at least 8 weeks.
15	**Curcumin** Inflammation	Supplement with 250 - 2,000 mg of curcumin extract per day.
16	**Docosahexaenoic Acid (DHA)** Mild Cognitive Impairment	Supplement with 2 g of Docosahexaenoic Acid (DHA) per day.
17	**L-Carnitine** Dementia	Supplement with 500 mg - 4 g of L-carnitine per day.

18	**L-Lysine and L-Arginine** Anxiety	Supplement with a combination of 2.64 g per day of L-lysine and 2.64 g of L-arginine per day.
19	**L-Theanine** Anxiety	Supplement with 200 mg of L-theanine per day.
20	**Lavender Oil** Anxiety	Supplement with 80 mg of an oral lavendar supplement per day.
21	**Multivitamin** Inflammation	Supplement with a multivitamin that includes activated B vitamins.
22	**Niacinamide (Vitamin B3)** Parkinson's Disease	Supplement with 1 - 3 g of niacinamide (vitamin B3) per day.
23	**Phosphatidylserine** Anxiety	Supplement with 400 mg of phosphatidylserine per day.
24	**Riboflavin (Vitamin B2)** Parkinson's Disease	Supplement with 100 - 400 mg of riboflavin (vitamin B2) per day.
25	**SAMe (S-Adenosyl-L-Methionine)** Depression	Supplement with 800 mg of SAMe per day.
26	**Vitamin B12** Mild Cognitive Impairment	Supplement with 500 mcg of vitamin B12 per day.

Note - If you are taking any medications, consult with your practitioner before starting any new supplements as they may have adverse effects with your medications.

Diet

Below is a list of dietary recommendations curated specifically for you based on the Diet sections found within your report. Diet recommendations are listed in order of importance based on your individual genetic results. The traits generating each recommendation are listed just below them. These recommendations have been reviewed by your healthcare provider. Please contact your provider if you have any questions.

Diet Recommendation & Linked Traits	Details	Comments
1 **Anti-Inflammatory Diet** Depression, Inflammation	Consume a diet rich in anti-inflammatory foods.	
2 **Consume Fatty Fish** Alzheimer's Disease, Mild Cognitive Impairment	Consume 5 to 6 oz of cold-water fatty fish 2 to 3 times per week.	
3 **Folate Rich Foods** Depression, Mild Cognitive Impairment	Consume a diet rich in folate.	
4 **Fruits and Vegetables** Inflammation, Oxidative Stress	Include fruits and vegetables at every meal to increase levels of antioxidants in the body, especially strawberries, blueberries, broccoli, sprouts, and green leafy vegetables.	
5 **Magnesium Rich foods** Anxiety, Depression	Consume a diet rich in magnesium.	
6 **Mediterranean Diet** Inflammation, Mild Cognitive Impairment	Adopt a Mediterranean-style diet that includes a variety of antioxidant-rich foods, heart healthy fats, and complex carbohydrates.	
7 **Beta-Carotene** Alzheimer's Disease	Aim to get the recommended 6 to 15 mg of beta-carotene from the diet per day.	
8 **Calorie Restriction** Oxidative Stress	Reduce overall calorie intake to create a calorie deficit.	

9	**Caution with Iron Rich Foods** Parkinson's Disease	Avoid excessive dietary iron intake.
10	**Consume Beneficial Probiotics** Alzheimer's Disease	Consume 6 to 8 oz of probiotic-rich foods daily.
11	**Diet Quality** Dementia	Consume a diet that is low in saturated fats, high in antioxidants, and high in B vitamins.
12	**Dietary Fiber** Inflammation	Increase dietary fiber intake to recommended 25 g for females and 30 g for males.
13	**Flavonoids** Parkinson's Disease	Aim to eat 6 servings, approximately 1,000 mg, per day of flavinoid foods.
14	**Gluten Free Diet** Depression	Avoid gluten-containing foods such as baked goods, cereals, or other foods processed in a facility that also processes gluten.
15	**Low Glycemic Index Foods** Alzheimer's Disease	Choose low-glycemic index foods to avoid blood sugar spikes.
16	**Nut Consumption** Inflammation	Consume a variety of nuts including almonds, walnuts, macadamia nuts, and brazil nuts.
17	**Potassium Rich Foods** Dementia	Consume a diet rich in potassium.
18	**Reduce Your Dietary Fat Intake** Parkinson's Disease	Reduce the amount of fat in the diet to no more than 20% of total daily caloric intake (no more than 22 g of saturated fat).

19 Selenium Rich Foods Mild Cognitive Impairment	Consume a diet rich in selenium.
20 Vitamin C Rich Foods Alzheimer's Disease	Consume a diet rich in vitamin C.
21 Vitamin E Rich Foods Alzheimer's Disease	Aim to get at least 15 mg of tocopherols (vitamin E) from a combintation of diet and supplementation per day.
22 Zinc Rich Foods Depression	Consume a diet rich in zinc.

Lifestyle

Below is a list of lifestyle recommendations curated specifically for you based on the Lifestyle sections found within your report. Lifestyle recommendations are listed in order of importance based on your individual genetic results. The traits generating each recommendation are listed just below them. These recommendations have been reviewed by your healthcare provider. Please contact your provider if you have any questions.

Lifestyle Recommendation & Linked Traits	Details	Comments
1 **Brain Exercise** Alzheimer's Disease, Mild Cognitive Impairment, Parkinson's Disease	Engage in daily brain stimulating activities, such as puzzles, crosswords, or reading, for at least 30 minutes.	
2 **Meditation** Anxiety, Depression	Engage in 10 to 20 minutes of mindfulness meditation 2 or more times per week.	
3 **Intermittent Fasting** Inflammation	Try intermittent fasting (fasting for 14+ hours daily) or alternate day fasting (fasting for 24 hours every other day).	
4 **Lemon Balm Essential Oils** Alzheimer's Disease	Apply a lemon balm essential oil twice daily for at least 4 weeks.	
5 **Reduce Stress** Oxidative Stress	Engage in enjoyable hobbies such as gardening, sports, or other leisure activities to help reduce stress.	
6 **Sleep Consistency** Inflammation	Stick to a consistent sleep routinue that consists of going to sleep and waking up at approximately the same time each day.	

Exercise

Below is a list of exercise recommendations curated specifically for you based on the Exercise sections found within your report. Exercise recommendations are listed in order of importance based on your individual genetic results. The traits generating each recommendation are listed just below them. These recommendations have been reviewed by your healthcare provider. Please contact your provider if you have any questions.

Exercise Recommendation & Linked Traits	Details	Comments
1 **Aerobic Activity** Alzheimer's Disease, Anxiety, Dementia, Depression, Mild Cognitive Impairment, Oxidative Stress, Parkinson's Disease	Aim for 20 to 30 minutes of aerobic physical activity most days of the week.	
2 **Yoga** Depression, Oxidative Stress	Incorporate at least 1 to 2 yoga sessions into your weekly excercise routine.	
3 **Dancing** Depression	Incorporate 45 to 60 minutes of dance several times per week into your normal exercise routine.	
4 **Qigong** Anxiety	Practice Qigong 30 minutes per day, 3 to 4 times per week.	

Further Testing

Below is a list of further testing recommendations curated specifically for you based on the Further Testing sections found within your report. Further Testing recommendations are listed in order of importance based on your individual genetic results. The traits generating each recommendation are listed just below them. These recommendations have been reviewed by your healthcare provider. Please contact your provider if you have any questions.

Further Testing Recommendation & Linked Traits	Details	Comments
1 **Homocysteine Levels** Alzheimer's Disease, Anxiety, Dementia, Depression, Inflammation, Mild Cognitive Impairment, Parkinson's Disease	Check blood homocysteine levels	
2 **Antioxidants** Dementia, Mild Cognitive Impairment, Parkinson's Disease	Test for circulating antioxidant levels	
3 **Vitamin D3 (25-OH)** Depression, Mild Cognitive Impairment, Parkinson's Disease	Test blood levels of vitamin D3 (25-OH)	
4 **C-Reactive Protein (CRP) or hsCRP** Inflammation	Test levels of C-Reactive Protein (CRP) or hsCRP	
5 **Carotinoids** Depression	Test alpha-carotene, beta-carotene, beta-cryptoxanthin, lycopene, lutein, zeaxanthin and serum Vitamin A	
6 **Erythrocyte Sedimentation Rate (ESR)** Inflammation	Test erythrocyte sedimentation rate (ESR) in blood	
7 **Fibrinogen** Inflammation	Test fibrinogen levels in the body	

8	**Folate Testing** Inflammation	Test folate levels
9	**Glutathione** Alzheimer's Disease	Test Glutathione serum levels
10	**IL-6 Testing** Inflammation	Test for levels of IL-6
11	**Magnesium** Depression	Test magnesium levels
12	**Manganese** Alzheimer's Disease	Test blood manganese levels
13	**Markers of Oxidative Stress** Oxidative Stress	Test markers of oxidative stress
14	**Methylmalonic Levels** Depression	Test for methylmalonic levels
15	**Non-Ceruloplasmin-Bound Copper** Mild Cognitive Impairment	Test non-ceruloplasmin-bound copper levels
16	**Serum B12 Levels** Depression	Measure serum B12 levels
17	**Serum Iron** Parkinson's Disease	Test serum iron levels
18	**TNF-alpha** Inflammation	Test for TNF-alpha

19	**Vitamin C Test** Parkinson's Disease	Test blood vitamin C levels
20	**Zinc** Depression	Test serum zinc levels

TOOLBOX GENOMICS

Appendix 1

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May 9, 2019

Demo Client

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Depression

People with similar genetic markers may be predisposed or at a higher risk for depression.

Gene	SNP	Variant	Impact
HTR1A	rs6295	+/+	High
HTR1A	rs878567	+/+	High
FKBP5	rs3800373	+/+	High
FKBP5	rs1360780	+/+	High
FKBP5	rs9296158	+/+	High
CRHR1	rs110402	+/+	High
GNB3	rs5443	+/+	High
CHRH2	rs3779250	+/+	High
MTHFR	rs1801133	+/-	Medium
KSR2	rs7973260	+/-	Medium
LHPP	rs35936514	-/-	Low
SLC6A15	rs1545843	+/-	Low
SLC6A4	rs25531	-/-	Low
SIRT1	rs12415800	-/-	Low
PCLO	rs2522833	+/-	Low

Recommendations

These recommendations are based on the genetic findings in the chart above.

SUPPLEMENT

- Omega-3
- Zinc
- Vitamin C
- Vitamin D3
- Folate
- Magnesium
- Probiotics
- SAMe (S-Adenosyl-L-Methionine)

DIET

- Magnesium Rich foods
- Zinc Rich Foods
- Anti-Inflammatory Diet
- Folate Rich Foods
- Gluten Free Diet

LIFESTYLE

- Meditation

EXERCISE	• Dancing	• Aerobic Activity
	• Yoga	
FURTHER TESTING	• Carotinoids	• Serum B12 Levels
	• Homocysteine Levels	• Zinc
	• Vitamin D3 (25-OH)	• Methylmalonic Levels
	• Magnesium	

Inflammation

People with similar genetic markers may be more likely to experience increased levels of inflammation, which is the body's natural response to an injury, wound, or infection.

Gene	SNP	Variant	Impact
TNF-α	rs1800629	+/+	High
IL6	rs1800795	+/+	High
TNF-α	rs1799724	+/-	Medium
PTPN22	rs2476601	+/-	Medium
IL-10	rs1800872	+/-	Low
TNF-α	rs1799964	-/-	Low
IL23R	rs2201841	+/-	Low
IL-10	rs3024505	-/-	Low

Recommendations

These recommendations are based on the genetic findings in the chart above.

SUPPLEMENT

- Multivitamin
- Vitamin D3
- Curcumin
- Betaine Hydrochloride (HCl)
- Folate

DIET

- Anti-Inflammatory Diet
- Mediterranean Diet
- Fruits and Vegetables
- Dietary Fiber
- Nut Consumption

LIFESTYLE

- Sleep Consistency
- Intermittent Fasting

FURTHER TESTING

- Homocysteine Levels
- C-Reactive Protein (CRP) or hsCRP
- Fibrinogen
- TNF-alpha
- IL-6 Testing
- Erythrocyte Sedimentation Rate (ESR)
- Folate Testing

Oxidative Stress

People with similar genetic markers may experience higher levels of oxidative stress due in part to antioxidant depletion.

Gene	SNP	Variant	Impact
UGT	rs1105879	+/+	High
CDKN	rs10811661	+/+	High
GSTP1	rs1695	-/-	Low
CYP1A1	rs1048943	-/-	Low
LRRK2	rs34637584	-/-	Low
SOD2	rs4880	+/-	Low

Recommendations

These recommendations are based on the genetic findings in the chart above.

SUPPLEMENT	• Zinc	• Vitamin C
	• Vitamin E	
DIET	• Calorie Restriction	• Fruits and Vegetables
LIFESTYLE	• Reduce Stress	
EXERCISE	• Aerobic Activity	• Yoga
FURTHER TESTING	• Markers of Oxidative Stress	

Alzheimer's Disease

People with similar genetic markers may be at a higher risk for developing Alzheimer's disease.

Gene	SNP	Variant	Impact
CD2Ap	rs9349407	+/+	High
SORL1	rs11218343	+/+	High
SPSB1	rs11121365	+/-	Medium
BIN1	rs744373	+/-	Medium
ABCA7	rs3764650	+/-	Medium
CR1	rs3818361	+/-	Medium
RAB20	rs56378310	+/-	Medium
MS4A4E	rs670139	+/-	Medium
BDH1	rs2484	-/-	Low
APOE	rs429358	-/-	Low
PLD3	rs145999145	-/-	Low
CR1	rs6656401	-/-	Low
APOE	rs7412	+/+	Low
ST6GAL1	rs3936289	-/-	Low
ADARB2	rs10903488	-/-	Low
TREM2	rs75932628	-/-	Low
PDS5B	rs192470679	-/-	Low
TOMM40	rs2075650	NR	Not Reportable

Recommendations

These recommendations are based on the genetic findings in the chart above.

SUPPLEMENT

- Omega-3
- Vitamin C
- Vitamin D3
- Resveratrol

DIET

- Vitamin C Rich Foods
- Low Glycemic Index Foods
- Consume Beneficial Probiotics
- Consume Fatty Fish
- Vitamin E Rich Foods
- Beta-Carotene

LIFESTYLE

- Lemon Balm Essential Oils
- Brain Exercise

EXERCISE	• Aerobic Activity	
FURTHER TESTING	• Manganese	• Homocysteine Levels
	• Glutathione	

Anxiety

People with similar genetic markers may be at a higher risk for anxiety-related disorders, such as generalized anxiety disorder and panic disorder.

Gene	SNP	Variant	Impact
LOCI5225	rs1709393	+/+	High
SLC6A4	rs25531	+/+	High
CAMKMT	rs1067327	+/+	High
RGS2	rs4606	+/+	High
MAOA	rs6323	+/+	High
ACCN1	rs280039	+/-	Medium
LOC101927284	rs9302001	+/-	Medium
TMEM132D	rs7309727	+/-	Medium
TMEM16B	rs12579350	+/-	Medium
SDK2	rs3816995	+/-	Medium
MFHAS1	rs12682352	+/-	Medium
MAGI1	rs35855737	+/-	Medium
NPSR1	rs324981	-/-	Low
PLEKHG1	rs9372078	-/-	Low
HTR1A	rs6295	-/-	Low
COMT	rs4680	+/-	Low
CALCOCO1	rs941184	-/-	Low
PKP1	rs860554	-/-	Low
BDNF	rs6265	-/-	Low
NPY5R	rs12501691	-/-	Low
NPY	rs16147	+/-	Low
CLU	rs17466684	-/-	Low
BDKBR2	rs10144552	-/-	Low

Recommendations

These recommendations are based on the genetic findings in the chart above.

SUPPLEMENT

- Omega-3
- Vitamin C
- Magnesium
- Probiotics
- L-Lysine and L-Arginine
- Lavender Oil
- Phosphatidylserine
- Ashwagandha

	• L-Theanine	
DIET	• Magnesium Rich foods	
LIFESTYLE	• Meditation	
EXERCISE	• Qigong	• Aerobic Activity
FURTHER TESTING	• Homocysteine Levels	

Dementia

People with similar genetic markers may be at a higher risk for developing certain forms of dementia in older age.

Gene	SNP	Variant	Impact
APOE	rs7412	+/+	High
PHLDB2	rs951660	+/-	Medium
TNF-α	rs1799724	+/-	Medium
HLA	rs9268856	+/-	Medium
SYK	rs290227	+/-	Medium
TNFRSF19	rs9317882	+/-	Medium
FAM134B	rs10041159	+/-	Medium
HLA	rs1980493	-/-	Low
TMEM106B	rs1990622	-/-	Low
APOE	rs429358	-/-	Low
AGT	rs61754634	-/-	Low
HSPA1A	rs1008438	-/-	Low
TNF-α	rs1799964	-/-	Low
HLA	rs9268877	-/-	Low
APOE	rs769449	-/-	Low

Recommendations

These recommendations are based on the genetic findings in the chart above.

SUPPLEMENT	• L-Carnitine	• Choline
	• Antioxidants	• Combined Nutraceutical
DIET	• Potassium Rich Foods	• Diet Quality
EXERCISE	• Aerobic Activity	
FURTHER TESTING	• Homocysteine Levels	• Antioxidants

Mild Cognitive Impairment

People with similar genetic markers may be at a higher risk for mild cognitive impairment.

Gene	SNP	Variant	Impact
HRK/FBXW8	rs7294919	+/+	High
ASTN2	rs7852872	+/-	Medium
LHFP	rs9315702	+/-	Medium
MSRB3/WIF1	rs17178006	-/-	Low
GCFC2	rs2298948	-/-	Low
BDNF	rs6265	-/-	Low
DPP4	rs6741949	-/-	Low
IL6	rs1800795	-/-	Low
MS4A6A	rs610932	-/-	Low
F5	rs6703865	-/-	Low
APOE	rs429358	-/-	Low
PARP1	rs1136410	-/-	Low

Recommendations

These recommendations are based on the genetic findings in the chart above.

SUPPLEMENT

- Folate
- Vitamin B12
- Magnesium
- Resveratrol
- Docosahexaenoic Acid (DHA)

DIET

- Folate Rich Foods
- Selenium Rich Foods
- Mediterranean Diet
- Consume Fatty Fish

LIFESTYLE

- Brain Exercise

EXERCISE

- Aerobic Activity

FURTHER TESTING

- Non-Ceruloplasmin-Bound Copper
- Homocysteine Levels
- Vitamin D3 (25-OH)
- Antioxidants

Parkinson's Disease

People with similar genetic markers may be at a higher risk for developing Parkinson’s disease.

Gene	SNP	Variant	Impact
SNCA	rs199498	+/+	High
RAB7L1	rs823128	+/+	High
SNCA	rs356219	+/+	High
GPNMB	rs199347	+/+	High
VPS13C	rs2414739	+/+	High
SNCA	rs2736990	+/+	High
GCH1	rs11158026	+/+	High
SIPA1L2	rs10797576	+/+	High
BCKDK/STX1B	rs14235	+/+	High
HLA-DQB1	rs9275326	+/+	High
MCCC1	rs11711441	+/+	High
SREBF1	rs11868035	+/+	High
INPP5F	rs117896735	+/+	High
MCCC1	rs12637471	+/+	High
RAB7L1	rs823114	+/-	Medium
RAB7L1	rs823118	+/-	Medium
BST1	rs4698412	+/-	Medium
SNCA	rs11012	+/-	Medium
LRRK2	rs1994090	+/-	Medium
MIR4697	rs329648	+/-	Medium
BST1	rs11724635	+/-	Medium
SNCA	rs17577094	+/-	Medium
SNCA	rs8070723	+/-	Medium
SNCA	rs2942168	+/-	Medium
FAM47E	rs6812193	+/-	Medium
SNCA	rs393152	+/-	Medium
SNCA	rs12185268	+/-	Medium
TMEM175	rs6599389	-/-	Low
TMEM175	rs11248051	-/-	Low
SNCA	rs199533	-/-	Low
GBA	rs12726330	-/-	Low
MTHFR	rs1801133	-/-	Low
SNCA	rs11931074	-/-	Low
UCHL1	rs5030732	-/-	Low
LRRK2	rs34637584	-/-	Low
RAB7L1	rs947211	-/-	Low
TMEM175	rs34311866	-/-	Low
SNCA	rs6532194	-/-	Low
TMEM175	rs11248060	-/-	Low

Gene	SNP	Variant	Impact
CCDC62	rs11060180	-/-	Low
LRRK2	rs1491942	-/-	Low
STK39	rs2102808	-/-	Low
RIT2	rs4130047	-/-	Low
STK39	rs1474055	-/-	Low
LRRK2	rs76904798	-/-	Low
DDRGK1	rs8118008	-/-	Low
GBA	rs34372695	-/-	Low
ACMSD/TMEM163	rs6430538	-/-	Low
TMEM175	rs6599388	NR	Not Reportable
SNCA	rs356220	NR	Not Reportable

Recommendations

These recommendations are based on the genetic findings in the chart above.

SUPPLEMENT

- Vitamin C
- Riboflavin (Vitamin B2)
- Niacinamide (Vitamin B3)
- Vitamin D3
- Vitamin E

DIET

- Caution with Iron Rich Foods
- Flavonoids
- Reduce Your Dietary Fat Intake

LIFESTYLE

- Brain Exercise

EXERCISE

- Aerobic Activity

FURTHER TESTING

- Homocysteine Levels
- Vitamin C Test
- Serum Iron
- Vitamin D3 (25-OH)
- Antioxidants

Client Summary

TOOLBOX GENOMICS

Appendix 2

Cognitive Panel

May 9, 2019

Demo Client

Kit #1234ABCD5678

Client Summary Report: Cognitive Panel

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	Comments
Depression	HTR1A	rs6295	*Increased risk of major depressive disorder*	+/+	High	
Depression	HTR1A	rs878567	*Increased risk of major depressive disorder*	+/+	High	
Depression	FKBP5	rs3800373	*Increased risk of major depressive disorder following traumatic event*	+/+	High	
Depression	FKBP5	rs1360780	*Increased risk of depressive disorders*	+/+	High	
Depression	FKBP5	rs9296158	*Increased risk of major depressive disorder following traumatic event*	+/+	High	
Depression	CRHR1	rs110402	*Increased risk of major depressive disorder*	+/+	High	
Depression	GNB3	rs5443	*Increased risk of major depressive disorder*	+/+	High	
Depression	CHRH2	rs3779250	*Increased risk of major depressive disorder*	+/+	High	
Depression	MTHFR	rs1801133	*Increased risk of major depressive disorder*	+/-	Medium	
Depression	KSR2	rs7973260	*Increased risk for depression*	+/-	Medium	
Depression	LHPP	rs35936514	*Increased risk of major depressive disorder*	-/-	Low	
Depression	SLC6A15	rs1545843	*Increased risk of major depressive disorder*	+/-	Low	
Depression	SLC6A4	rs25531	*Increased risk of major depressive disorder*	-/-	Low	

Trait	Gene	SNP/RSID	Clinical Significance	Variant Type	SNP Impact Score	Comments
Depression	SIRT1	rs12415800	*Increased risk of major depressive disorder*	-/-	Low	
Depression	PCLO	rs2522833	*Increased risk of depressive disorders*	+/-	Low	
Inflammation	TNF-α	rs1800629	*Increased risk of elevated inflammatory response*	+/+	High	
Inflammation	IL6	rs1800795	*Increased risk of elevated circulating IL-6 cytokines*	+/+	High	
Inflammation	TNF-α	rs1799724	*Increased risk of elevated inflammatory response*	+/-	Medium	
Inflammation	PTPN22	rs2476601	*Increased risk of elevated inflammatory response*	+/-	Medium	
Inflammation	IL-10	rs1800872	*Increased risk of elevated inflammatory response*	+/-	Low	
Inflammation	TNF-α	rs1799964	*Increased risk of elevated inflammatory response*	-/-	Low	
Inflammation	IL23R	rs2201841	*Increased risk of elevated inflammatory response*	+/-	Low	
Inflammation	IL-10	rs3024505	*Increased risk of elevated inflammatory response*	-/-	Low	
Oxidative Stress	UGT	rs1105879	*Increased risk for elevated levels of oxidative stress*	+/+	High	
Oxidative Stress	CDKN	rs10811661	*Increased risk for elevated levels of oxidative stress*	+/+	High	
Oxidative Stress	GSTP1	rs1695	*Increased risk for elevated levels of oxidative stress*	-/-	Low	
Oxidative Stress	CYP1A1	rs1048943	*Increased risk for elevated levels of oxidative stress*	-/-	Low	

Trait	Gene	SNP/RSID	Clinical Significance	Variant Type	SNP Impact Score	Comments
Oxidative Stress	LRRK2	rs34637584	*Increased risk for elevated levels of oxidative stress*	-/-	Low	
Oxidative Stress	SOD2	rs4880	*Increased risk for elevated levels of oxidative stress*	+/-	Low	
Alzheimer's Disease	CD2Ap	rs9349407	*Increased risk for AD*	+/+	High	
Alzheimer's Disease	SORL1	rs11218343	*Increased risk for AD*	+/+	High	
Alzheimer's Disease	SPSB1	rs11121365	*Increased risk for AD development after MCI diagnosis*	+/-	Medium	
Alzheimer's Disease	BIN1	rs744373	*Increased risk for AD*	+/-	Medium	
Alzheimer's Disease	ABCA7	rs3764650	*Increased risk for early onset AD*	+/-	Medium	
Alzheimer's Disease	CR1	rs3818361	*Increased risk for late-onset AD*	+/-	Medium	
Alzheimer's Disease	RAB20	rs56378310	*Increased risk for AD development after MCI diagnosis*	+/-	Medium	
Alzheimer's Disease	MS4A4E	rs670139	*Increased risk for AD*	+/-	Medium	
Alzheimer's Disease	BDH1	rs2484	*Increased risk for AD development after MCI diagnosis*	-/-	Low	
Alzheimer's Disease	APOE	rs429358	*Increased risk for AD*	-/-	Low	
Alzheimer's Disease	PLD3	rs145999145	*Increased risk for AD*	-/-	Low	
Alzheimer's Disease	CR1	rs6656401	*Increased risk for late-onset AD*	-/-	Low	
Alzheimer's Disease	APOE	rs7412	*Normal - decreased risk for AD*	+/+	Low	
Alzheimer's Disease	ST6GAL1	rs3936289	*Increased risk for AD development after MCI diagnosis*	-/-	Low	

Trait	Gene	SNP/RSID	Clinical Significance	Variant Type	SNP Impact Score	Comments
Alzheimer's Disease	ADARB2	rs10903488	*Increased risk for AD development after MCI diagnosis*	-/-	Low	
Alzheimer's Disease	TREM2	rs75932628	*Increased risk for AD*	-/-	Low	
Alzheimer's Disease	PDS5B	rs192470679	*Increased risk for AD development after MCI diagnosis*	-/-	Low	
Alzheimer's Disease	TOMM40	rs2075650	*Increased risk for AD*	NR	Not Reportable	
Anxiety	LOCI5225	rs1709393	*Abnormal regulation of basic threat-response systems, increased risk of anxiety disorders*	+/+	High	
Anxiety	SLC6A4	rs25531	*Altered serotonin signaling and increased risk of anxiety disorders*	+/+	High	
Anxiety	CAMKMT	rs1067327	*Abnormal regulation of basic threat-response systems, increased risk of anxiety disorders*	+/+	High	
Anxiety	RGS2	rs4606	*Decreased stress coping ability, increased risk of generalized anxiety disorder*	+/+	High	
Anxiety	MAOA	rs6323	*Increased risk of generalized anxiety disorder in females*	+/+	High	
Anxiety	ACCN1	rs280039	*Increased risk for panic disorder*	+/-	Medium	
Anxiety	LOC101927284	rs9302001	*Increased risk for panic disorder*	+/-	Medium	
Anxiety	TMEM132D	rs7309727	*Increased risk for panic disorder*	+/-	Medium	
Anxiety	TMEM16B	rs12579350	*Increased risk for panic disorder*	+/-	Medium	

Trait	Gene	SNP/RSID	Clinical Significance	Variant Type	SNP Impact Score	Comments
Anxiety	SDK2	rs3816995	*Increased risk for panic disorder*	+/-	Medium	
Anxiety	MFHAS1	rs12682352	*Increased risk of anxiety disorders*	+/-	Medium	
Anxiety	MAGI1	rs35855737	*Increased risk of anxiety disorders and major depressive disorders*	+/-	Medium	
Anxiety	NPSR1	rs324981	*Decreased stress coping ability, increased risk of generalized anxiety disorder*	-/-	Low	
Anxiety	PLEKHG1	rs9372078	*Increased risk for panic disorder*	-/-	Low	
Anxiety	HTR1A	rs6295	*Increased risk of generalized anxiety disorder*	-/-	Low	
Anxiety	COMT	rs4680	*Increased risk of generalized anxiety disorder*	+/-	Low	
Anxiety	CALCOCO1	rs941184	*Increased risk for panic disorder*	-/-	Low	
Anxiety	PKP1	rs860554	*Increased risk for panic disorder*	-/-	Low	
Anxiety	BDNF	rs6265	*Increased risk of generalized anxiety disorder*	-/-	Low	
Anxiety	NPY5R	rs12501691	*Increased risk for panic disorder*	-/-	Low	
Anxiety	NPY	rs16147	*Decreased stress coping ability, increased risk of generalized anxiety disorder*	+/-	Low	
Anxiety	CLU	rs17466684	*Increased risk for panic disorder*	-/-	Low	
Anxiety	BDKBR2	rs10144552	*Increased risk for panic disorder*	-/-	Low	

Trait	Gene	SNP/RSID	Clinical Significance	Variant Type	SNP Impact Score	Comments
Dementia	APOE	rs7412	*Increased risk for vascular dementia*	+/+	High	
Dementia	PHLDB2	rs951660	*Increased risk for vascular dementia*	+/-	Medium	
Dementia	TNF-α	rs1799724	*Increased risk for vascular dementia*	+/-	Medium	
Dementia	HLA	rs9268856	*Increased risk of ferritin light chain degradation, decreased antioxidant capacity, increased risk for dementia*	+/-	Medium	
Dementia	SYK	rs290227	*Increased risk for vascular dementia*	+/-	Medium	
Dementia	TNFRSF19	rs9317882	*Increased risk for vascular dementia*	+/-	Medium	
Dementia	FAM134B	rs10041159	*Increased risk for vascular dementia*	+/-	Medium	
Dementia	HLA	rs1980493	*Increased risk of ferritin light chain degradation, decreased antioxidant capacity, increased risk for dementia*	-/-	Low	
Dementia	TMEM106B	rs1990622	*Increased risk of ferritin light chain degradation-TDP, decreased antioxidant capacity, increased risk for dementia*	-/-	Low	
Dementia	APOE	rs429358	*Increased risk for vascular dementia*	-/-	Low	
Dementia	AGT	rs61754634	*Increased risk for vascular dementia*	-/-	Low	
Dementia	HSPA1A	rs1008438	*Increased risk for vascular dementia*	-/-	Low	
Dementia	TNF-α	rs1799964	*Increased risk for vascular dementia*	-/-	Low	

Trait	Gene	SNP/RSID	Clinical Significance	Variant Type	SNP Impact Score	Comments
Dementia	HLA	rs9268877	*Increased risk of ferritin light chain degradation, decreased antioxidant capacity, increased risk for dementia*	-/-	Low	
Dementia	APOE	rs769449	*Increased risk for lewy body dementia*	-/-	Low	
Mild Cognitive Impairment	HRK/FBXW8	rs7294919	*Reduced hippocampal volume, increased risk for cogntive impairment*	+/+	High	
Mild Cognitive Impairment	ASTN2	rs7852872	*Reduced hippocampal volume, increased risk for cogntive impairment*	+/-	Medium	
Mild Cognitive Impairment	LHFP	rs9315702	*Reduced hippocampal volume, increased risk for cogntive impairment*	+/-	Medium	
Mild Cognitive Impairment	MSRB3/WIF1	rs17178006	*Reduced hippocampal volume, increased risk for cogntive impairment*	-/-	Low	
Mild Cognitive Impairment	GCFC2	rs2298948	*Reduced hippocampal volume, increased risk for cogntive impairment*	-/-	Low	
Mild Cognitive Impairment	BDNF	rs6265	*Accelerated hippocampal atrophy, increased risk for cognitive impairment*	-/-	Low	
Mild Cognitive Impairment	DPP4	rs6741949	*Reduced hippocampal volume, increased risk for cogntive impairment*	-/-	Low	
Mild Cognitive Impairment	IL6	rs1800795	*Increased cognitive decline in elderly individuals*	-/-	Low	
Mild Cognitive Impairment	MS4A6A	rs610932	*Increased rate of hippocampal volume loss in MCI patients*	-/-	Low	

Trait	Gene	SNP/RSID	Clinical Significance	Variant Type	SNP Impact Score	Comments
Mild Cognitive Impairment	F5	rs6703865	*Reduced hippocampal volume, increased risk for cogntive impairment*	-/-	Low	
Mild Cognitive Impairment	APOE	rs429358	*Reduced hippocampal volume, increased risk for cogntive impairment*	-/-	Low	
Mild Cognitive Impairment	PARP1	rs1136410	*Increased rate of hippocampal volume loss in MCI patients*	-/-	Low	
Parkinson's Disease	SNCA	rs199498	*Increased risk for PD*	+/+	High	
Parkinson's Disease	RAB7L1	rs823128	*Increased risk for PD*	+/+	High	
Parkinson's Disease	SNCA	rs356219	*Increased risk for PD*	+/+	High	
Parkinson's Disease	GPNMB	rs199347	*Increased risk for PD*	+/+	High	
Parkinson's Disease	VPS13C	rs2414739	*Increased risk for PD*	+/+	High	
Parkinson's Disease	SNCA	rs2736990	*Increased risk for PD*	+/+	High	
Parkinson's Disease	GCH1	rs11158026	*Increased risk for PD*	+/+	High	
Parkinson's Disease	SIPA1L2	rs10797576	*Increased risk for PD*	+/+	High	
Parkinson's Disease	BCKDK/STX1B	rs14235	*Increased risk for PD*	+/+	High	
Parkinson's Disease	HLA-DQB1	rs9275326	*Increased risk for PD*	+/+	High	
Parkinson's Disease	MCCC1	rs11711441	*Increased risk for PD*	+/+	High	
Parkinson's Disease	SREBF1	rs11868035	*Increased risk for PD*	+/+	High	
Parkinson's Disease	INPP5F	rs117896735	*Increased risk for PD*	+/+	High	

Trait	Gene	SNP/RSID	Clinical Significance	Variant Type	SNP Impact Score	Comments
Parkinson's Disease	MCCC1	rs12637471	*Increased risk for PD*	+/+	High	
Parkinson's Disease	RAB7L1	rs823114	*Increased risk for PD*	+/-	Medium	
Parkinson's Disease	RAB7L1	rs823118	*Increased risk for PD*	+/-	Medium	
Parkinson's Disease	BST1	rs4698412	*Increased risk for PD*	+/-	Medium	
Parkinson's Disease	SNCA	rs11012	*Increased risk for PD*	+/-	Medium	
Parkinson's Disease	LRRK2	rs1994090	*Increased risk for PD*	+/-	Medium	
Parkinson's Disease	MIR4697	rs329648	*Increased risk for PD*	+/-	Medium	
Parkinson's Disease	BST1	rs11724635	*Increased risk for PD*	+/-	Medium	
Parkinson's Disease	SNCA	rs17577094	*Increased risk for PD*	+/-	Medium	
Parkinson's Disease	SNCA	rs8070723	*Increased risk for PD*	+/-	Medium	
Parkinson's Disease	SNCA	rs2942168	*Increased risk for PD*	+/-	Medium	
Parkinson's Disease	FAM47E	rs6812193	*Increased risk for PD*	+/-	Medium	
Parkinson's Disease	SNCA	rs393152	*Increased risk for PD*	+/-	Medium	
Parkinson's Disease	SNCA	rs12185268	*Increased risk for PD*	+/-	Medium	
Parkinson's Disease	TMEM175	rs6599389	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	TMEM175	rs11248051	*Increased risk for late-onset PD*	-/-	Low	
Parkinson's Disease	SNCA	rs199533	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	GBA	rs12726330	*Increased risk for PD*	-/-	Low	

Trait	Gene	SNP/RSID	Clinical Significance	Variant Type	SNP Impact Score	Comments
Parkinson's Disease	MTHFR	rs1801133	*Increased risk for sporadic PD due to problems with homocysteine metabolism*	-/-	Low	
Parkinson's Disease	SNCA	rs11931074	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	UCHL1	rs5030732	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	LRRK2	rs34637584	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	RAB7L1	rs947211	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	TMEM175	rs34311866	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	SNCA	rs6532194	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	TMEM175	rs11248060	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	CCDC62	rs11060180	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	LRRK2	rs1491942	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	STK39	rs2102808	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	RIT2	rs4130047	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	STK39	rs1474055	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	LRRK2	rs76904798	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	DDRGK1	rs8118008	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	GBA	rs34372695	*Increased risk for PD*	-/-	Low	
Parkinson's Disease	ACMSD/ TMEM163	rs6430538	*Increased risk for PD*	-/-	Low	

Trait	Gene	SNP/RSID	Clinical Significance	Variant Type	SNP Impact Score	Comments
Parkinson's Disease	TMEM175	rs6599388	*Increased risk for PD*	NR	Not Reportable	
Parkinson's Disease	SNCA	rs356220	*Increased risk for PD*	NR	Not Reportable	
Concussion with TBI	BDNF	rs6265	*Decreased memory and processing speed one month after brain injury*	-/-	Low	
Concussion with TBI	CACNA1A	rs121908225	*Increased risk of severe edema after minor head trauma*	-/-	Low	
Concussion with TBI	NOS3	rs2070744	*Decreased cerebral blood flow and increased risk for poor outcome following traumatic brain injury*	-/-	Low	
Concussion with TBI	APOE	rs429358	*Increased risk of poor outcome following brain injury*	-/-	Low	
Omega 3	FADS1	rs174537	*Increased risk of low Omega-3 fatty acid levels*	-/-	Low	
Omega 3	FADS2	rs174576	*Increased risk of low Omega-3 fatty acid levels*	-/-	Low	

Report Key

Gene: 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

SNP/RSID: A SNP is also called 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 in the base pair 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: 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.

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. Variants are not necessarily "good" or "bad," rather genetic variants are simply the differences in the forms of the genes present in the body.

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

Impact: The potential impact based on research of a variant type.

Impact	Definition
High (H)	Likely a large clinical impact.
Moderate (M)	Likely a slightly elevated clinical impact
Low (L)	Likely a low clinical impact