

INTRODUCTION

Understanding your report

Have you ever wondered why certain people lose or gain more weight compared to others? And why some foods cause uneasiness in some people? Do you want to know which diet suits you best? The answer lies in your genes.

The way we fuel our bodies with the foods we eat are all impacted by our genetic make-up. The old adage “you are what you eat” plays a major role in determining our health and well-being. Food and its nutrients directly and indirectly influence our gene expressions. Genetic variations affecting certain metabolic traits in turn dictate dietary means and requirements. For instance, the response to food varies from individual to individual explaining why some people can eat as much as they want and not gain weight. These factors may be attributed to the large role that genes play in influencing eating behaviours and metabolism of different foods.

Some interesting facts about genes and nutrition:

- Craig Maclean, the famous track cyclist and Olympics Gold medalist, and Novak Djokovic, the famous tennis player, were both diagnosed with Celiac disease (gluten intolerance) and owe their success to a gluten-free diet.
- A study on weight management conducted by Stanford University found that people who eat and exercise according to their genetic predisposition tend to lose two-and-a-half times as much weight as compared to those who do not.
- Approximately 74% of Native American, 90% of Asian Americans, 70% of African Americans and 53% of Mexican Americans are lactose intolerant. Research studies have also showed that there is a considerable reduction in lactase activity among people whose ancestry is from Greek, Italian, Arab, Asian, African, Hispanic or Jewish origin.
- According to Centres for Disease Control and Prevention (CDC), 43% of children and 38% of pregnant women suffer from iron deficiency, 1 in 6 women suffer from Vitamin A deficiency and 17.3% of the global population has Zinc deficiency.
- Fast metabolizers of caffeine, who drank up to 3 cups of coffee per day, have almost 52% lower risk of heart attack as compared to slow metabolizers.

In this report, we profile genes that have been shown to influence nutritional traits like diet and weight management, micronutrient requirements, food intolerance and several other attributes relevant to nutritional well-being.

We hope that this report will help you understand your body better and to align your diet to your genetic type to get the best results.

INTRODUCTION

Understanding your report

Human health is a complex interplay between genetics and the environment (lifestyle, diet, activity, stress, etc.). Your genes, training and diet, all play a vital role in your well-being.

This report is presented in a user friendly language and format. The following tips will help you get the best information value out of the report.


1. The word "likely" is used often in the report. What does it mean?

People generally know that high cholesterol can lead to heart conditions. However, there are individuals with high cholesterol who do not develop heart disease. Similarly, smoking can lead to lung disease, but not always. Hence, certain genetic parameters can lead to certain outcomes but other factors may modify the outcome. "Likely" means, it is more likely that one will see the outcome, but other factors may modify it.

2. What does the term "average" mean in the report?

Average implies neither high nor low, rather an intermediate outcome. For example, average likelihood of weight gain is an intermediate level between high and low likelihood. Average can also be understood in the context of "Normal" or "Typical" or "Moderate"

3. How do I know which result is applicable to me?

Only results with a check mark  are applicable to you, the others are not applicable. All possible outcomes are provided in the table to provide a context to your outcome.

4. Where did the information contained in the report come from?

The genetic markers that are used in this report are based on scientific studies published in international journals. A list of references is available for you to read on our web blog.

5. Some sentences are colored in green and others in red, why?

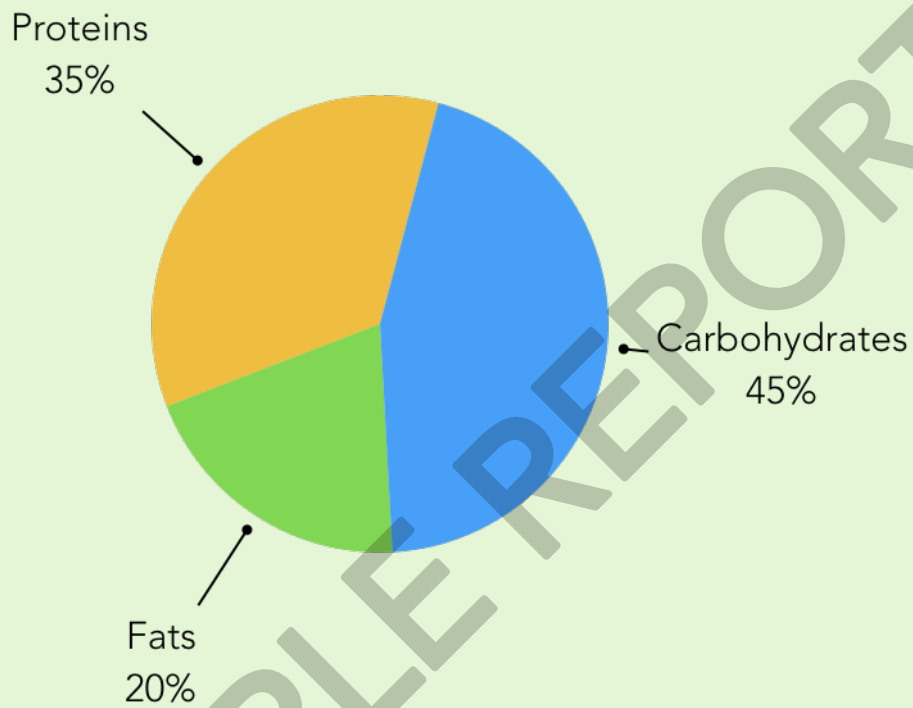
Attributes that are advantageous in nutritional well-being are indicated in green and those that are not advantageous are in red. Moderate or Neutral outcomes are indicated in black.

6. In the vitamins and Micro Nutrient section, what does normal intake indicate?

Normal intake refers to the Recommended Dietary Allowance (RDA) of the specific vitamin or mineral.

SUMMARY RESULTS

Your diet plan



Key takeaways

Gluten Sensitivity	Gluten Sensitive: Increased risk of being gluten sensitive
Lactose Intolerance	Tolerant: Less likely to be lactose intolerant
Alcohol Flush	Low: Less likely to experience alcohol flush
Increase Intake of	Vitamin B6, Vitamin C, Calcium, Choline, Copper, Zinc

Nutrition Results

TRAIT NAME	YOUR RESULTS	POSSIBLE OUTCOMES
Tendency To Gain Weight A genetic tendency for higher weight gain due to increased energy storage	✓	Moderate: Moderately likely to gain weight
		Low: Less likely to gain weight
		High: Highly likely to gain weight
Tendency To Overeat A genetic tendency to over consume foods due to increased craving	✓	Moderate: Moderately likely to overeat
		Low: Less likely to overeat
		High: Highly likely to overeat
Tendency To Prefer Fatty Foods A genetic tendency for lower fat taste perception and overconsumption of fatty foods	✓	Moderate: Likely to overconsume high fat foods
		Low: Less likely to overconsume high fat foods
		High: Highly likely to overconsume high fat foods
Tendency To Prefer Sweet Foods A genetic tendency for lower sweet taste perception and overconsumption of sweet foods	✓	Moderate: Likely to overconsume sweet foods
		Low: Less likely to overconsume sweet foods
		High: Highly likely to overconsume sweet foods
Tendency To Prefer Bitter Foods A genetic tendency for high bitter taste perception and low intake of bitter vegetables	✓	Moderate: Normal bitter vegetable preference
		Low: Less likely to prefer bitter vegetables
		High: Likely to prefer bitter vegetables
Carbohydrate Intake And Weight Gain Tendency A genetic tendency for increased weight gain upon higher carb intake	✓	Moderate: Likely to gain weight on high carb intake
		Low: Less likely to gain weight on high carb
		High: Highly likely to gain weight on high carb intake
Saturated Fats Intake And Weight Gain Tendency A genetic tendency for higher weight gain upon higher sat fat intake		Moderate: Likely to gain weight on high SFA intake
	✓	Low: Less likely to gain weight on high SFA intake
		High: Highly likely to gain weight on high SFA intake
Mono Unsaturated Fats Intake And Weight Gain Tendency A genetic tendency for weight gain upon higher MUFA intake		Moderate: Likely to gain weight with high MUFA intake
		Low: Less likely to gain weight with high MUFA intake
	✓	High: Highly likely to gain weight with high MUFA intake
Poly Unsaturated Fats Intake And Weight Gain Tendency A genetic tendency for weight gain upon higher PUFA intake		Moderate: Likely to gain weight with high PUFA intake
	✓	Low: Less likely to gain weight with high PUFA intake
		High: Highly likely to gain weight with high PUFA intake

TRAIT NAME	YOUR RESULTS	POSSIBLE OUTCOMES
Protein Intake And Weight Loss Tendency A genetic tendency for increased weight loss upon higher protein intake		Moderate: Likely to lose weight on high protein intake
	✓	High: Highly likely to lose weight on high protein intake
Fibre Intake And Weight Loss Tendency A genetic tendency for increased weight loss upon higher fibre intake	✓	Moderate: Likely to lose weight on high fibre intake
		High: Highly likely to lose weight on high fibre intake
Tendency To Regain Weight A genetic tendency for rapid weight regain after a weight loss program	✓	Moderate: Likely to regain weight after weight loss
		Low: Less likely to regain weight after weight loss
		High: Highly likely to regain weight after weight loss
Vitamin A Needs A genetic tendency to require more Vitamin A due to inefficient metabolism of vitamin A	✓	Need more: Moderately increase vitamin A intake
		Normal: Maintain normal Vitamin A intake
		Need more: Significantly increase vitamin A intake
Vitamin B12 Needs A genetic tendency to require more Vitamin B12 due to inefficient metabolism of vitamin B12	✓	Need more: Moderately increase vitamin B12 intake
		Normal: Maintain normal Vitamin B12 intake
		Need more: Significantly increase vitamin B12 intake
Vitamin B6 Needs A genetic tendency to require more Vitamin B6 due to inefficient metabolism of vitamin B6		Need more: Moderately increase vitamin B6 intake
		Normal: Maintain normal Vitamin B6 intake
	✓	Need more: Significantly increase vitamin B6 intake
Vitamin B9 Needs A genetic tendency to require more Vitamin B9 due to inefficient metabolism of vitamin B9	✓	Need more: Moderately increase vitamin B9 intake
		Normal: Maintain normal Vitamin B9 intake
		Need more: Significantly increase vitamin B9 intake
Vitamin C Needs A genetic tendency to require more Vitamin C due to inefficient metabolism of vitamin C		Need more: Moderately increase vitamin C intake
		Normal: Maintain normal Vitamin C intake
	✓	Need more: Significantly increase vitamin C intake
Vitamin D Needs A genetic tendency to require more Vitamin D due to inefficient metabolism of vitamin D		Need more: Moderately increase vitamin D intake
	✓	Normal: Maintain normal Vitamin D intake
		Need more: Significantly increase vitamin D intake
Vitamin E Needs A genetic tendency to require more Vitamin E due to inefficient metabolism of vitamin E	✓	Need more: Moderately increase vitamin E intake
		Normal: Maintain normal Vitamin E intake
		Need more: Significantly increase vitamin E intake

TRAIT NAME	YOUR RESULTS	POSSIBLE OUTCOMES
Vitamin K Needs A genetic tendency to require more Vitamin K due to inefficient metabolism of vitamin K	✔	Need more: Moderately increase vitamin K intake
		Normal: Maintain normal Vitamin K intake
		Need more: Significantly increase vitamin K intake
Calcium Needs A genetic tendency to need more or less of Calcium due to differences in metabolism of Calcium		Need less: You may have higher calcium levels
		Normal: Maintain normal Calcium intake
	✔	Need more: Significantly increase Calcium intake
Choline Needs A genetic tendency to require more Choline due to inefficient metabolism of Choline		Need more: Moderately increase Choline intake
		Normal: Maintain normal Choline intake
	✔	Need more: Significantly increase Choline intake.
Copper Needs A genetic tendency to require more Copper due to inefficient metabolism of Copper		Need more: Moderately increase Copper intake
		Normal: Maintain normal Copper intake
	✔	Need more: Significantly increase Copper intake
Iron Needs A genetic tendency to require more Iron due to inefficient metabolism of Iron	✔	Need more: Moderately increase Iron intake
		Normal: Maintain normal Iron intake
		Need more: Significantly increase Iron intake
Magnesium Needs A genetic tendency to require more Magnesium due to inefficient metabolism of Magnesium	✔	Need more: Moderately increase Magnesium intake
		Normal: Maintain normal Magnesium intake
		Need more: Significantly increase Magnesium intake
Phosphate Needs A genetic tendency to require more Phosphate due to inefficient metabolism of Phosphate		Need more: Moderately increase Phosphate intake
	✔	Normal: Maintain normal Phosphate intake
		Need more: Significantly increase Phosphate intake
Zinc Needs A genetic tendency to require more Zinc due to inefficient metabolism of Zinc		Need more: Moderately increase Zinc intake
		Normal: Maintain normal Zinc intake
	✔	Need more: Significantly increase Zinc intake
Selenium Needs A genetic tendency to require more Selenium due to inefficient metabolism of Selenium		Need more: Moderately increase Selenium intake
	✔	Normal: Maintain normal Selenium intake
		Need more: Significantly increase Selenium intake
Antioxidant Needs A genetic tendency to require more Antioxidants due to inefficient metabolism of Antioxidants		Need more: Moderately increase antioxidants intake
	✔	Normal: Maintain normal antioxidants intake
		Need more: Significantly increase antioxidants intake

TRAIT NAME	YOUR RESULTS	POSSIBLE OUTCOMES
Caffeine Consumption A genetic tendency for variation in caffeine consumption due to difference in preference		High: Likely to consume more caffeine
		Low: Likely to consume less caffeine
	✓	Moderate: Likely to consume moderate amount of caffeine
Caffeine Metabolism A genetic tendency for variation in caffeine clearance due to varied metabolism	✓	Slow: Likely to be a slow metabolizer of caffeine
		Fast: Likely to be a fast metabolizer of caffeine
Gluten Sensitivity A genetic tendency for variation in response to due to varied sensitivity		Gluten insensitive: Unlikely to be gluten sensitive
	✓	Gluten Sensitive: Increased risk of being gluten sensitive
Lactose Intolerance A genetic tendency for difference in response to lactose due to varied tolerance	✓	Tolerant: Less likely to be lactose intolerant
		Intolerant: Likely to be lactose intolerant
Salt Intake And Blood Pressure Sensitivity A genetic tendency for lower blood pressure due to salt sensitivity		Moderate: Likely to have lower BP on low salt diet
		Normal: Likely to slightly reduce BP on low salt diet
	✓	High: Highly likely to have lower BP on low salt diet
Riboflavin And Blood Pressure Response A genetic tendency for lower blood pressure on increased riboflavin intake	✓	Insensitive: Less likely to have lower BP on high Riboflavin intake
		Sensitive: Highly likely to have lower BP with high Riboflavin Intake
Alcohol Flush A genetic tendency for variation in response to alcohol intake due to reduced clearance of acetaldehyde	✓	Low: Less likely to experience alcohol flush
		Moderate: Moderately likely to experience alcohol flush
		High: Highly likely to experience alcohol flush.

1. TENDENCY TO GAIN WEIGHT

Moderate: Moderately likely to gain weight

People of certain genetic type have more of a tendency to gain weight than others due to their genetic makeup. Genes that regulate metabolic rate, energy expenditure and energy storage influence the tendency to store calories versus expending calories. Certain genes that once offered a survival advantage to our ancestors by storing calories for leaner times have now become liabilities in the age of surplus food availability. Your genetic profile influences the tendency of your body to store or expend more calories.

Recommendation:

- You have a moderate genetic tendency to gain weight.
- Ensure a healthy balance between energy intake and physical activity to maintain a healthy weight.

Genes analyzed: *KCTD15, MC4R, NPC1, LEP, NEGR1, UCP3, PCSK1, ETV5, MTCH2, SH2B1, MAF, BDNF, ADRB21, STK33, TMEM18, ADRB2, FTO, ADIPOQ, ADRB1, UCP2, GNPDA2, SEC16B*

2. TENDENCY TO OVEREAT

Moderate: Moderately likely to overeat

People of certain genetic type have more of a tendency to over consume foods. We analyze genes that are known to influence various hunger and satiety hormones such as Leptin, Ghrelin and Neuropeptides, which influence neurological aspects of feeding, producing effects such as persistent hunger, excessive snacking, preference for high calorific food and emotional eating.

Recommendation:

- You may have a moderate genetic tendency to overeat.
- Practice mindful eating and eat high fibre or high protein snacks to increase feeling of fullness

Genes analyzed: *FTO, MC4R, TAS2R38, CLOCK, DRD2*

3. TENDENCY TO PREFER FATTY FOODS

Moderate: Likely to overconsume high fat foods

People of certain genetic type tend to over consume fatty foods due to a lower ability to perceive fats. In studies, people with lower fat perception ability were found to rate the fat content of food consistently lower than the actual fat content. Eating high quantities of fatty food can lead to weight gain and other health conditions.

Recommendation:

- You may have a moderate genetic ability to taste fats and are likely to consume more fatty foods.
- Consciously reduce intake of high fat food, especially fried and oily foods.
- Look for 0 g trans fat on the Nutrition Facts label and no hydrogenated oils in the ingredients list

Genes analyzed: *CD361, CD36*

4. TENDENCY TO PREFER SWEET FOODS

Moderate: Likely to overconsume sweet foods

People of certain genetic type tend to over consume sweet foods due to low sensitivity to sweet taste, either due to lesser number or reduced sensitivity of sweet taste receptors on their tongue. Sugary foods are rich in calories and can cause insulin resistance, leading to weight gain and other health conditions.

Recommendation:

- You may have a slightly decreased genetic sweet taste sensitivity and are likely to consume more sweet foods.
- Consciously reduce intake of sweets.
- High sugar intake increases risk for obesity and diabetes.
- Snack on dry fruits, fruits and green leafy vegetables to reduce sugar cravings.
- Drink plenty of water.

Genes analyzed: *TAS1R3, TAS1R31, TAS1R21, GLUT2, TAS1R2, TAS2R381, TAS2R38, TAS2R382*

5. TENDENCY TO PREFER BITTER FOODS

Moderate: Normal bitter vegetable preference

Bitter taste perception is due to genetic variations in taste receptors. When food is chewed in the mouth, molecules such as phenylthiocarbamide bind to the taste receptors present in the tongue, which gives rise to the bitter taste. People of certain genetic type tend to avoid bitter vegetables due to higher sensitivity to bitter taste. Vegetables are low calorie and high fibre foods, which help in weight management and have several health benefits.

Recommendation:

- You may have a genetic tendency to prefer bitter vegetables which could be due to moderate sensitivity to bitter taste.
- Add natural sweeteners, lemon juice or spices to flavor bitter tasting green leafy vegetables, be creative with vegetable preparations.
- Bitter foods help absorb nutrients, reduce sugar cravings and balance appetite.
- Eat vegetables and fruits of different colors

Genes analyzed: *TAS2R381, TAS2R38, TAS2R382*

6. CARBOHYDRATE INTAKE AND WEIGHT GAIN TENDENCY

Moderate: Likely to gain weight on high carb intake

Carbohydrates are the main sources of energy and they provide the kilocalories for weight maintenance. 45-65% of total calories are the recommended intake of carbohydrates with starch and sugars being the major carbohydrates. Corn, rice, potatoes, pasta and breads are sources of starch. Fruits and fruit juices have natural sugars while desserts, candies and soft drinks have added sugar. Carbs are considered as weight increasing foods, but that's not true for everyone. People of certain genetic type tend to gain more weight upon consuming carbohydrate rich foods than others. These individuals can better maintain weight by reducing the amount of carbs in their diet. Eat a balanced diet. Choose complex carbohydrates such as fruits, vegetables, legumes and whole grain.

Recommendation:

- You may have a moderate genetic risk for weight gain on a high carbohydrate diet.
- Eat a balanced diet.
- Choose complex carbohydrates such as fruits, vegetables, legumes and whole grains.

Genes analyzed: *SEC16B, FABP2, FAIM2, FTO, TCF7L2, AMY1, FTO1, RBJ, LRRN6C, FLJ35779*

7. SATURATED FATS INTAKE AND WEIGHT GAIN TENDENCY

Low: Less likely to gain weight on high SFA intake

Saturated fats are a type of fat that are largely solid at room temperature as they are saturated with hydrogen molecules. Meat and dairy products are rich sources of saturated fats. A high intake of saturated fats is associated with an increase in LDL cholesterol levels in the body. The American Heart Association recommends no more than 5-6% of calories from saturated fat from the daily diet. People of certain genetic type tend to gain more weight upon consuming saturated fat rich foods than others. These individuals can better maintain weight by reducing the amount of saturated fats in their diets

Recommendation:

- You may have a genetic tendency to have a lower BMI on a high fat diet.
- Limit the consumption of saturated fat sources in the diet (butter, ghee, lard, margarine) Choose low fat, non-fried dishes when dining out.
- Choose baked or steamed or grilled method of cooking

Genes analyzed: *FTO, APOA2*

8. MONO UNSATURATED FATS INTAKE AND WEIGHT GAIN TENDENCY

High: Highly likely to gain weight with high MUFA intake

Monounsaturated fatty acids include omega-7 and omega 9 fatty acids. They are associated with anti-inflammatory properties, lowering blood pressure, maintaining triglyceride levels. MUFAs are also found to benefit skin health as they balance water levels and provide ceramides for skin renewal. The Mediterranean diet is rich in MUFA. People of certain genetic type tend to gain weight upon consuming MUFA rich foods than others. These individuals can better maintain weight by balancing the amount of MUFA in their diets. Given that MUFA is beneficial for overall health and particularly heart health, individuals with the weight gain genotype can increase the amount of exercise to compensate for the increased risk of weight gain.

Recommendation:

- You may have a genetic tendency for higher BMI on a high MUFA diet.
- Include MUFA rich food sources in moderation.
- Olive oil, avocado, olives, almonds, peanuts are rich in MUFA.
- Though a diet rich in MUFA might not help in weight maintenance, it is recommended to include MUFA rich foods in the diet to improve heart health.
- Weight gain can be prevented by increasing physical activity

Genes analyzed: *PPARG*, *NR1D1*, *ADIPOQ*

9. POLY UNSATURATED FATS INTAKE AND WEIGHT GAIN TENDENCY

Low: Less likely to gain weight with high PUFA intake

Omega 3s are important for brain and heart health as they reduce blood pressure and triglyceride levels. They are also important for skin and vision health. Omega 6s help in bone health and in stimulating hair growth. People of certain genetic type tend to gain weight upon consuming PUFA rich foods than others. These individuals can better maintain weight by lowering the amount of PUFA in their diets or increasing physical activity. Importantly, targeting the Omega3: Omega6 ratio is recommended, with preference towards Omega 3.

Recommendation:

- You may be less likely to have a higher BMI on a high PUFA diet.
- Include PUFA-rich food in your diet.
- Grapeseed oil, canola oil, soybean oil, chia seeds, tuna and mackerel are rich in PUFA.

Genes analyzed: *BDNF*

10. PROTEIN INTAKE AND WEIGHT LOSS TENDENCY

High: Highly likely to lose weight on high protein intake

Protein is an important building block for bones, skin, blood, cartilage and muscles, and it is present in every cell in the body. Nails, hair, enzymes, hormones and other body chemicals consist of large amounts of protein. Moreover, our body utilises protein to build and repair tissues. People of certain genetic type tend to benefit more in terms of weight maintenance with high protein intake than others

Recommendation:

- You may have a genetic tendency to lose more weight on a high protein diet.
- Eat a diet rich in proteins.
- Include proteins in diet (eggs, chicken breast, tuna, cottage cheese, greek yogurt, almonds, oats, broccoli, quinoa) as they are highly satiating, leading to reduced hunger and appetite

Genes analyzed: *FTO*

11. FIBRE INTAKE AND WEIGHT LOSS TENDENCY

Moderate: Likely to lose weight on high fibre intake

Dietary fiber is found in whole grains, vegetables, fruits and legumes. It helps relieve constipation or prevent it while also helping in weight maintenance, reducing the risk for heart disease and diabetes. People of certain genetic type tend to benefit more in terms of weight loss with high fiber intake than others.

Recommendation:

- You may have a genetic tendency to lose less weight on a high fibre diet.
- Fibre rich food can result in weight loss by increasing the feeling of fullness thus leading to reduced calorie intake.
- Pear, apple, banana, carrot, beetroot, broccoli, lentils, chickpeas, oats and almonds are examples of fibre rich foods

Genes analyzed: *FTO*

12. TENDENCY TO REGAIN WEIGHT

Moderate: Likely to regain weight after weight loss

People of certain genetic type tend to quickly regain weight after having been on a weight loss program. These individuals need to continue adherence to exercise and diet program to maintain optimal weight.

Recommendation:

- You may have a genetic tendency for moderate weight regain after an interventional strategy.
- Follow healthy lifestyle and eating pattern to ensure better weight maintenance.
- Do not skip breakfast as a good breakfast curbs hunger, avoid processed food and sugar sweetened beverages.
- Engage in 30-60 minutes of physical activity.
- Maintain a balanced diet and include more of whole grains, nuts, fruits and vegetables to your diet.
- Have a food journal and record your daily food habits which will help you to monitor your food consumption

Genes analyzed: *TFAP2B, PPARG, BDNF, ADIPOQ*

13. VITAMIN A NEEDS

Need more: Moderately increase vitamin A intake

Vitamin A is required for clear vision, healthy skin and enhanced immunity. Animal sources provide Vitamin A in the form of retinol, while some plant sources provide the precursor of Vitamin A in the form of carotenes, which in turn must be converted to retinol. People of certain genetic type need more Vitamin A in their diet due to less efficient conversion of carotenoids to retinol.

Recommendation:

- You may have a genetic tendency to have moderately low vitamin A levels.
- Meet your daily requirements for Vitamin A.
- Measure serum Vitamin A level, if below normal even after meeting RDA requirements; consult a physician.
- Include carrots, sweet potato, pumpkin, green leafy vegetables, parsley, basil, coriander, milk, fish and bell peppers in daily diet

Genes analyzed: *BCMO11, BCMO1*

14. VITAMIN B12 NEEDS

Need more: Moderately increase vitamin B12 intake

Vitamin B12 is actively involved in red blood cell maturity and its deficiency can lead to pernicious anemia and general fatigue. It also helps in the removal of homocysteine from the cells. People of certain genetic type need more Vitamin B12 in their diet due to lower levels in the body.

Recommendation:

- You may have a genetic tendency for moderately low vitamin B12 levels.
- Meet your daily requirements for Vitamin B12.
- Measure serum Vitamin B12 level, if below normal even after meeting RDA requirements; consult a physician.
- Vitamin B12 rich foods include fish and seafood.
- Also seaweed, eggs, poultry, meat and dairy products provide this nutrient

Genes analyzed: *TCN1, FUT2, CUBN, RASIP1*

15. VITAMIN B6 NEEDS

Need more: Significantly increase vitamin B6 intake

Vitamin B6 is required for the proper utilization of sugars, fats and proteins in the body. It also protects the cells against glycation-induced damage. People of certain genetic type need more Vitamin B6 in their diet as they lack the ability to fully metabolize this vitamin leading to its low levels in the body.

Recommendation:

- You may have a genetic tendency for low vitamin B6 levels.
- Meet your daily requirements for Vitamin B6.
- Measure serum Vitamin B6 level, if below normal even after meeting RDA requirements; consult a physician.
- Vitamin B6 rich foods include whole grain products, nuts and seeds, fish, pork and meat.

Genes analyzed: *ALPL, NBPF3, NBPF31*

16. VITAMIN B9 NEEDS

Need more: Moderately increase vitamin B9 intake

Vitamin B9 or folate plays a major role in DNA synthesis and repair. It is also essential for the conversion of homocysteine to methionine. Excess accumulation of homocysteine can be harmful. People of certain genetic type need more Vitamin B9 in their diet due to lower folate levels and an inefficient enzymatic conversion of homocysteine to methionine.

Recommendation:

- You may have a genetic tendency for moderately low vitamin B9 levels.
- Meet your daily requirements for Vitamin B9.
- Measure serum Vitamin B9 level, if below normal even after meeting RDA requirements; consult a physician.
- Vitamin B9 rich foods include green leafy vegetables, dark coloured fruits (such as oranges, peaches, broccoli, papaya, grapefruit, strawberries, beans, peas, lentils, avocados, okra, sunflower seeds, peanuts, flaxseeds, almonds, cauliflower, corn, celery, carrots and fortified grains)

Genes analyzed: *MYT1L, MTHFR*

17. VITAMIN C NEEDS

Need more: Significantly increase vitamin C intake

Vitamin C is a potent antioxidant and is essential for enhanced immunity. People of certain genetic type need more Vitamin C in their diet due to lower levels in the body.

Recommendation:

- You may have a genetic tendency for low vitamin C levels.
- Meet your daily requirements for Vitamin C.
- Measure serum Vitamin C level, if below normal even after meeting RDA requirements; consult a physician.
- Vitamin C rich foods include agathi, cabbage, coriander leaves, drumstick leaves, capsicum, guava, green chillies, orange and broccoli.

Genes analyzed: *SLC23A1*

18. VITAMIN D NEEDS

Normal: Maintain normal Vitamin D intake

Vitamin D is essential for the absorption of calcium from the intestine and also for enhanced immunity. Our body can synthesize sufficient Vitamin D from cholesterol when the skin is exposed to adequate amounts of sunlight. People of certain genetic type need more Vitamin D in their diet due to its inefficient synthesis in our body.

Recommendation:

- You may have a genetic tendency for normal vitamin D levels.
- Meet your daily requirements for Vitamin D.
- Include calcium rich foods in the diet to improve absorption of vitamin D.
- Measure serum Vitamin D level, if below normal even after meeting RDA requirements; consult a physician.
- Calcium rich food sources are chia seeds, beans, lentils, almonds, spinach, tofu, milk & milk products, eggs and mushrooms and finger millets.

Genes analyzed: *GC1, CYP2R1, VDR, NADSYN1, GC2, GC, CYP27B1*

19. VITAMIN E NEEDS

Need more: Moderately increase vitamin E intake

Vitamin E is an antioxidant and it defends our body against free radical damage and protects polyunsaturated fatty acids from oxidation. People of certain genetic type need more Vitamin E in their diet due to inefficient transport and lower plasma levels of Vitamin E.

Recommendation:

- You may have a genetic tendency for moderately low vitamin E levels.
- Meet your daily requirements for Vitamin E.
- Measure serum Vitamin E level, if below normal even after meeting RDA requirements; consult a physician.
- Sunflower seeds, olive oil, wheat germ oil, spinach, avocados, almonds, broccoli and shrimps are rich in vitamin E

Genes analyzed: *CD362, SCARB1, intergenic, CD36, TTPA, CD361, CYP4F2, ZPR1*

20. VITAMIN K NEEDS

Need more: Moderately increase vitamin K intake

Vitamin K plays an important role in helping blood clotting process and in preventing excessive bleeding. People of certain genetic type need enhanced Vitamin K supplementation to maintain adequate levels in blood.

Recommendation:

- You may have a genetic tendency for moderately low vitamin K levels.
- Meet your daily requirements for vitamin K.
- Measure serum vitamin K level, if below normal even after meeting RDA requirements; consult a physician.
- Vitamin K rich foods include Brussels sprouts, cabbage, prunes, spring onions and green leafy vegetables.

Genes analyzed: *VKORC2, GGCX, CYP4F2, VKORC1*

21. CALCIUM NEEDS

Need more: Significantly increase Calcium intake

Calcium is the most abundant mineral in the body, essential for maintaining the strength and structure of bones and teeth and certain metabolic functions. Both higher and lower calcium levels can have important consequences for health. People of certain genetic type tend to have higher serum calcium levels and can restrict their calcium intake.

Recommendation:

- You may have a genetic tendency for low calcium levels.
- Meet your daily requirements for Calcium (1300mg per day) Measure serum calcium level, if below normal even after meeting RDA requirements; consult a physician.
- For adults between 19 and 50 years of age, calcium intake should not exceed 2500mg per day.
- For adults older than 50 years, calcium intake should not exceed 2000 mg per day.
- Include calcium rich foods such as amaranth leaves, almonds, mustard seeds, sunflower seeds, finger millets, sesame seeds, broccoli and dairy (subject to lactose tolerance recommendation)

Genes analyzed: *CARS, CASR, CASR1, CYP24A1, DGKD, TTC39B, WDR81, DGKD1, DGKH, GATA3, GCKR*

22. CHOLINE NEEDS

Need more: Significantly increase Choline intake.

Choline is a macronutrient which plays an important role in liver function, nerve function, normal brain development, muscle movement and in supporting a healthy metabolism. People with a genetic variant in the PEMT gene and other genes are likely to experience adverse health consequences when fed a low choline diet. Hence supplementation is recommended for such individuals.

Recommendation:

- You may have a genetic tendency for low choline levels.
- Meet your daily requirements for choline.
- Measure serum choline level, if below normal even after meeting RDA requirements; consult a physician.
- Choline rich foods include eggs, liver, meat, pasta and shellfish.

Genes analyzed: *MTHFD1, PEMT*

23. COPPER NEEDS

Need more: Significantly increase Copper intake

Copper is necessary for the absorption of iron, in the synthesis of haemoglobin and in the maintenance of connective tissue, brain, heart and other organs. People of certain genetic types need more copper.

Recommendation:

- You may have a genetic tendency for low copper levels.
- Meet your daily requirements for copper.
- Measure serum copper level, if below normal even after meeting RDA requirements; consult a physician.
- Copper rich foods include sunflower seeds, almonds, dried apricots, dark chocolates and lentils.

Genes analyzed: *SMIM1, SELENBP1*

24. IRON NEEDS

Need more: Moderately increase Iron intake

Iron is essential for oxygen transport through the blood. Its deficiency leads to anemia. People of certain genetic type need more iron in their diet as they have reduced ability to absorb iron from the diet.

Recommendation:

- You may have a genetic tendency for moderately low iron levels.
- Meet your daily requirements for iron.
- Men should consume 8 mg per day, women between 19 and 50 years should consume 18 mg per day and women over 50 years should consume 5 mg per day.
- Measure serum iron level, if below normal even after meeting RDA requirements; consult a physician.
- Iron rich foods include amaranth leaves, spinach, beans, lentils, chickpeas, peas, soybeans, liver, turkey, pumpkin seeds, broccoli, tofu and dark chocolate

Genes analyzed: *TF, SLC17A1, TMPRSS6, TFR2, TMPRSS61*

25. MAGNESIUM NEEDS

Need more: Moderately increase Magnesium intake

Magnesium helps in maintaining normal nerve and muscle function and helps maintain strong bones. It is also important for regulating blood glucose levels and in the production of energy and amino acids.

Recommendation:

- You may have a genetic tendency for moderately low magnesium levels.
- Meet your daily requirements for magnesium.
- Measure serum magnesium level, if below normal even after meeting RDA requirements; consult a physician.
- Magnesium rich foods include dark leafy greens, nuts, fish, whole grains, avocados and yogurt.

Genes analyzed: *SHROOM3, MUC1, DCDC5, HOXD9, LUZP2, MDS1, CASR, TRPM6*

26. PHOSPHATE NEEDS

Normal: Maintain normal Phosphate intake

Phosphate is necessary for the formation of bones and teeth and is also used as a building block for several important molecules including DNA. People of certain genetic type need more phosphate in their diet as they have decreased phosphate levels in blood.

Recommendation:

- You may have a genetic tendency for normal phosphate levels.
- Meet your daily requirements for phosphate.
- Measure serum phosphate level, if below normal even after meeting RDA requirements; consult a physician.
- Phosphate rich foods include pumpkin seeds, brazil nuts, salmons and shellfish

Genes analyzed: *CASR, TKT*

27. ZINC NEEDS

Need more: Significantly increase Zinc intake

Zinc plays an important role in the proper functioning of the immune system, cell division, cell growth and in the breakdown of carbohydrates. Zinc is also important for the senses of taste and smell.

Recommendation:

- You may have a genetic tendency for low zinc levels.
- Meet your daily requirements for zinc.
- Measure serum zinc level, if below normal even after meeting RDA requirements; consult a physician.
- Zinc rich foods include flax seeds, kidney beans, pumpkin seeds, watermelon seeds and beef

Genes analyzed: *MT1A, CA1, IL6, NBDY, MT2A*

28. SELENIUM NEEDS

Normal: Maintain normal Selenium intake

Selenium helps in the synthesis of antioxidant enzymes and in maintaining a healthy immune system. People of certain genetic type may benefit from selenium supplementation.

Recommendation:

- You may have a genetic tendency for normal selenium levels.
- Meet your daily requirements for selenium.
- Measure serum selenium level, if below normal even after meeting RDA requirements; consult a physician.
- Selenium rich foods brazil nuts, yellow fin tuna, turkey, chicken, white button mushrooms and brown rice.

Genes analyzed: *CBS*

29. ANTIOXIDANT NEEDS

Normal: Maintain normal antioxidants intake

Antioxidants play a key role in reducing the ill effects of 'free radicals' and thereby preventing premature aging, tissue damage and the onset of chronic diseases. They are present in many vegetables, fruits, cereals, green tea, etc. People of certain genetic type have lower efficiency to defend themselves against free radical damage and hence require more antioxidants in their diet.

Recommendation:

- You may have a genetic tendency to require moderate antioxidants.
- Include foods rich in antioxidants.
- Low antioxidant level increases the risk for cardiomyopathy.
- Foods rich in antioxidants are purple, red and blue grapes, blueberries, nuts, green leafy vegetables, sweet potato, carrots, whole grains and beans

Genes analyzed: *GPX1, NAT1, SOD21, XRCC1, SOD2, PON11, PON1, CAT*

30. CAFFEINE CONSUMPTION

Moderate: Likely to consume moderate amount of caffeine

People of certain genetic type tend to consume more cups of coffee (>625mg of caffeine) a day. Caffeine is a central nervous system stimulant and the most widely consumed psychoactive drug. Increased coffee consumption has been linked to improved health benefits for fast metabolizers of caffeine. Slow metabolizers are prone to increased risk of heart disease with higher caffeine intake.

Recommendation:

- You have a genetic tendency to consume moderate amount of coffee.

Genes analyzed: *ABCG2, GKCR, AHR, AHR1, MLXIPL, EFCAB5, BDNF, CYP1A2, CYP1A1*

31. CAFFEINE METABOLISM

Slow: Likely to be a slow metabolizer of caffeine

People of certain genetic type are slow metabolizers of caffeine and may experience symptoms such as palpitations and anxiety upon consuming more than 1 to 2 cups of coffee a day. These individuals may also be at a higher risk of heart disease with increased coffee intake.

Recommendation:

- You have a genetic tendency to be a slow metabolizer.
- Restrict coffee intake up to 2 cups a day.
- Choose decaffeinated coffee and other low caffeine beverages.
- May be at higher risk of heart attack when more than 2 cups of coffee are consumed everyday.
- Drink green tea instead.
- Caffeine is present in coffee, energy drinks, in colas and a variety of other foods and beverages.

Genes analyzed: *CYP1A2*

32. GLUTEN SENSITIVITY

Gluten Sensitive: Increased risk of being gluten sensitive

People of certain genetic type may have lower tolerance to gluten, a protein found in wheat, barley and rye. Some people experience symptoms like abdominal cramps, bloating, "foggy mind", depression, headaches, pain in the bone or joint, diarrhea or constipation and chronic fatigue when they have gluten in their diet but may not test positive for serological determination of celiac disease. When gluten is removed from their diet, these symptoms subside, this condition is known as gluten sensitivity. In some cases (~1% of western population), it may lead to celiac disease.

Recommendation:

- You carry genetic markers associated with increased risk of gluten sensitivity.
- However, not all individuals who carry these markers are found to have gluten sensitivity.
- Gluten sensitivity needs to be further confirmed by the presence of symptoms.
- please consult your physician or dietetician to confirm gluten sensitivity, before starting on a gluten free diet.

Genes analyzed: *HLA DQ 8, HLA-DQ 2.5, HLA DQ2.2 (M3), HLA DQ2.2 (M1), HLA DQ2.2 (M2)*

33. LACTOSE INTOLERANCE

Tolerant: Less likely to be lactose intolerant

People of certain genetic type stop producing the enzyme lactase in late childhood. Lactase is needed to breakdown the sugar lactose present in milk. These individuals may experience gastrointestinal symptoms upon consuming large quantities of milk as adults.

Recommendation:

- You are less likely to be lactose intolerant.
- Include dairy products in the diet.
- Include milk and other dairy products as sources of calcium, vitamin D and milk protein

Genes analyzed: *MCM6*

34. SALT INTAKE AND BLOOD PRESSURE SENSITIVITY

High: Highly likely to have lower BP on low salt diet

Sodium is an essential electrolyte present in the extra cellular fluid. It regulates osmosis and maintains fluid levels within the cell and it also plays an important role in enzyme functions and contraction of muscles. The American Heart Association (AHA) recommends not more than 2300 mg of salt per day; however, most people eat too much salt. On an average 3400 mg of salt is consumed with most of it coming from processed foods. People of certain genetic type will have higher blood pressure in response to high salt consumption. Nearly 50% of hypertensive people are salt-sensitive, which is associated with a rise in BP with salt intake. These individuals will tend to reduce BP with lower salt intake, which is recommended.

Recommendation:

- People with your genetic type show a greater reduction in blood pressure levels on a low salt diet.
- Reduce salt intake to about a teaspoon of salt per day.
- Limit high salt content food (canned, processed, baked, salt-dried and pickled foods).
- Even sweet tasting food can have high salt content, check the food labels carefully.
- Consider adding spices and herbs such as oregano, rosemary, mint, parsley, garlic and ginger for favour instead of salt.
- Potassium rich foods (banana, sweet potato, spinach, apple, orange, cabbage) help regulate blood pressure.

Genes analyzed: *ACE, CYP11B2, NPPA, AGT, SGK1*

35. RIBOFLAVIN AND BLOOD PRESSURE RESPONSE

Insensitive: Less likely to have lower BP on high Riboflavin intake

Riboflavin, also known as vitamin B2, is a water soluble vitamin. Nerves and brain need riboflavin to function properly. It is also required for healthy skin, hair, eyes and liver. people of certain genetic types will have lower blood pressure in response to high riboflavin intake.

Recommendation:

- You have a genetic tendency to have no effect on blood pressure on increased intake of riboflavin.
- Though blood pressure levels are not affected by increasing intake of riboflavin, its deficiency can lead to symptoms like burning mouth, angular cheilitis, anemia, and vision problem.
- Include foods rich in riboflavin like eggs, liver, dairy products and enriched flour in your diet to ensure optimum level of vitamin B2 in the body.

Genes analyzed: *MTHFR*

36. ALCOHOL FLUSH

Low: Less likely to experience alcohol flush

People of certain genetic type may experience symptoms like redness of the face and neck upon consuming alcohol due to reduced clearance of acetaldehyde which is produced in the body upon consuming alcohol. Though alcohol avoidance per limitation is recommended for all, people with the alcohol flush genotype may be at higher health risk upon alcohol consumption

Recommendation:

- You have a low genetic tendency to experience alcohol flush.
- However, do remember alcohol consumption is a risk factor for many health conditions.
- Consume alcohol in moderation.

Genes analyzed: *ALDH2*

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