Summarised GENEDIET™ Report

Name	Female	Report Date	2022-03-22
Surname	Case Study	Date of Sample Collection	2016-05-15
Ref Number	00001014	Date Sample Received	2016-05-17
Sample Type	Buccal Swab	Referring Practitioner	Female Case Study
Gender	Female	Estimated Weight	64
Age	49	Estimated Height	1.6
Race	White/Caucasian	Estimated Waist	80
Date of Birth	1971-10-10	Blood Pressure	Normal

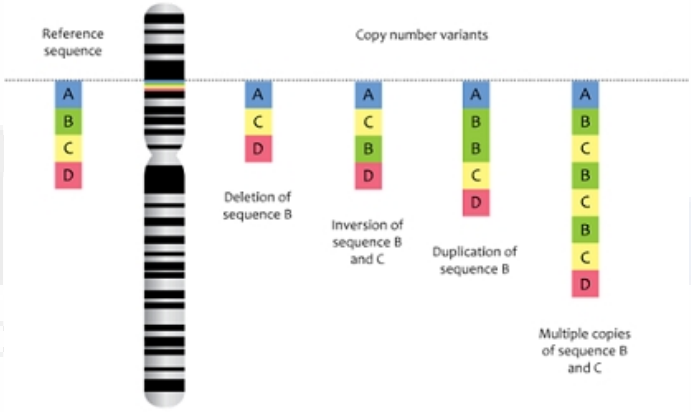
GENEDIET™

UNDERSTANDING THE RESULTS

The complexity of modern health care necessitates an innovative approach to manage the risk of multifactorial diseases that could be applied in a medical context where genetic test results are integrated with relevant clinical, environmental, lifestyle and pathology assessments.

Variations in DNA

Genetic variations account for the different phenotypes and diverse responses to the environment between individuals. The detection of genetic variations are reported as Single Nucleotide Polymorphisms (SNPs) or copy-number variations (CNVs).

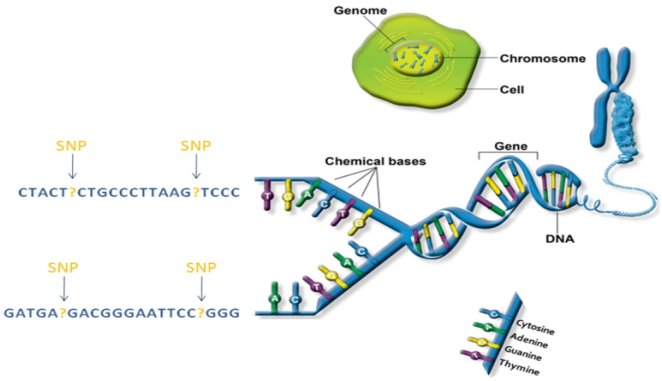


CNVs

CNVs comprise deletions, insertions and duplications. A CNV is present when the number of copies of a particular gene varies from one individual to the next. Thus, the genome (the entire set of 23 chromosomes in a person) experiences gains and losses of genetic material.
www.emedmd.com

SNPs

DNA molecules consists of four different types of nucleotides that pair with each other in a very specific manner. Complementary base pairings are responsible for the double-helix structure of DNA. There are four different kinds of nucleotides that make up DNA: adenine (A), cytosine (C), guanine (G) and thymine (T). Only two kinds of base pairs are possible: GC (or CG) and AT (or TA). A variation at a single base pair is called a SNP. SNPs generate biological variation between people.
https://kaiserscience.wordpress.com/biology-the-living-environment/genetics/



Result Legend

- The red circle indicates high impact, compared to the risk of the general population.
- The yellow circle indicates moderate impact, compared to the risk of the general population.
- The green circle indicates low impact, compared to the risk of the general population.
- The blue circle indicates no impact, or additional self-reported information.

Lifestyle Questionnaire

Personal History

Cognitive
Diabetes
Fatty Liver
Thyroid
Overweight
PCOS
Pregnancy Loss
Sleep
Allergy: Fish

Family History

Cognitive
Inflammatory
Hypertension
Fatty Liver
PCOS
Pregnancy Loss
Sleep
Anaemias
Bone density
Insulin Resistance

Diet

Fat Intake - High
Fibre & Magnesium Intake - Moderate
Folate Intake - Moderate

Physical Activity

Physical Activity Level: Casual

Lifestyle

Alcohol Consumption - Low
Body Mass Index
Non-Smoker

Pharmaceutical

Vitamin B-complex
Protein or other Shake

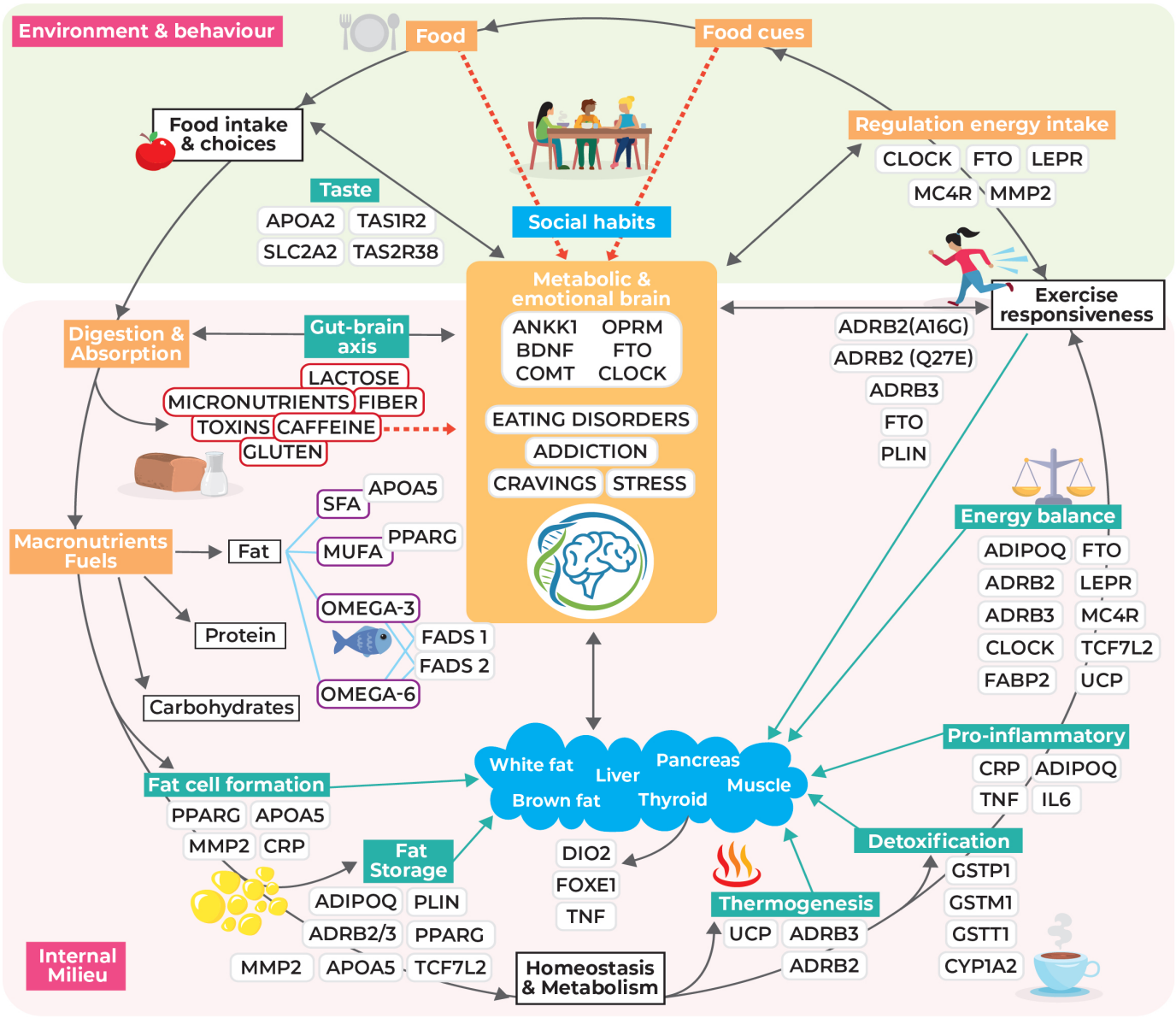
Priorities based on Genetic Impact

Unfavourable				Favourable
Benefit of increasing MUFA for weight management	Hunger & Satiety	Caffeine Sensitivity	Eating Behaviours	Lactose Sensitivity
Plant-derived Vitamin A Conversion Effectiveness	Obesity Risk Index	How effective will a lower-carbohydrate diet be for weight management?	Magnesium Requirement	Iron Deficiency Risk
Fiber Requirement	Energy Expenditure	Taste Preference & Perception	How effective will a higher protein diet be for weight management?	Glutathione Conjugation (binding) Capacity
Non-Celiac Gluten Sensitivity	Thyroid	Weight Loss Resistance		Plant-derived Omega-3 Conversion Effectiveness
	Exercise Responsiveness	How effective will a lower-fat diet be for weight management?		Iron Overload Susceptibility
	Pro-inflammatory Response	Vitamin C Requirement		
	Saturated Fat Tolerance during Weight Loss	Calorie Restriction Required		
		Detoxification		
		Vitamin D & Calcium Requirement		
		Plant-derived Omega-6 Conversion Effectiveness		

OBESITY & GENETICS

GENEWAY because genes matter™

GENES



NOTES:

Recommendations & Comments

Biomarkers & Clinical

Comprehensive Fatty Acids Test

DHEAs (de-hydro-epi-androsterone)

Fasting Insulin, Glucose, HbA1c

Full Thyroid Profile: TSH, Free T4, Free T3 and Thyroid antibodies (Optimal T3:T4 ratio is 2.4 to 2.7) Conversion calculator of units of blood tests: https://www.amamanualofstyle.com/page/si-conversion-calculator

High sensitivity C-Reactive Protein (hs-CRP) (Ideal: <1 - 1.5mg/L)

Hydroxy-2-deoxyguanosine (8-OHdG) to measure oxidative stress

Lipogram (total cholesterol, LDL, HDL, TG)

Monitor Blood Pressure

Red Blood Cell Folate (Especially with low dietary folate intake)

Uric acid

Vitamin D3 (Ideal 50 - 85ng/ml)

Supplements / Nutrients

Amino Acids (if dietary intake is insufficient eg vegan)

Antioxidant supplementation eg GENEWAY™ Antioxidant: 2-4 caps/d

CLA (Conjugated Linoleic Acid): 1-3g/day

Curcumin: 500-1500mg/day

EGCG (Epi-gallo-catechin-3-gallate): 400 to 800mg/d

Fiber: 4-6g/day, mostly soluble

Folate (methylated): 400-800µg/day

Genistein (soy): 10-20mg/kg

Glucose & Insulin metabolism e.g. GENEWAY™ Carb Support: 1-4 capsules/day

Glutathione Antioxidant (dosage as per practitioner)

Heavy metal detoxification supplement, if needed

Magnesium 500-1500mg/d e.g. GENEWAY™ Magnesium: 1-4 capsules/day

May need to avoid iodine supplements, unless otherwise indicated by Healthcare Professional

Omega-3 (DHA/EHA)

Probiotics e.g. GENEWAY™ Probiotic

Supreme Wellness Multivitamin: 2-4 tablets/d

Thyroid support supplements (contains iodine)

Vitamin C: 100-500mg/day

Zinc: >1.5mg/day

Lifestyle

BPA (Bisphenol A) exposure affects the MC4R gene and can contribute to an increase in weight gain

Eat regularly, five times per day

Impaired ability to detoxify environmental toxins (air pollution, smoke) as well as pesticides, herbicides, and polycyclic aromatic hydrocarbons (PAHs) found in grilled meat

Mould (fungus) can affect MC4R function – ensure your home is mould free

Never skip meals - the risk of overweight is nearly 3 times higher in meal skippers

You have a genetic predisposition to crave fatty foods

You have genetic predisposition to an increased feeling of hunger

Diet

Anti-inflammatory diet eg Okinawan & Mediterranean diets high in Omega -3

Avoid Butylated Hydroxyanisole (BHA) - an additive that preserves oils in food (including chewing gums)

Avoid starchy foods that have been heated higher than 120°C (e.g. Crisps and french fries)

Caffeine dosage: 3-6mg/kg body weight (100mg caffeine in 1 cup filter coffee)

Cooking reduces glutathione content of vegetables by 30-60%

If overweight, reduce intake of omega -6 fatty acids (linoleic acid [safflower, grapeseed, wheat germ, corn and walnut oil] and arachidonic acid [meat, dairy, eggs])

If overweight, restrict lactose intake to less than 8g/day (even though you are considered lactose tolerant)

Likely to tolerate lactose

May benefit from MCT oil during weight loss

Sensitivity to saturated fats eg animal fats and full cream products, may be present

Time-restricted feeding: eat within a 12-hour time frame for weight loss

You have a rare variant of the APOA2 gene that makes you very sensitive to saturated fat - thus avoid

Pharmaceutical

If you are smoking, Bupropion (Wellbutrin) is very effective for smoking cessation for the ANKK1 gene result

Orlistat increases adiponectin levels

Tendency to gain weight on atypical antipsychotics (MC4R)

Physical Activity

For weight loss, a target of at least 20 - 25 METs (Metabolic Equivalent for Task) per week, consisting of moderate to high intensity activities (3-6 METs), is recommended. A MET is a unit that estimates the amount of energy used by the body during physical activity, as compared to resting metabolism. The MET unit is standardised so it can apply to people of varying body weight and compare different activities. Resting energy expenditure (sitting) is defined as 1 MET. The MET values can be found here:
https://sites.google.com/site/compendiumofphysicalactivities/compendia

Other

A slow rate of weight loss is expected

Calculate your BMR (Basal Metabolic Rate) www.bmi-calculator.net/bmr-calculator/

Very low genetic risk for addictive traits

Visit https://learn.genetics.utah.edu/content/epigenetics to find out more about genetics

Interpretation Summary

Obesity Risk Index

Genetically, you are predisposed to excessive weight gain. Your overall Obesity Risk Score index is much higher compared to the general population. Preventative strategies including the appropriate diet and physical activity are thus very important. Discuss the best type of diet with your healthcare practitioner.

Weight Loss Resistance

Your genetic results show a moderately high susceptibility to weight loss resistance and adipogenesis. Weight loss resistance refers to losing weight slowly and adipogenesis indicates if you pick up weight easily. This result should guide your targets about the rate of weight loss.

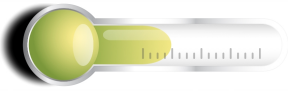
Calorie Restriction Required

Based on your genetic results, the Energy-In-Energy-Out rule will play part in your weight loss success. You have to reduce your energy intake, or increase the output, to create a caloric deficit in order to lose weight. Discuss your calorie restriction strategy with a professional, since it may influence muscle loss and affect your metabolism negatively.

How effective will a lower-carbohydrate diet be for weight management?

Based on your genetic profile, a moderate restriction of carbohydrates is likely to be effective for weight management. There is no standard definition, but generally, moderate-carb diets provide 40-60% of total energy intake. Taking an average of 50%, that translates to 190g carbs for a diet providing 6,500 kJ and 235g/8,000 kJ. The RDA for all adults is 130g carbs daily. Consult a healthcare practitioner for the interpretation and recommendations for your overall macronutrient requirements.

How effective will a higher protein diet be for weight management?



Your genetic profile suggests that a higher protein diet would be beneficial for weight management. Higher protein diets typically provide 1.2-2g/kg body mass of protein or about 25% of the total energy intake. The results of your dietary carbohydrate and fat tolerance, among other factors, will guide the healthcare practitioner about your protein requirements. The safe upper limit for protein intake is 35% (or 2.5g/kg), and if prescribed, limited to supervised and special instances e.g. for professional athletes.

How effective will a lower-fat diet be for weight management?

Based on your genetic profile, you are likely to maintain a healthy weight with moderate dietary fat intake. The balance of the total energy intake is made up of carbohydrates and protein. Moderate-fat diets are not well defined but typically provide 25-35% of total energy from dietary fat, and less than 10% from saturated fats. Discuss your individual requirements with a qualified healthcare professional, since many other factors should be considered.

Benefit of increasing MUFA for weight management

Based on your genetic profile, adhering to a diet with very high monounsaturated fats (MUFA) content is less likely to benefit weight management. The most common sources of MUFAs are olive oil, nuts and seeds. MUFAs are non-essential fatty acids unlike linoleic acid and alpha-linoleic acid, the only two fatty acids that are considered essential. Both are polyunsaturated fatty acids.

Energy Expenditure

Energy expenditure (EE) is the total amount of energy (or calories) that a person needs to complete all bodily functions and physical activity. The genetic effect may reach 40% of the variance in EE. Based on your genetic testing, you have a low EE potential and will burn calories less efficiently. It is important that you follow the correct diet and have an active lifestyle to overcome this genetic weakness.

Eating Behaviours

Eating behaviours generally influence meal timing, the quantity of food intake, food preference, food selection, emotional and binge eating. Genetically, you have a low risk of tendencies towards eating behaviours that may hinder your weight loss. If compromising eating behaviours are present, it might be due to lifestyle or circumstantial factors.

Hunger & Satiety

Genes influence the delicate balancing act between hunger and satiety hormones. The genetic variations detected in your gene profile will make you susceptible to an increased appetite and reduced feeling of fullness after meals. Increasing the amount of fiber, protein and regular healthy snacks throughout the day, may help to curb your appetite.

Thyroid

Your genetic profile confers a high risk of thyroid dysfunction. It can relate to either over- or underactive thyroid function. The thyroid gland's primary function is to regulate the body's metabolism - how fast you burn energy. Adequate iodine and selenium intake are especially important.

Exercise Responsiveness

Your genetic results indicate that your rate of fat loss in response to exercise tend to be slow. You have to include dietary changes to maintain your ideal body mass as regular physical activity on its own may not suffice. In addition you might need to increase the intensity and/or duration of exercise to achieve weight loss goals.

Taste Preference & Perception

Taste perception plays a fundamental role in our dietary preferences and genetic variations in taste receptors may account for differences in food choices. The types of tastes and preferences that are tested include bitter, sweet, salty and fatty. The genetic test detected variations in the taste genes and it may affect your food choices and behaviours. For example, you may add extra flavourings such as salt or sugar to food to offset certain tastes or may tend to crave certain foods.

Detoxification

Detoxification is the metabolic process the body uses to transform and eliminate toxins. Genetics drive glutathione production - a critical molecule to bind toxins. Based on the genes tested, you have reduced glutathione production. Added measures are needed to support detoxification such as the liberal consumption of cruciferous vegetables (e.g. broccoli).

Pro-inflammatory Response

Susceptibility to an increased inflammatory response is genetically determined. Your genotype profile indicates you are at high risk for chronic low-grade inflammation which is associated with metabolic conditions such as impaired glucose tolerance and obesity.

Overall Nutritional Requirements

Plant-derived Vitamin A Conversion Effectiveness

Vitamin A is essential for proper vision, growth, immune function, fertility, skin and gut health. Your BCMO1 gene result is associated with an inability to convert plant-based vitamin A (beta-carotene) to the active form, retinol. Therefore, you may benefit from retinol supplementation. Excessive intake can lead to toxic levels. Excessive intake can lead to toxic levels, therefore discuss supplementation with a health care professional. Consider monitoring your blood retinol levels. Vitamin A is a general term for a group of compounds including retinol, retinal, retinoic acid and provitamin A carotenoids. Carotenoids (betacarotene) are naturally present in plant-based foods such as sweet potatoes, carrots, spinach and dried apricots. Beta-carotene must be converted into bioactive vitamin A that is critical for normal vision, the immune system, and reproduction. Vitamin A also helps the heart, lungs, kidneys and other organs work properly.

Vitamin C Requirement

Vitamin C must be acquired from dietary sources, as humans are unable to synthesize it. Genetically, your Vitamin C requirements are at least double that of the RDA (Recommended Dietary Allowance). For females, it's 130mg/day and for males, 180mg/day. Some dietary sources of vitamin C include lemons, oranges, red peppers and strawberries.

Fiber Requirement

Your genetic profile indicates that dietary fiber is essential for you to maintain optimal body weight. The recommended intake is 25-30g per day, for adult females and males respectively. However, you need more based on your genetic results. Current research shows the average daily intake of dietary fiber is closer to 15g/day. Fiber is grouped by soluble, insoluble or resistant starch. Fiber supports the growth of friendly bacteria needed to help maintain a healthy gut, reduce cholesterol absorption, slow down the absorption of glucose, keeping you feeling fuller for longer and helps to keep you regular. It is found in edible plant foods such as cereals, fruits, vegetables, legumes, nuts, lentils and grains.

Glutathione Conjugation (binding) Capacity

Based on your genetic profile, you have a very good ability to utilise glutathione, the 'master' antioxidant that binds free radicals and several toxins. Accumulation of free radicals and toxins are harmful to the body and affects weight loss.

Carb Support™ Requirement

Based on the genes tested in this analysis, you have a moderately increased risk for type 2 diabetes and insulin resistance. You are likely to benefit from the GENEWAY™ Carb Support supplement to reduce the risk. The bioactive ingredients in Carb Support™ function on various pathways responsible for metabolic regulation such as body fat accumulation and dietary carbohydrate digestion and absorption. Other factors that increase the risk of developing type 2 diabetes and insulin resistance include obesity, chronic steroid use and stress. Insulin resistance typically precedes the development of type 2 diabetes. In addition, the ingredients in Carb Support™ have some other health benefits including potent antioxidant, anti-inflammatory, weight management and cardiovascular health advantages.

Vitamin D & Calcium Requirement

Your genetic profile is associated with an increased risk of insufficient vitamin D stores in the body. This risk increases if you are following a very low-fat diet, is a professional athlete, or has limited exposure (less than 20 minutes) to sunlight daily. Consider testing your vitamin D levels (blood tests). Vitamin D is known mostly for its role in maintaining strong bones. It does so by helping the body absorb calcium. Both vitamin D and calcium are required by the muscles, nervous and immune systems to function optimally. Very few foods naturally have vitamin D. The body makes vitamin D when the skin is directly exposed to the sun. Approximately 600 IU is required per day of the active form of vitamin D3, cholecalciferol. Calcium is found in dairy and adults need between 1000-1200mg daily. Consider testing your vitamin D levels (blood tests).

Plant-derived Omega-3 Conversion Effectiveness

The FADS1/2 genes are essential for the conversion of omega-3 fatty acids derived from plant sources (e.g. linolenic acid (ALA) found in walnuts, flaxseed, canola and soybean oil), into the bioactive omega-3 fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Your result is associated with an optimal conversion ability resulting in normal to higher EPA/DHA levels. You should be able to fulfill your omega-3 requirements from plant-based sources.

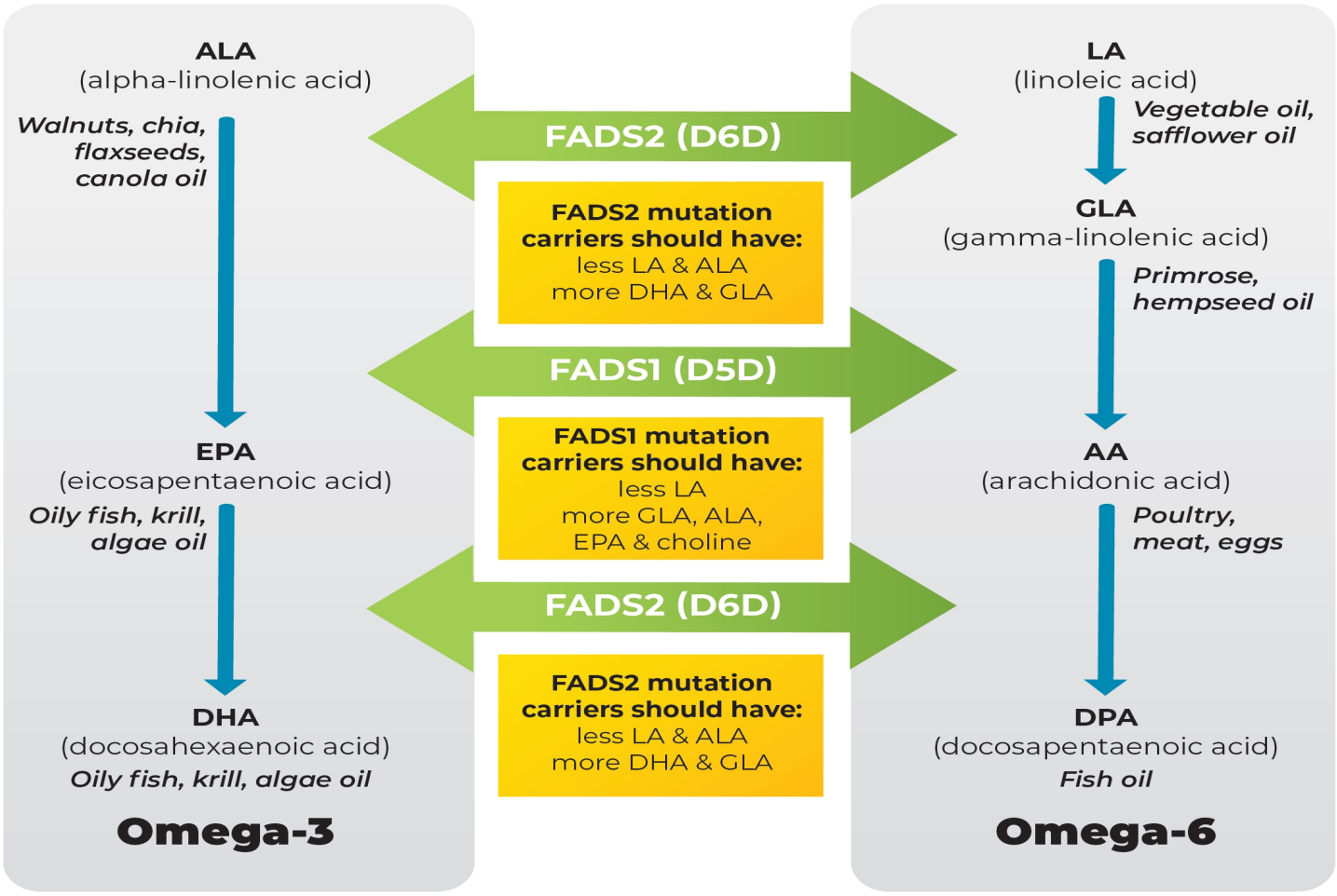
Saturated Fat Tolerance during Weight Loss

Based on your gene profile, eating a high amount of saturated fats (SFA) increases your risk of obesity and weight loss difficulty. A maximum of 7-8% of your daily energy intake may consist of SFA. Lowering the intake of dietary sources of SFA such as fatty beef, lamb, pork, poultry with skin, cream, butter and cheese, will have a beneficial effect on lowering body mass.

Plant-derived Omega-6 Conversion Effectiveness

Your gene profile detected variations in the FADS1/2 genes. Faster FADS1 gene activity (G allele) is associated with higher arachidonic acid (AA) levels. AA dietary sources include chicken and beef. Slower FADS2 gene activity (G allele) is associated with higher linoleic acid (LA) and lower gamma-linoleic acid (GLA) levels. LA is found in flaxseeds (and oil), canola oil, soybeans (oil), pumpkin seeds and walnuts (oil). GLA is obtained from evening primrose, borage and hemp seed oil and spirulina.

FATTY ACID SYNTHESIS



Iron Overload Susceptibility

Hemochromatosis is a condition where the body absorbs too much iron. Your overall genetic results indicate a low risk of iron overload. There are, however, other non-genetic factors that may contribute to high iron levels in the body.

Magnesium Requirement

According to your genetic profile, you have typical magnesium requirements. Magnesium is an essential mineral that is a cofactor in more than 400 reactions in the body and the recommended daily intake is around 400mg/d for adults.

Caffeine Sensitivity

Your genetic profile is associated with moderately slow caffeine metabolism. As a result caffeine is not retained for a long time in the body. This result may cause difficulty in sleeping, Other lifestyle factors such as the quantity of caffeine consumed, smoking or hormonal birth control may also affect your ability to metabolise caffeine.

Non-Celiac Gluten Sensitivity

Based on the gene tested, you are at high risk for non-celiac gluten sensitivity. There are other genes and factors involved in determining gluten intolerance (GI). Gluten intolerance is quite complex and difficult to diagnose. GI can cause widespread symptoms, many of which have nothing to do with digestion, such as tiredness, depression, skin problems and joint pain.

Lactose Sensitivity

Lactose is the natural sugar found in dairy products and based on the genetic profile you are likely able to digest lactose without adverse effects. Lactose tolerance should not be confused with a milk allergy.

Iron Deficiency Risk

Iron is a mineral essential for oxygen transport through the blood. Your genetic result indicates a normal ability to absorb dietary iron and you thus have a lower risk to suffer from anemia. Nevertheless, with a low iron intake (e.g. vegetarian diet) or blood loss, you may still become anemic.

THE MET SYSTEM

From the physical activity recommendation above, you are now aware of the amount of exercise needed to aid in weight loss and maintaining a healthy weight. This is expressed in terms of MET hours.

What is a MET?

The Metabolic Equivalent of Task (MET) is a physiological measure expressing the energy cost of physical activities. MET is defined as the ratio of the metabolic rate (thus the rate of energy consumption) during a specific physical activity to a reference metabolic rate.

One MET equals 1 kcal/kg/hour and is roughly equivalent to the energy cost of sitting quietly.

MET Hours Explained

The MET system can be thought of as an index of the intensity of activities: for example, an activity with a MET value of 2, such as walking at a slow pace (e.g. 3 km/h) would require twice the energy that an average person consumes at rest (e.g. sitting quietly). The more vigorous the activity the higher the MET value will be. Accurate MET values are available for a wide variety of activities and are an excellent way to develop and track your progress. The Compendium of Physical Activities is a comprehensive catalogue of MET intensities and can be found on the following website:

https://sites.google.com/site/compendiumofphysicalactivities/

HOW TO CALCULATE YOUR WEEKLY MET HOUR SCORE

Choose your preferred activity from the list of activities in the Tables below. The activities have been divided into light, moderate and vigorous intensities.

By means of applying the formula below, multiply the MET value of the selected activity by the actual number of hours the activity is performed to determine your MET hours.

Add all the MET hours for each of the activities for the week together, to determine your weekly MET hour score. You can now compare it to your goals and the recommended weekly MET hours, based on your current fitness level and genetic results.

MET Hours Score Calculation Example

Activity:	Walking 7.2km/hr level, firm surface, very, very brisk
Duration:	1 hour per session
Frequency:	3 days per week

Formula:

MET Value x Duration (in actual hours) = MET Hours

7 METs x 1 hour = 7 MET hours

7 MET hours x 3 days in a week = 21 weekly MET hours

How to determine your Intensity Range

You can find your exercise intensity by using the 'talk test' or Target Heart Rate (THR).

With light intensity exercise, you can still talk and hold a conversation. During moderate intensity exercise, your breathing is more rapid, but you are not out of breath and you can still talk but not sing. Vigorous intensity exercise causes deep and rapid breathing and you cannot say more than a few words without pausing.

Your Target Heart Rate (THR) is a percentage of your Maximum Heart Rate (HR_{max}). A straightforward (but less scientific) way to find your HR_{max} is to subtract your age from 220. Once you have your HR_{max}, you can calculate your THR for moderate and vigorous aerobic activity. Moderate aerobic activity is 60% to 70% of your HR_{max}. Vigorous aerobic activity is 70% to 80% of your HR_{max}.

Example of Target Heart Rate for a 31-year old:

Maximum Heart Rate: 220 – 31 years = 189 beats per minute (bpm)

60% of 189 bpm = 113 bpm and indicates moderate intensity.

80% of 189 bpm = 151 bpm and indicates vigorous intensity.

RATE OF PERCEIVED EXERTION AND TARGET HEART RATE ZONES

Zone	Intensity % of HRmax bpm	RPE	Benefits
Maximum	90 - 100%	>6	Develop maximum performance and speed
Anaerobic	80 - 90%	5 - 6	Improve maximum performance capacity
Aerobic	70 - 80%	4 - 5	Improve aerobic fitness and blood circulation
Fat Burning	60 - 70 %	2 - 3	Improve general endurance and burn fat
Warm up	50 - 60 %	< 2	Warm up and cooling down, aid in recovery

bpm - beats per minute

HR_{max} - Maximum Heart Rate

RPE - Rate of Perceived Exertion: your perception of a training session with a score of zero (0) being no exertion, and 10 being maximum output

For weight loss, you will need to exercise in the 'Fat Burning Zone'. Exercises such as walking and cycling with little resistance prompt your heart rate to stay in the 'Fat Burning Zone'. This zone encourages your body to use fats as a fuel source.

When designing your weekly exercise program, it is important to include injury preventing conditioning exercises and allow time for recovery during and after training sessions.

Use the MET Weekly Exercise Planner on the next page to design your workout program. Consult your Health Care Practitioner before starting any new exercise regime and stop should you feel dizzy, nauseous or experience severe shortness of breath.

ACTIVITIES WITH MET VALUES AND INTENSITIES

ACTIVITY	MET/60 min	INTENSITY
Walk less than 3.2km/hr, firm surface	2	LIGHT INTENSITY
Horse riding, walking	2.5	
Stretching, yoga	2.5	
Walking 3.2km/hr, firm surface	2.5	
Walking 4km/hr, downhill	2.8	
Light effort abdominal crunches	2.8	
Fitball exercise	2.8	
Upper arm exercise	2.8	
Canoeing, rowing 3-7km/hr, light effort	2.8	
Pilates	3	
Diving, springboard or platform	3	
Cycling less than 16km/hr, for leisure	3.5	MODERATE INTENSITY
Cycling stationary, 30-50 watts very light to light efforts	3.5	
Walking 5.6km/hr, brisk pace, firm surface	3.8	
Callisthenics (e.g. push-ups, sit-ups, pull-ups, lunges), moderate effort	3.8	
Tai Chi	4	
Circuit Training, moderate effort	4.3	
Golf, walking, carrying clubs	4.5	
Badminton	4.5	
Rowing, Stationary, 50 watts light effort	4.8	
Resistance (weight) training, squats , slow or explosive effort	5	
Water aerobics	5.3	
Horse riding, trotting	5.5	
Swimming freestyle, moderate effort	5.8	
Cycling stationary 100 watts, light to moderate efforts	6	
Weight lifting, vigorous effort	6	
Jogging/walking combination less than 10 min	6	
Boxing, against punching bag	6	
Hiking, cross country	6	
Walking 5.6km/hr, uphill	6	
Running less than 7km/hr (15 min/2km)	6	

ACTIVITY	MET/60 min	INTENSITY
Walking 7.2km/hr level, firm surface, very, very brisk	7	HIGH INTENSITY
Squash	7.3	
Cycling, general	7.5	
Hockey	7.8	
Boxing, sparring	7.8	
Jogging	8	
Circuit training, including kettlebells, some aerobic movement with minimal rest, general, vigorous intensity	8	
Conditioning classes (Aerobics, vigorous)	8	
Running 8km/hr	8	
Mountain climbing	8	
Tennis, singles	8	
Walking, 8km/hr, firm surface	8.3	
Mountain biking, general	8.5	
Stationary rowing 150 watts	8.5	
Cycling stationary at 150 watts, vigorous effort	8.8	
Cross country running	9	
Orienteering	9	
Swimming, freestyle, vigorous effort	9.8	
Running 10km/hr	9.8	
Walking 8km/hr, uphill	9.8	
Cycling 22-26km/hr, vigorous	10	
Soccer, competitive	10	
Swimming, crawling, fast speed	10	
Martial arts (Kickboxing, Judo, Tae Bo, etc.)	10.3	
Rope jumping, fast	11	
Cycling stationary at 160-200 watts, vigorous effort	11	
Running 12.8km/hr	11.8	
Stationary rowing 200 watts, very vigorous	12	
Cycling, racing 26-30km/hr	12	
Canoeing, rowing, kayaking, competition, >10km/hr, vigorous effort	12.5	
Running marathons	13	
Swimming, butterfly	13.8	
Mountain biking, uphill and competitive	14	
Cycling >32km/hr	15.8	

MET WEEKLY EXERCISE PLANNER

DAY	ACTIVITY	MET-Value	DURATION	MET-Hours = MET Value x Duration (in hours)	TOTAL MET SCORE (for the day)
Example					
Monday	Cycling <16km/hr	3.5	1 hour	3.5	3.5
Tuesday	Cycling stationary at 150 watts, vigorous	8.8	½ hour	4.4	4.4
Friday	Cycle >32km/hr	15.8	1 hour	15.8	15.8
				Total for the week	23.7
				Weekly Goal:	24 MET Hours
				TOTAL SCORE FOR THE WEEK	

Summary of Genetic Results

Obesity Risk Index

ADIPOQ (-11391G>A): Whole-body energy homeostasis	G/G
ADRB2 (A16G): Thermogenesis	G/G
ADRB2 (Q27E): Size of fat cells (Adipocytes)	G/G
FTO (T>A): Satiety	A/A
PPARG (Pro12Ala): Adipogenesis (fat cell production)	C/C
TNF α (-308 G>A): Pro-inflammation	A/A
FABP2 (Ala54Thr): Absorption of Omega-6 fats	C/T
LEPR (668A>G): Regulating food intake	A/G
MC4R (T>C): Weight regain	C/T
TCF7L2 (C>T): Insulin secretion	C/C
UCP1 (-3826T>C): Thermogenesis	T/T

Weight Loss Resistance

ADIPOQ (-11391G/A): Glucose regulation	G/G
ADRB2 (A16G): Adipose tissue turnover	G/G
ADRB2 (Q27E): Size of fat cells (Adipocytes)	G/G
APOA2 (-265T>C): Fat intake -dependent fat cell formation	G/G
PPARG (Pro12Ala): Adipogenesis (fat cell production)	C/C
CLOCK (3111 T>C): Circadian patterns	A/G
CRP4 (G3872A): Inflammation-driven adipogenesis	C/T
FABP2 (Ala54Thr): Fatty acids absorption	C/T
IRS1 (T>C): Insulin resistance	C/T
MMP2 (Gly226Gly): Fat cell storage capacity	C/G
ACE (I/D): Weight regain	C/C
ADRB3 (Trp64Arg): Thermogenesis	A/A
APOA5 (-1131T>C): Inhibition of adipogenesis	A/A
PLIN (11482G>A): Lipolysis (Fat breakdown)	C/C
TCF7L2 (C>T): Adipocyte differentiation & Blood glucose homeostasis	C/C
UCP1 (-3826T>C): Thermogenesis	T/T

Calorie Restriction Required

ADIPOQ (-11391G>A): Calorie restriction	G/G
ADRB2 (A16G): Lipolysis	G/G
ADRB2 (Q27E): Lipolysis	G/G
UCP2 (-866G>A): Energy homeostasis	G/G
UCP3 (55C>T): Energy intake restriction	G/G
CLOCK (3111 T>C): Energy intake restriction	A/G
LEPR (Lys109Arg): Energy intake	A/G
ADRB3 (Trp64Arg): Thermogenesis	A/A
PPARG (Pro12Ala): Adipogenesis	C/C
UCP1 (-3826T>C): Basal Metabolic Rate	T/T

How effective will a lower-carbohydrate diet be for weight management?

ACE (I/D): Glucose tolerance	C/C
FTO (T>A): Compliance to lower-carbohydrate diet	A/A
TCF7L2 (C>T): Glucose metabolism	C/C
TFAP2B (A>G): Carbohydrate restriction	A/A
FABP2 (Ala54Thr): Fatty acids absorption	C/T
ADRB2 (Q27E): Benefit of carbohydrate restriction	G/G
PLIN (11482G>A): Baseline insulin levels	C/C
UCP3 (55C>T): Higher protein, Lower carbohydrate diet	G/G
SLC2A2 (Thr110Ile): Glucose 'carrier'	G/G

How effective will a higher protein diet be for weight management?

TCF7L2 (C>T): Higher protein diet effectiveness	C/C
FTO (T>A): Satiety response on protein intake	A/A
TFAP2B (A>G): Protein intake and adiposity	A/A
UCP3 (55C>T): Higher protein, lower carbohydrate, higher MUFA diet	G/G
BDNF (Val66Met): Protein requirements	C/C

Benefit of increasing MUFA for weight management

ADIPOQ (-11391G>A): Monounsaturated fats tolerance	G/G
IL6 (-174 G/C): Mediterranean-style diet effectiveness	G/G
FTO (T>A): MUFA for weight management	A/A
PPARG (Pro12Ala): Monounsaturated fat tolerance	C/C
TCF7L2 (C>T): Increase MUFA intake for glucose management	C/C

How effective will a lower-fat diet be for weight management?

ACE: SFA sensitivity	C/C
TCF7L2: Omega-6 restriction	C/C
FABP2: Omega-6 absorption	C/T
IRS1 (T>C): Insulin resistance improvement	C/T
ADRB3: SFA sensitivity	A/A
APOA2: SFA sensitivity	G/G
APOA5: SFA sensitivity & TG metabolism	A/A
FTO: SFA sensitivity	A/A
LEPR: Leptin sensitivity	A/G
PLIN: Fat storage	C/C
TFAP2B: Fat tissue	A/A
TNFA: Dietary fat sensitivity	A/A
PPARG: PUFA:SFA ratio	C/C

Energy Expenditure

ADRB2 (A16G): Thermogenesis	G/G
ADRB2 (Q27E): Fat breakdown	G/G
FTO (T>A): Energy homeostasis	A/A
CLOCK (3111 T>C): Cyclic energy expenditure	A/G
FABP2 (Ala54Thr): Resting metabolic rate	C/T
LEPR (Lys109Arg): Leptin resistance	A/G
MC4R T>C: Appetite	C/T
ADRB3 (Trp64Arg): Lipolysis	A/A
LEPR (Lys656Asn): Resting metabolic rate	G/G
UCP1 (-3826T>C): Thermogenesis & metabolic rate	T/T

Eating Behaviours

CLOCK (3111 T>C): Irregular eating times	A/G
COMT (Val158Met): Stress/Anxiety	A/G
LEPR (Lys109Arg): Snacking	A/G
ANKK1 (Taq1A): Cravings & addictive tendencies	G/G
BDNF (Val66Met): Risk of eating disorders	C/C
OPRM1 (A118G): Emotional eating and alcohol cravings	A/A

Hunger & Satiety

FTO (T>A): Visual cues & binge eating	A/A
LEPR (668A>G): Satiety impairment	A/G
MC4R (V103I): Overeating behaviours & satiety signal	C/T
MMP2 (Gly226Gly): Satiety signals	C/G

Thyroid

FTO (T>A): Thyroid hormone levels (TSH)	A/A
TNF α (-308 G>A): Auto-immunity	A/A
FOXE1 (A>G): Hypothyroidism	A/G
LEPR (668A>G): Thyroid health	A/G
ADRB2 (Q27E): Hyperthyroidism	G/G

Exercise Responsiveness

ADRB2 (A16G): Fat burning during exercise	G/G
ADRB2 (Q27E): Fat mobilisation	G/G
PLIN (11482G>A): Fat oxidation & lipolysis	C/C
ACE (I/D): Exercise response	C/C
ADRB3 (Trp64Arg): Abdominal fat breakdown	A/A
FTO (T>A): Exercise response	A/A
PPARG (Pro12Ala): Aerobic or anaerobic exercise for weight loss	C/C
LEPR (668A>G): Resistance training	A/G

Taste Preference & Perception

APOA2 (-265T>C): Fat taste preference	G/G
TAS2R38 (A>G): Taster/Non-Taster and overeating	A/G
SLC2A2 (Thr110Ile): Sweet tooth	G/G
TAS1R2 (Ile191Val): Sweet taste perception	T/T

Detoxification

GSTM1 (Lys173Gln): Cellular detoxification	ABS
CYP1A2*1F: Caffeine detoxification	C/A
GSTP1 (Ile105Val): Neutralise Free Radicals	A/G
GSTT1 (Val169Ile): Antioxidant requirements	PRS

Pro-Inflammatory Response

ADIPOQ (-11391G>A): Systemic low-grade inflammation	G/G
TNF α (-308 G>A): Inflammatory Response	A/A
CRP4 (G3872A): Inflammatory marker	C/T
IL6 (-174 G/C): Pro- and anti -inflammatory	G/G

Nutrients

Vitamin A Requirement

BCMO1 (G>A): Vitamin A requirements	G/G

Vitamin C Requirement

GSTM1 (Lys173Gln)	ABS
SOD2 (Val16Ala)	A/G
GSTT1 (Val169Ile)	PRS

Fiber Requirement

FTO (T>A)	A/A
TCF7L2 (C>T)	C/C
TNF α (-308 G>A)	A/A
UCP1 (-3826T>C)	T/T
CLOCK (3111 T>C)	A/G
CRP4 (G3872A)	C/T

Ability to bind Glutathione to Toxins

NBPF3 (C>T)	C/T

Carb Support™ Requirement

ADRB2 (A16G)	G/G
PPARG (Pro12Ala)	C/C
IRS1 (T>C)	C/T
SLC2A2 (Thr110Ile)	G/G
TCF7L2 (C>T)	C/C

Vitamin D & Calcium Requirements

DBP (Glu416Asp)	A/C
DBP (rs2282679)	G/T
VDR Fok1	A/G
VDR BsmI	G/G
VDR Taq1	A/A

Plant-derived Omega-3 Conversion Effectiveness

FADS1 (G>T): Plant-derived omega-3 conversion effectiveness	G/G
FADS2 (A>G): Conversion of plant based omega-3 fatty acid alpha linolenic acid (ALA) to EPA.	A/A

Tolerance of Saturated Fat during Weight Loss

APOA2	G/G
APOA5 (-1131T>C)	A/A
FTO (T>A)	A/A
ACE (I/D)	C/C
TCF7L2 (C>T)	C/C

Plant-derived Omega-6 Conversion Effectiveness

FADS1 (G>T): Synthesis of fatty acids	G/G
FADS2 (D6D): Plant-derived Omega-6 conversion effectiveness	A/A

Haemochromatosis Susceptibility

HFE (C282Y)	G/G
HFE (H63D)	C/C

Magnesium Requirement

COMT (Val158Met)	A/G
MAT1A (T*1297C)	A/A
MUC1 (C>T)	T/T

Caffeine Sensitivity

CYP1A2*1F	C/A

Gluten Sensitivity

TNF α (-308 G>A)	A/A

Lactose Sensitivity

MCM6 (-13910C/T)	A/A

Iron Deficiency Risk

TMPRSS6 (V736A)	G/G

Additional Information

Methodology

SNP (Single Nucleotide Polymorphism) detection takes place using a biomedical technology called polymerase chain reaction (PCR). During this process, a few copies of a piece of DNA are amplified generating an exponential number of copies of a DNA sequence. Variations in the genes, called polymorphisms, are detected and feedback on the possible (disease) associations of these variations are provided in a report format.

Glossary

Amino acids - Organic compounds that combine to form a protein.
Carrier - An individual who carries gene variants but usually does not display that trait or show symptoms of the disease.
DNA (deoxyribonucleic acid) - The molecule that encodes genetic information.
DNA sequence - The relative order of base pairs.
Gene - The fundamental physical and functional unit of heredity.
Gene expression - The process by which a gene's coded information is converted into the structures present and operating in the cell.
Gene product - The biochemical material - either RNA or protein - resulting from the expression of a gene.
Genome - All the genetic material in the chromosomes of an organism.
Heterozygote - An individual with two different alleles at one locus (position) on the chromosome pair.
Homozygote - An individual with two identical alleles at one locus (position) on the chromosome pair.
Locus (pl. loci) - The position of a gene on a chromosome.
Mitochondrial DNA - DNA inherited only from your mother.
Mutation - Any heritable change in the DNA sequence. See also polymorphism.
Nucleotide - A subunit of DNA consisting of a base: adenine, guanine, thymine or cytosine.
Polygenic disorders - Genetic disorders resulting from the combined action of alleles of more than one gene (e.g. heart disease, obesity).
Polymorphism - A difference in DNA sequence among individuals.
Protein - A large molecule composed of amino acids in a specific order - of which the order is determined by the sequence of nucleotides in the gene coding for the protein.

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