

Client Name:
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Vial Number: Sample
Client Sex:

Referring Account:
Sample Date:
Report Date: 11/20/2018



MaxFitness

Consult with a licensed healthcare professional before making changes based upon any information contained within this report. These recommendations and explanations are based upon clinical observation by MaxGen Labs and current medical research. These results are for educational purposes only and not intended to diagnose, treat or cure any disease or condition. The use of this test and its recommendations have not been approved by the FDA. MaxGen Labs and its staff are not responsible for how this test is used or any damages resulting from its use.



Basic Genetics

DNA

DNA can be described as your own personal cookbook. Full of recipes that create you as a human being, each page contains specific details about every cellular process in your body.

Proteins

Proteins are created by a series of amino acids that all code for specific functions in cells, tissues, and organs.

Genes

Genes should be considered the recipes of your cookbook. Each recipe is designed to produce a fully functional product. In this case, your product is a protein. You inherit your genes from your parents.

Your recipes need the appropriate ingredients. In this case, ingredients are called alleles.

Variations

Variations (or single nucleotide polymorphism – SNP) in allele pairing create regulatory issues within the body. Variations can be considered slight changes to your ingredients in the recipe. When you inherit genes from your parents, your alleles may join in a specific pattern. We call these patterns wild type, heterozygous, and homozygous. Wild type simply means that the pairing is most commonly found in nature. Heterozygous means you have one variation from a parent (different alleles). Homozygous means you have two variations (the same allele) from both parents.

Alleles

Alleles are the nitrogenous bases: adenine (A), thymine (T), cytosine (C), and guanine (G). When sequenced together correctly, they create the final product: proteins. Alleles also determine the visual expression of your genes. For example: curly hair, green eyes, etc. This is known as your phenotype.

Epigenetics

Epigenetics is the study of how the environment influences genetic expression. While we may have variations in our genetic code, our environment controls whether our genes are switched on or off. Our test does not account for environmental influences. We report genetic variations only. Work with a trained provider if you need help understanding the epigenetic influences.

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The type of exercise that is best for you is largely dependent on gene expression. Certain genes determine muscle fiber types, which drive one to excel in long distance running or another in sprinting. Other genes determine whether you could become an elite endurance athlete. While research has been done on a variety of men (and few women), ones who are trained Olympians and others who are trying to get in shape, please keep in mind that you do have the ability to exercise and participate in sport regardless of genetic potential. Genetic testing does, however, help guide you on proper function for your body, and it allows you to modify your exercise routine to maximize gains.

Understanding the make up of your muscle fibers can help determine what form of exercise is best for you. Broadly put, muscle fibers are broken into two categories: fast twitch and slow twitch. While these categories can be further expanded, for the purposes of this report we will discuss the bigger picture. Fast twitch muscle fibers are important for short bursts, high energy, high strength actions. Exercises such as sprinting or heavy weight lifting require speed and brut force that are controlled by fast twitch fibers. On the other hand, slow twitch muscle fibers are important for endurance sports such as long distance running and swimming. They require greater amounts of oxygen and blood flow over longer periods of time. Most of the population has a mixture of these two fibers and could be served well by combining exercises; however, knowing your muscle fiber type can help you define the appropriate training both for pleasure or performance.

The gene ACTN3 is commonly known as the “gene for speed.” The wild type is found in a large population of elite athletes who focus on sprinting and fast action sports. Variants within this gene appear to reduce the fast twitch action of muscle fibers into a slow twitch action, creating an ideal setting for endurance sport. With the ADRB3 gene, one may have a greater chance of training to become an elite endurance athlete. The MSTN gene may play a role in whether one can perform instant muscle contractions that require peak muscle power (example: vertical box jumping) which would be required in HIIT training (High Intensity Interval Training).

Endurance Examples: long distance running, swimming, biking, dance, basketball, tennis, and soccer.

Strength Examples: low rep weight lifting, sprinting, sit ups, pull ups, climbing stairs, and box jumping.

Strength Vs Endurance

Your muscles are built for strength training and speed.

Elite Endurance Athlete

You have average endurance training abilities.

HIIT Training Safety

You may be less able to create peak muscle power for instant movements. This can increase your chances of injury during fast, intense exercises.

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VO2Max is maximum oxygen uptake, which suggests how much oxygen is used by the body during intense, prolonged periods of exercise. It is a common measurement used during endurance training. People who have higher VO2Max can typically succeed at endurance sports. In the fitness world, the ability to maximize cardiorespiratory function can play a critical role in whether one becomes an endurance athlete. One gene appears to aid in the ability to train, while the other determines sustainability.

The PPARGC1A gene has been studied in European men, and research suggests that variants of this gene may allow for normal oxygen use while training. People who do not have a variant here may be at a disadvantage during training, as it lowers aerobic capacity.

The GABPB1 (NRF2) gene has been studied for its aerobic sustainability and antioxidant function. This gene appears to determine longevity in endurance sport once a person is already fully trained. Variants of this gene add greater aerobic capacity for endurance athletes.

VO2Max Potential (PPARGC1A)

You appear to have lower VO2Max potential during training. This may impede your ability to train for endurance sports.

VO2Max Potential (GABPB1)

You have greater potential for higher VO2Max once you are trained for endurance sports. This may help you sustain oxygen uptake during endurance sports.

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Exercise plays a critical role in maintaining an ideal physique; however, losing weight and having the right fat to muscle ratio may not be dependent on exercise alone. Several genes determine how one will respond to exercise. This information can help you determine how much emphasis to place on exercise routines as it relates to weight and fat mass loss.

If you are a person who is less likely to lose weight or fat mass in response to exercise, it is important to note that you still need to be physically active for overall wellness. If weight loss is a goal, you may need to focus more on the quality of food you consume instead of spending hours in a gym. Choose an exercise routine that is fun and plays to your strengths.

If you are a person who would respond well to exercise and need to lose weight, keep in mind that you can modify your movements based on muscle fiber genetics to gain the most benefit from your exercise routine. Choose a routine that is fun and sustainable.

Children who are obese may also be at a disadvantage based on the INSIG2 gene. Early intervention with exercise programs will help some but not others. It is important for all children to be physically active regardless of this genetic variant.

Weight Loss With Exercise

You are less likely to lose weight with exercise. You should still move, but consider low impact movements that are enjoyable.

Weight Gain With Inactivity

You have a greater chance of obesity if you are inactive. Exercise at least 30 minutes a day.

Early Childhood Intervention

Early childhood intervention may not allow you to lose weight with exercise. You should still move, but consider low impact sports that are enjoyable.

Body Mass Reduction

You may be able to lower body mass with exercise.

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Resistance Training

Resistance training is a type of exercise that applies a force against your movement. When your muscles are contracting against an external force, you may have a greater ability to build bulk within the muscle belly, increase bone strength, and increase endurance. Subcutaneous fat loss may occur more readily with resistance training as compared to other forms of exercise. Women respond exceptionally well to resistance training, especially as it pertains to bone health. Consider using resistance training as a part of any exercise routine for general wellness and longevity.

Examples of resistance training include:

- Lifting free weights
- Using a resistance band
- Using your body weight for pull ups or push ups
- Running in water
- Pulling heavy items
- Using medicine balls or kettle bells

Fat Loss

You may not be able to lose subcutaneous fat with resistance training.

Bone Strength

You have a greater chance of building bone strength with resistance training.

Muscle Gains

You should be able to gain more muscle mass with resistance training.

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Cardiovascular Response to Exercise



There are variety of risks and benefits with any form of exercise. While every person needs to be physically active and get adequate amounts of exercise daily, some may need to know common risk factors that could occur with specific types of exercise routines. If you are an elite athlete or simply want to get fit, certain precautions should be taken into consideration. While these genetic factors are not diagnostic or absolutes, there are specific nutritional protocols that can reduce your risk of an incident while exercising. Please consult with a physician if any of these risks are of concern.

Insulin Response

You have an average response for insulin sensitivity when exercising. Monitor blood glucose, HbA1C, and HOMA-IR levels with your doctor.

Cholesterol Response

You may be able to raise healthy HDL levels with exercise. Increase resistance training.

Blood Pressure Response

Exercise should help regulate your blood pressure. Consider hydroxocobalamin if vitamin B12 is needed.

You have an average risk of high blood pressure while exercising if you are unfit.

Cardiovascular Health

You have an increased risk of exercise induced ischemia. Consider yearly cardiometabolic testing and micronutrient testing.

You have an average risk of exercise induced idiopathic venous thrombosis. Consider yearly cardiometabolic testing and micronutrient testing.

You have an increased risk of ischemic heart disease. Consider yearly cardiometabolic testing and micronutrient testing.

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Injuries to muscles, tendons, ligaments, and joints are common during exercise. Your genetics simply describe your propensity for these specific concerns, but injury can be exacerbated by a number of factors. To reduce your chances of injury, drink plenty of water, use proper form, and warm up appropriately. If you are already injured, consider changing your exercise routine so that you will not produce further damage.

Muscle Weakness & Soreness

You may have muscle soreness and strength loss after a workout. Consider using branch chain amino acids and magnesium glycinate immediately after a workout. Drink at least half your body weight in ounces of water daily.

Muscle Cramping

You have an average risk of muscle cramping after exercising.

Joint & Tendon Health

Osteoarthritis

You have an average risk of osteoarthritis as a response to exercise. Consider adding resistance training as a daily routine to build strength. You can also consider using collagen peptides as a nutrient.

Knee Pathology

You have an average risk of knee osteoarthritis. Consider adding resistance training as a daily routine to build strength. You can also consider using collagen peptides as a nutrient.

Achilles Tendinopathy

You have an increased risk of developing Achilles tendinopathy with exercise. Be sure to fully stretch before starting your exercise routine.

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GENE	rsID	Result	Client	Minor	Description
Muscle Performance					
ADRB3	rs4994	++ Homozygous	AA	A	Normal potential for elite endurance performance
NRF2	rs7181866	-- Wild Type	AA	G	Normal potential for elite endurance
PPARGC1A	rs8192678	-- Wild Type	CC	T	Increased potential endurance performance activity
ADRB2	rs1042713	-- Wild Type	GG	A	Normal endurance potential
GABPB1 (NRF2)	rs12594956	-+ Heterozygous	CA	A	Slightly higher endurance potential
GABPB1 (NRF2)	rs8031031	-- Wild Type	CC	T	Normal endurance potential
LIPC	rs1800588	-- Wild Type	CC	T	Enhanced benefit from endurance training
LPL	rs328	-- Wild Type	CC	G	Enhanced benefit from endurance training
PPARD	rs2016520	-+ Heterozygous	CT	T	Normal benefit from endurance training
ACTN3	rs1815739	-- Wild Type	CC	T	Better performing muscles-Likely sprinter
AMPD1	rs17602729	-- Wild Type	GG	A	Normal potential risk of muscle cramping
SLC30A8	rs13266634	-- Wild Type	CC	T	Normal post exercise soreness and strength loss
MSTN	rs1805086	-+ Heterozygous	CT	C	Lower potential peak muscle power
VO2Max					
GABPB1 (NRF2)	rs12594956	-+ Heterozygous	CA	A	Higher potential VO2 Max
GABPB1 (NRF2)	rs8031031	-- Wild Type	CC	T	Normal VO2 Max
PPARGC1A	rs8192678	-- Wild Type	CC	T	Lower potential baseline VO2 MAX
NRF2	rs7181866	-- Wild Type	AA	G	Normal VO2 Max
Weight loss					
LPL	rs328	-- Wild Type	CC	G	Normal fat loss in response to exercise
FTO	rs8050136	-+ Heterozygous	CA	A	Less potential fat mass and %body fat loss with exercise
INSIG2	rs7566605	++ Homozygous	GG	G	Less potential for weight loss after intervention
LEP	rs7799039	-+ Heterozygous	GA	A	Normal potential reduction in fat and BMI levels in response to exercise
FTO	rs1121980	-+ Heterozygous	GA	A	Greater potential for obesity or weight gain if inactive
Resistance Training					
INSIG2	rs7566605	++ Homozygous	GG	G	Less potential benefit from resistance training
IL15	rs1057972	-+ Heterozygous	TA	T	Greater potential post training strength improvement
LEPR	rs1805096	-+ Heterozygous	GA	A	Greater potential muscle gain in response to resistance training
IL15RA	rs2296135	-+ Heterozygous	CA	C	Greater potential strength improvement from resistance training
Cardiovascular and Injury Risks					
PPARD	rs2016520	-+ Heterozygous	CT	T	Increased benefit to HDL levels by exercising
NOS3	rs2070744	-+ Heterozygous	CT	T	More favorable potential blood pressure response to exercise
EDN1	rs5370	-+ Heterozygous	GT	T	Normal risk of blood pressure in unfit people
LIPC	rs1800588	-- Wild Type	CC	T	Normal insulin sensitivity in response to exercise
CCL2	rs1024611	++ Homozygous	AA	A	Increased potential risk of exercise induced ischemia
ADRB2	rs1042714	-+ Heterozygous	GC	C	Normal risk of idiopathic venous thrombosis
LEPR	rs1137101	++ Homozygous	GG	G	Increased potential risk for ischemic heart disease
GDF5	rs143383	++ Homozygous	GG	G	Normal potential risk for osteoarthritis
intergenic	rs4140564	++ Homozygous	AA	A	Normal potential risk of knee osteoarthritis
MMP3	rs679620	++ Homozygous	CC	C	Higher potential risk of developing Achilles tendinopathy

Client: Your genotype.

Minor: The genotype that is found least in nature.

Wild Type: The genotype that is found most often in nature, this is reported as green. This isn't always ideal.

Homozygous: This means you tested for both copies of the minor type allele. This typically has more severe issues.

Heterozygous: This means you tested for one copy of the minor allele and one copy of the wild type allele.

Gene: This is the specific gene we are looking at for variations.

RS#: This is the specific variation within the gene. There are multiple locations within a gene for potential variations, all of which can indicate a different issue or severity.

Disclaimer: This test was developed by MaxGen Labs and has not been approved by the FDA. It is not intended to diagnose, treat, cure or prevent disease. This test should be considered for educational purposes only. Do not make decisions about your health without discussing it with a licensed practitioner. The information contained within the report does not consider other genetic variations or environmental factors that might contribute to someone's phenotype or symptoms.

This test does not analyze all variations within a gene that someone might carry. The rs#'s contained within the report were picked from scientific literature, multiple physician collaborations, and clinical observation by MaxGen Labs and are subject to change at any time.