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GENETICS • PERFORMANCE • INTELLIGENCE

by SPORTOTEAM

PERFORM

Professional Athlete Genetics

GENETIC INSIGHTS FOR
HIGHER PERFORMANCE

PERFORMANCE | ADAPTATION | ENDURANCE | POTENTIAL

TURN DATA INTO A STRONGER YOU

ATHLETE GENETIC REPORT · GENETIC REPORT SERIES

MOVE | TRAIN | **PERFORM** | PEAK | YOUTH & GROWTH | NUTRITION

PERFORM

— *Professional Athlete Genetics*

A comprehensive genetic map for competitive and professional athletes — advanced training adaptation, injury risk and performance-limiting factors.

◎ ABOUT THIS REPORT

Genes influence how your body responds to training, how you recover between sessions, how you handle nutrition and stress, and how resilient you stay through years of hard work. This report translates current science into everyday language, so you (and those who work with you) can build smarter, more personal routines.

Each result below is written in a plain format: what the gene does, what your version means for this profile, and a 1–5 grade showing how strongly the gene affects the trait. More stars mean your genotype has a greater effect on this trait; it is not a measure of how much research exists.

≋ TEST PLATFORM

This report uses the Illumina Global Screening Array v3 / v4 (GSA) platform, a genome-wide SNP genotyping platform with multi-disease and pharmacogenomic content. Every genetic variant reported here is read directly on the GSA platform and yields clear letter-based genotypes (A/T/C/G).

👤 ATHLETE INFORMATION

SAMPLE BARCODE	**GSA-2027-08471-A**	REPORT NO	**RPT-PERFORM-2027-1042**
PANEL	**Illumina GSA v3 / v4 — PERFORM — Professional Athlete Genetics**	SPORT	**Endurance running**
AGE / SEX	**27 / Male**	ANCESTRY GROUP	**Europe**
SAMPLING DATE	**2027-08-14**	ANALYSIS DATE	**2027-08-22**
REPORT DATE	**2027-08-24**		

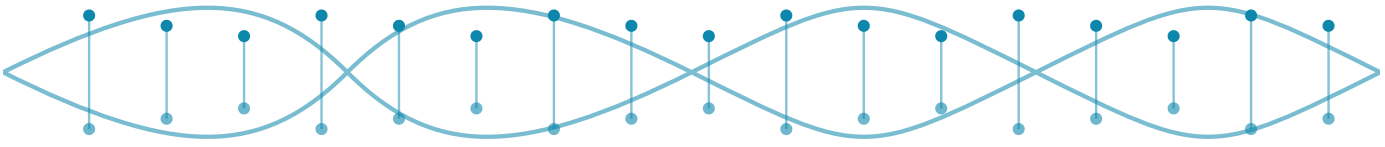
⚗ PANEL SUMMARY

TOTAL GENETIC PROFILE
47

DISTINCT DNA VARIANTS ANALYSED
70

CATEGORIES COVERED
11

ⓘ This report translates genetic markers into personal training, recovery and nutrition context. Use it with your coach, trainer or dietitian to fine-tune your daily choices.



ⓘ READING YOUR REPORT

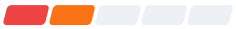
About **the Grades**

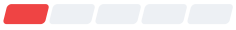
Each variant is scored from 1 to 5 by **how strongly YOUR genotype affects this trait**. A high grade is neither 'good' nor 'bad'; it means the gene matters *for you* in this area.


Very strong effect: this genotype has a large, meaningful effect on this trait


Strong effect: this genotype clearly shifts the trait in one direction


Moderate effect: some effect — typical when carrying one copy of each version


Mild effect: in this profile the gene has a small effect for you


Minimal effect: your genotype does not meaningfully change this trait

🏆 HOW TO USE THIS REPORT

1 **Read it with a professional**

Genetics gives you the foundation; a coach, physician or dietitian helps you build the path.

2 **Don't over-interpret**

A single 'unfavourable' result doesn't mean you can't succeed; many elite athletes carry 'non-ideal' variants.

3 **Combine with lifestyle data**

Sleep, nutrition, training history and mental state matter at least as much as any single gene, if not more.

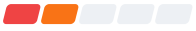
4 **Use it to personalise, not to predict**

It is best used not to predict outcomes but to shape how you train, eat and recover.

Domain *Overview*

Each profile is scored on a 1–5 scale by how strongly your genotype affects the trait.

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01. Power – Endurance Profile

RS	GENE	GENOTYPE	GRADE
rs1815739	**ACTN3**	CC	
rs4341	**ACE (I/D proxy)**	GG	

✧ rs1815739 — ACTN3 Genotype: CC

WHAT DOES YOUR GENE DO?

This gene determines whether your fast-twitch muscle fibres get a reinforcing protein called alpha-actinin-3. Its presence or absence is the clearest genetic marker of which end of the power–endurance spectrum your muscles naturally sit at.

WHAT DOES YOUR GENETICS SAY?

When many elite power athletes are compared with ordinary people, the intact (working) form of this gene appears more often than chance would predict. You carry the full version, so your fast fibres get their reinforcing protein and sit firmly on the power side of the spectrum.

✧ rs4341 — ACE (I/D proxy) Genotype: GG

WHAT DOES YOUR GENE DO?

This variant marks a well-studied region controlling a hormone system that regulates blood pressure and circulation. This system also affects muscle fibre character, so it has been studied for decades in Olympic athletes in both endurance and power sports.

WHAT DOES YOUR GENETICS SAY?

This marker is read in place of the better-known insertion/deletion (I/D) change in the ACE gene, studied in power and endurance athletes in a comprehensive 2024 review. You have the pattern more often linked to power and strength sports, associated with a stronger circulatory response to intense effort.

02. Aerobic Capacity

RS	GENE	GENOTYPE	GRADE
rs6552828	**ACSL1**	AG	
rs11549465	**HIF1A**	AA	

✧ rs6552828 — ACSL1 Genotype: AG

WHAT DOES YOUR GENE DO?

Aerobic capacity measures how much oxygen you can actually put to work. This gene prepares fat molecules to be burned in your cells, a process that directly fuels the measured aerobic engine.

WHAT DOES YOUR GENETICS SAY?

Your fat oxidation is typical, giving an average aerobic capacity response.

✧ rs11549465 — HIF1A Genotype: AA

WHAT DOES YOUR GENE DO?
Your cells have an oxygen sensor that detects when oxygen starts running short and launches a coordinated response: more red blood cells, more capillaries, more efficient energy use. This gene makes that sensor.

WHAT DOES YOUR GENETICS SAY?
In a group of strength athletes tested at this position, the rare form was found more often than in non-athlete controls. Your sensor is at its most sensitive, triggering the strongest low-oxygen adaptive response, and is linked to high aerobic capacity.

03. Exercise Response

RS	GENE	GENOTYPE	GRADE
rs8192678	**PPARGC1A**	TT	
rs4253778	**PPARA**	GC	
rs1042713	**ADRB2**	AA	

✧ rs8192678 — PPARGC1A Genotype: TT

WHAT DOES YOUR GENE DO?
This gene is the master switch telling muscle cells to build more mitochondria —the tiny structures that produce energy aerobically. Since mitochondria production is one of the main changes exercise makes in your body, this gene sits at the very centre of how you respond to training.

WHAT DOES YOUR GENETICS SAY?
Pooled athlete studies link the Ser-containing form of this variant with weaker endurance traits. Your switch is less responsive, so building an aerobic base takes more stimulus than average.

✧ rs4253778 — PPARA Genotype: GC

WHAT DOES YOUR GENE DO?
This gene works like a fuel selector in your muscles, deciding how readily they turn to fat instead of carbohydrate. This choice determines which types of exercise feel sustainable to you and which drain you quickly.

WHAT DOES YOUR GENETICS SAY?
A review of all published endurance athlete studies showed the G form concentrates in people with high aerobic ability. You use both fuels flexibly with no clear preference, so different training types are all supported by the same balanced fuel setting.

✧ rs1042713 — ADRB2 Genotype: AA

WHAT DOES YOUR GENE DO?
Adrenaline is the signal telling your body to mobilise during exercise: it raises heart rate, opens the airways and releases fuel. This gene determines how strongly your tissues 'hear' this signal.

WHAT DOES YOUR GENETICS SAY?
Elite endurance athletes were compared with controls at exactly this position, and genotype distribution differed between the groups. You respond strongly to adrenaline, so your body mobilises decisively when you start working hard.

04. Explosiveness

RS	GENE	GENOTYPE	GRADE
rs1815739	**ACTN3**	CC	
rs35767	**IGF1**	CC	

✧ rs1815739 — ACTN3 Genotype: CC

WHAT DOES YOUR GENE DO?

Explosiveness is less about how much force you can produce than how fast it appears. This gene gives your fast fibres the internal support to transmit force sharply, so it shows in jump height, first-step quickness and change-of-direction tests.

WHAT DOES YOUR GENETICS SAY?

Your fibres have full support, so force tends to appear quickly rather than build slowly. A large 2024 review of power and endurance athletes lists this among the performance findings most reliably confirmed on replication.

✧ rs35767 — IGF1 Genotype: CC

WHAT DOES YOUR GENE DO?

This gene tells your body how much IGF-1 (a growth factor) to make. IGF-1 helps muscles grow, repair and get stronger after training.

WHAT DOES YOUR GENETICS SAY?

Your version is linked to higher circulating IGF-1, a strong muscle-building signal. A study pooling many power and endurance athlete cohorts tested this growth-factor variant directly.

05. Sprint Tendency

RS	GENE	GENOTYPE	GRADE
rs1815739	**ACTN3**	CC	

✧ rs1815739 — ACTN3 Genotype: CC

WHAT DOES YOUR GENE DO?

Sprinting asks your fast fibres to contract forcefully hundreds of times with almost no margin for error. This gene determines whether those fibres carry the structural protein that lets them withstand such loading and transmit force.

WHAT DOES YOUR GENETICS SAY?

Few findings in sports genetics hold up as more athlete cohorts are added; this is one of them. Both copies working means your fibres are equipped for the loading sprinting demands, which is why this genotype is more common in sprint athletes.

06. Repeated High-Intensity Performance

RS	GENE	GENOTYPE	GRADE
rs17602729	**AMPD1**	GG	

✧ rs17602729 — AMPD1 Genotype: GG

WHAT DOES YOUR GENE DO?

Repeated hard efforts depend on energy being restored between them. This gene makes an enzyme that helps sustain this restoration when demand is extreme, exactly the situation repeated sprints create.

WHAT DOES YOUR GENETICS SAY?

Elite Lithuanian athletes were genotyped at this position, and the variant was seen to track sprint and power performance. Your enzyme is fully functional, so energy restoration keeps pace across repeated hard efforts.

07. Muscle Performance

RS	GENE	GENOTYPE	GRADE
rs1805086	**MSTN**	TT	
rs1544410	**VDR (BsmI)**	CT	

✧ rs1805086 — MSTN Genotype: TT

WHAT DOES YOUR GENE DO?

Your body has a built-in brake that stops muscles from growing without limit, and this gene makes that brake. How tightly the brake is applied sets part of the upper limit of functional muscle you can carry.

WHAT DOES YOUR GENETICS SAY?

A review pooling athletes' strength and muscle mass data found that carriers of the rare form stand out clearly. Your growth brake works normally, which is the case for almost everyone.

✧ rs1544410 — VDR (BsmI) Genotype: CT

WHAT DOES YOUR GENE DO?

Vitamin D acts on muscle through a receptor, and this gene makes that receptor. Enough vitamin D in your blood only helps if the muscle can actually respond to it; this is exactly what this variant affects.

WHAT DOES YOUR GENETICS SAY?

A recent review pooling vitamin D receptor studies linked this variant with bone density outcomes. Your receptor sensitivity is moderate, giving a typical relationship between vitamin D levels and muscle performance.

08. Muscle Fatigue

RS	GENE	GENOTYPE	GRADE
rs17602729	**AMPD1**	GG	
rs4880	**SOD2**	TT	

✧ rs17602729 — AMPD1 Genotype: GG

WHAT DOES YOUR GENE DO?

Fatigue sets in when usable energy in muscle runs low. The enzyme this gene makes is part of the emergency system that keeps energy available during the hardest efforts, so its function affects when this deficit appears.

WHAT DOES YOUR GENETICS SAY?

Full enzyme function means your emergency energy system works normally and fatigue arrives when expected. Because the athlete evidence comes from a single country's athlete group, the effect size should be interpreted with caution.

✧ rs4880 — SOD2 Genotype: TT

WHAT DOES YOUR GENE DO?

Working muscles produce reactive waste products, and if these build up faster than they are cleared, contraction quality drops. This gene makes the enzyme that clears this waste inside your muscle cells, linking it directly to how quickly you tire.

WHAT DOES YOUR GENETICS SAY?

In elite athletes, genotype at this position tracked with muscle damage markers measured in blood. Lower clearance capacity in your muscle cells means waste builds up faster in hard work, and fatigue may come earlier in long or repeated high-intensity efforts.

09. Response to Strength Training

RS	GENE	GENOTYPE	GRADE
rs1130214	**AKT1**	GG	
rs1815739	**ACTN3**	CC	
rs4341	**ACE (I/D proxy)**	GG	

✧ rs1130214 — AKT1 Genotype: GG

WHAT DOES YOUR GENE DO?

Inside the muscle cell is a switch that, once flipped, starts new protein building. This gene makes that switch, making it one of the most direct genetic inputs into whether lifting will make you bigger and stronger.

WHAT DOES YOUR GENETICS SAY?

Functional studies characterised this AKT1 variant in the context of glucose use and metabolic syndrome. Your building switch flips easily, so weight training triggers muscle building efficiently.

✧ rs1815739 — ACTN3 Genotype: CC

WHAT DOES YOUR GENE DO?
When you lift, your muscles decide how much to grow and strengthen. This gene influences that decision by setting how well your fast fibres, which respond most to heavy loading, are structurally supported.

WHAT DOES YOUR GENETICS SAY?
Your fast fibres are fully supported, and this genotype usually shows the largest strength gains from heavy lifting. Sprint and power athlete cohorts repeatedly show the same trend in who carries the working copy.

✧ rs4341 — ACE (I/D proxy) Genotype: GG

WHAT DOES YOUR GENE DO?
The hormone system this gene regulates does more than manage blood pressure; it also signals muscle tissue during loading. This is why it features in studies of how much strength people gain from a training programme.

WHAT DOES YOUR GENETICS SAY?
This pattern has been linked to greater strength gains from resistance training, probably via enhanced muscle signalling during loading. Scale matters here: in pooled athlete analysis the ACE effect is real but modest, not a decisive factor.

10. Skeletal Muscle Development

RS	GENE	GENOTYPE	GRADE
rs2287926	**MYH15**	GG	
rs1805086	**MSTN**	TT	

✧ rs2287926 — MYH15 Genotype: GG

WHAT DOES YOUR GENE DO?
Muscle fibres work through motor proteins called myosin, and different versions of these proteins suit different jobs. This gene helps determine which myosin mix your fibres carry as muscle develops.

WHAT DOES YOUR GENETICS SAY?
Your myosin mix leans towards the power side, supporting muscle that develops towards size and force production.

✧ rs1805086 — MSTN Genotype: TT

WHAT DOES YOUR GENE DO?
This profile concerns how much muscle tissue you build over years, rather than across training blocks. This gene sets the biological limit of that build-up by controlling the signal that tells muscle to stop growing.

WHAT DOES YOUR GENETICS SAY?
A normal growth-limiting signal means your long-term muscle development will follow standard expectations. One note: because the rare form is uncommon, even pooled estimates rest on relatively few carriers.

11. Exercise-Induced Muscle Damage

RS	GENE	GENOTYPE	GRADE
rs28497577	**MYLK**	AC	

✧ **rs28497577 — MYLK** Genotype: **AC**

WHAT DOES YOUR GENE DO?
This gene controls a protein that helps muscle fibres contract. Some variants make fibres slightly more fragile after very demanding eccentric work (downhill running, heavy negative reps), meaning more muscle soreness.

WHAT DOES YOUR GENETICS SAY?
Your muscle cell membranes are slightly more fragile under strain, so demanding eccentric work causes more soreness than average. This variant is among the small group of markers studied for links to exercise-induced muscle damage.

12. Endurance Response

RS	GENE	GENOTYPE	GRADE
rs3918226	**NOS3 (proxy)**	GG	
rs2070744	**NOS3**	TC	
rs4253778	**PPARA**	GC	

✧ **rs3918226 — NOS3 (proxy)** Genotype: **GG**

WHAT DOES YOUR GENE DO?
During exercise, blood vessels must widen to deliver oxygen where it is needed. This gene sits near the machinery that produces the signal telling vessels to relax, so it affects how much oxygen actually reaches working muscle.

WHAT DOES YOUR GENETICS SAY?
Your vessels widen readily during exercise, supporting good oxygen delivery in long efforts.

✧ **rs2070744 — NOS3** Genotype: **TC**

WHAT DOES YOUR GENE DO?
This variant lies in the control region of the gene that produces nitric oxide in your vessel lining. Nitric oxide is the molecule that tells vessels to relax, so this variant affects how much of this signal is produced in the first place.

WHAT DOES YOUR GENETICS SAY?
Pooled blood pressure studies show this control-region change among the changes that repeatedly emerge for signalling in this gene. Slightly reduced signal production means marginally less vessel relaxation in prolonged efforts.

✧ **rs4253778 — PPARA** Genotype: **GC**

WHAT DOES YOUR GENE DO?

Endurance performance depends on saving your limited carbohydrate stores for when you truly need them. This gene affects how much of your energy comes from fat at a given pace, which effectively sets how long you can keep going before running out.

WHAT DOES YOUR GENETICS SAY?

Your fuel mix is balanced, so your endurance response is normal, neither clearly enhanced nor limited. Among fuel-switching markers, this variant has unusually robust pooled athlete data behind it.

13. Lactate Management

RS	GENE	GENOTYPE	GRADE
rs660339	**UCP2**	TT	

✧ **rs660339 — UCP2** Genotype: **TT**

WHAT DOES YOUR GENE DO?

This gene affects how efficiently your mitochondria convert fuel into usable energy and how much they 'waste' as heat.

WHAT DOES YOUR GENETICS SAY?

Your version of the uncoupling protein is less efficient and burns more fuel per unit of work; this has been linked to a predisposition for power sports. This uncoupling protein variant has been tested for links to obesity, fasting blood sugar and blood lipids.

14. General Recovery Tendency

RS	GENE	GENOTYPE	GRADE
rs1799722	**BDKRB2 (proxy)**	AA	
rs3918226	**NOS3 (proxy)**	GG	

✧ **rs1799722 — BDKRB2 (proxy)** Genotype: **AA**

WHAT DOES YOUR GENE DO?

This gene affects a receptor called bradykinin B2 that helps blood vessels open during and after exercise, which is important for recovery and nutrient delivery.

WHAT DOES YOUR GENETICS SAY?

Your version produces a slightly weaker response in this vasodilator pathway.

✧ rs3918226 — NOS3 (proxy) Genotype: GG

WHAT DOES YOUR GENE DO?

Recovery depends on blood flow bringing nutrients and removing waste after training ends. This gene affects how easily your vessels stay open in the post-exercise period, which determines how quickly you recover.

WHAT DOES YOUR GENETICS SAY?

Good vasodilation supports the post-training blood flow recovery relies on, so you tend to recover fairly quickly.

15. Oxidative Stress

RS	GENE	GENOTYPE	GRADE
rs4880	**SOD2**	TT	

✧ rs4880 — SOD2 Genotype: TT

WHAT DOES YOUR GENE DO?

This kind of cell stress is the biological equivalent of rust: damage that builds up when reactive molecules outpace your defences. This gene makes your primary defence enzyme inside the mitochondria, where most of this reactive load is produced.

WHAT DOES YOUR GENETICS SAY?

With lower defence enzyme activity, rust-like cell damage builds up more easily during intense training blocks. Athlete studies here measured blood markers of muscle damage such as creatine kinase, not performance itself.

16. Inflammation Response

RS	GENE	GENOTYPE	GRADE
rs1800795	**IL6**	GG	
rs1800629	**TNF**	AA	
rs2794520	**CRP**	TT	

✧ rs1800795 — IL6 Genotype: GG

WHAT DOES YOUR GENE DO?

After hard training your body produces inflammatory signals that both cause soreness and drive adaptation. This gene sets how much of the main signal you produce, which determines the size of the inflammation wave.

WHAT DOES YOUR GENETICS SAY?

Among inflammation genes studied for post-exercise muscle damage, this control-region change is a frequently encountered name. You produce more of this inflammatory signal, so the wave after hard training is larger.

✧ rs1800629 — TNF Genotype: AA

WHAT DOES YOUR GENE DO?
This gene produces TNF-alpha, a potent inflammatory signal. It affects how intense your inflammatory response is after damaging exercise.

WHAT DOES YOUR GENETICS SAY?
For this inflammatory signal, you carry the version at the high-production end of the gene. This change lies in the gene's on/off region and alters how much TNF is produced, so it appears in both exercise-damage reviews and metabolic health studies.

✧ rs2794520 — CRP Genotype: TT

WHAT DOES YOUR GENE DO?
This gene affects your baseline level of C-reactive protein (CRP), a marker of general inflammation in your body.

WHAT DOES YOUR GENETICS SAY?
You carry two copies of the version linked to a higher baseline level, so this marker tends to read above average even when healthy. A genome-wide study of over 200,000 people mapped what determines resting inflammation and found the CRP region to be central.

17. Muscle Damage & Recovery Genetics

RS	GENE	GENOTYPE	GRADE
rs13266634	**SLC30A8**	CT	
rs11730582	**SPP1 (OPN proxy)**	GG	

✧ rs13266634 — SLC30A8 Genotype: CT

WHAT DOES YOUR GENE DO?
This gene carries zinc into the insulin-producing cells of the pancreas, which is why it features in blood sugar control studies.

WHAT DOES YOUR GENETICS SAY?
Your zinc transporter works slightly less efficiently, which mildly reduces insulin release. Pooled study data, supported by experiments on human insulin-producing cells, have linked this variant to insulin release.

✧ rs11730582 — SPP1 (OPN proxy) Genotype: GG

WHAT DOES YOUR GENE DO?
This gene produces osteopontin, a protein that calls repair cells to damaged muscle tissue after intense exercise.

WHAT DOES YOUR GENETICS SAY?
Your version produces a slightly weaker damage alarm, so the first signal your muscle sends after hard work is quieter than average.

18. General Injury Predisposition

RS	GENE	GENOTYPE	GRADE
rs1815739	**ACTN3**	CC	
rs12722	**COL5A1**	CT	
rs679620	**MMP3**	TT	

✧ rs1815739 — ACTN3 Genotype: CC

WHAT DOES YOUR GENE DO?

Injury risk partly depends on how well your tissues absorb sudden, irregular loads. This gene affects how stiff or compliant your fast muscle fibres are, and this stiffness changes how force is shared between muscle, tendon and joint during hard efforts.

WHAT DOES YOUR GENETICS SAY?

The reinforcement in your fibres makes your muscle stiffer; this is great for force transfer but means less of the shock is absorbed by the muscle itself. The direction of this result matches findings reported repeatedly in athlete groups.

✧ rs12722 — COL5A1 Genotype: CT

WHAT DOES YOUR GENE DO?

This gene makes one of the fibres that organise collagen throughout your body, so it affects the quality of tendons, ligaments and other connective tissues everywhere at once, not in a single joint.

WHAT DOES YOUR GENETICS SAY?

When tendon and ligament injury studies in people of European ancestry are placed side by side, this COL5A1 change is the one carrying the signal. You carry one copy of the less favourable version, meaning a slightly raised baseline for tendon and ligament injuries overall.

✧ rs679620 — MMP3 Genotype: TT

WHAT DOES YOUR GENE DO?

To repair soft tissue, damaged material must be broken down before new tissue is built. This gene produces one of the enzymes that does this breakdown, so it affects the whole pace of tissue renewal.

WHAT DOES YOUR GENETICS SAY?

This variant first emerged in Achilles tendinopathy cases, and the signal held when later tendon and ligament studies were added. Your tissue renewal runs at a standard pace, meaning usual repair times and an unremarkable injury risk.

19. Tendon / Ligament Profile

RS	GENE	GENOTYPE	GRADE
rs1800012	**COL1A1**	AA	
rs12722	**COL5A1**	CT	

✧ rs1800012 — COL1A1 Genotype: AA

WHAT DOES YOUR GENE DO?

Type-I collagen is the main rope-like fibre in your tendons and ligaments, and this gene controls how much of it is made. More of the right collagen usually means tissue that better withstands repeated loading.

WHAT DOES YOUR GENETICS SAY?

Pooled data on sport-related tendon and ligament injuries show the rare form here to be protective. You produce clearly more of the stronger collagen form, linked to the lowest baseline tendon and ligament injury risk for this gene.

✧ rs12722 — COL5A1 Genotype: CT

WHAT DOES YOUR GENE DO?

Tendons and ligaments must be stiff enough to transmit force efficiently and elastic enough to absorb shock. This gene regulates how collagen fibres are packed, helping set where your tissue sits on this stiffness scale.

WHAT DOES YOUR GENETICS SAY?

Your tendon stiffness is in a mid range, giving a reasonable balance between force transfer and shock absorption. This variant appears in your report because of those pooled injury findings.

20. Stress Fracture Predisposition

RS	GENE	GENOTYPE	GRADE
rs1544410	**VDR (BsmI)**	CT	
rs143383	**GDF5**	CT	

✧ rs1544410 — VDR (BsmI) Genotype: CT

WHAT DOES YOUR GENE DO?

Bone constantly renews itself, and vitamin D signalling through this receptor governs how well calcium is absorbed and laid into bone. Weaker signalling means bone that remodels less effectively under repeated loading.

WHAT DOES YOUR GENETICS SAY?

Moderate receptor function means your bone renews at a typical rate and your stress fracture risk is average. The bone evidence rests on many pooled studies and is fairly robust; its extension to muscle performance is much weaker.

✧ rs143383 — GDF5 Genotype: CT

WHAT DOES YOUR GENE DO?
This gene helps form joint cartilage and determines how it repairs itself, which affects long-term joint durability.

WHAT DOES YOUR GENETICS SAY?
You carry one copy of the version linked to a slightly higher chance of joint wear building up over the years. About 24,000 people were included in the pooled analysis linking this variant to knee joint wear.

21. Anterior Cruciate Ligament (ACL) / Knee

RS	GENE	GENOTYPE	GRADE
rs12722	**COL5A1**	CT	
rs1800012	**COL1A1**	AA	

✧ rs12722 — COL5A1 Genotype: CT

WHAT DOES YOUR GENE DO?
Your anterior cruciate ligament (ACL) must resist rotational forces in the knee, and its strength depends on how well its collagen fibres are organised. This gene contributes to that organisation, so it has been studied specifically in ACL tears.

WHAT DOES YOUR GENETICS SAY?
One copy places your ACL risk in a mid range; it is not a warning sign, but it offers no protection either. In pooled injury studies the effect, though modest, points the same way every time.

✧ rs1800012 — COL1A1 Genotype: AA

WHAT DOES YOUR GENE DO?
Your ACL consists mostly of type-I collagen, so the amount and form of collagen your body makes directly affects how much rotational force the ligament can withstand before tearing.

WHAT DOES YOUR GENETICS SAY?
This genotype has been linked to protection against ACL tears, probably by forming a denser, stronger ligament. This protective direction comes not from a single study but from pooling many sports injury studies.

22. Achilles Tendon Predisposition

RS	GENE	GENOTYPE	GRADE
rs679620	**MMP3**	TT	
rs12722	**COL5A1**	CT	
rs1800012	**COL1A1**	AA	

✧ rs679620 — MMP3 Genotype: TT

WHAT DOES YOUR GENE DO?

Because the Achilles tendon absorbs so much load, it remodels almost constantly. This gene's breakdown enzyme is central to that remodelling, which is why it has been studied specifically in Achilles problems.

WHAT DOES YOUR GENETICS SAY?

A standard remodelling pace gives your Achilles tendon a normal repair and maintenance cycle. Pooled tendon and ligament injury data support this; the first Achilles study suggested the effect partly depends on your COL5A1 result.

✧ rs12722 — COL5A1 Genotype: CT

WHAT DOES YOUR GENE DO?

The Achilles tendon carries several times your body weight with every step, and its durability largely depends on how its collagen is organised. This gene is among the best-studied genetic factors, specifically in Achilles problems.

WHAT DOES YOUR GENETICS SAY?

Taken together, soft-tissue injury studies in people of European descent show this position in COL5A1 to be informative. Your Achilles risk is moderate.

✧ rs1800012 — COL1A1 Genotype: AA

WHAT DOES YOUR GENE DO?

The Achilles tendon is essentially a thick cable of type-I collagen. How much of this collagen your body makes, and in what form, affects how well the tendon withstands the huge repeated loads of running and jumping.

WHAT DOES YOUR GENETICS SAY?

Producing more of the stronger collagen form places you at the low end of Achilles injury risk for this gene. Pooled sports injury data from many studies stand behind this interpretation.

23. Muscle Injury Predisposition

RS	GENE	GENOTYPE	GRADE
rs1815739	**ACTN3**	CC	

✧ rs1815739 — ACTN3 Genotype: CC

WHAT DOES YOUR GENE DO?

Muscle tears usually occur when a fibre is both stretching and trying to contract: running downhill, decelerating or lowering a heavy load. This gene determines whether your fast fibres have the internal scaffold that helps them hold together under exactly this stress.

WHAT DOES YOUR GENETICS SAY?

Because many athlete cohorts have been pooled for this position, the interpretation rests on unusually solid ground. Your fibres have the full internal scaffold, making them more resistant to tearing under lengthening contraction loads.

24. Weight / BMI Tendency

RS	GENE	GENOTYPE	GRADE
rs9939609	**FTO**	TA	
rs17782313	**MC4R**	AG	

✧ rs9939609 — FTO Genotype: TA

WHAT DOES YOUR GENE DO?

This is the most studied genetic variant in body-weight research, and it works mainly through appetite rather than metabolism. It affects the weight your body tends to settle at over the years.

WHAT DOES YOUR GENETICS SAY?

The most useful fact about this variant is that physical activity blunts its effect; this was shown in 218,166 adults and 19,268 children. One copy gives a moderate upward push on weight; this is the most common result.

✧ rs17782313 — MC4R Genotype: AG

WHAT DOES YOUR GENE DO?

This variant lies near a brain receptor that is part of the circuit regulating body weight long term. It is one of the most consistently confirmed variants in body-weight research.

WHAT DOES YOUR GENETICS SAY?

The first genome-wide scan near MC4R linked this variant to fat mass, body weight and obesity risk. One copy gives your weight tendency a slight upward push; this is the most common case.

25. Fat Loss Response

RS	GENE	GENOTYPE	GRADE
rs1558902	**FTO**	AA	
rs2419621	**ACSL1**	CC	
rs4994	**ADRB3**	AG	

✧ rs1558902 — FTO Genotype: AA

WHAT DOES YOUR GENE DO?
Another marker in the FTO region; it affects body fat percentage and body mass index (BMI).

WHAT DOES YOUR GENETICS SAY?
You carry two copies of the version linked to higher body fat; the effect works through appetite regulation rather than metabolic rate. This is a second FTO signal discussed in the review of how the gene shapes body weight and food intake.

✧ rs2419621 — ACSL1 Genotype: CC

WHAT DOES YOUR GENE DO?
This gene activates fat molecules so muscles can burn them as fuel, especially during prolonged, low-intensity work.

WHAT DOES YOUR GENETICS SAY?
Your version readily prepares fatty acids for use, supporting efficient fat burning during exercise.

✧ rs4994 — ADRB3 Genotype: AG

WHAT DOES YOUR GENE DO?
This gene lets stress hormones reach fat cells and release fat for fuel, especially in abdominal fat.

WHAT DOES YOUR GENETICS SAY?
Your fat-releasing receptor works slightly less efficiently, so abdominal fat tends to be more stubborn. A study in healthy adults measured body composition and cardiorespiratory fitness by genotype at this position.

26. Body Composition Response to Training

RS	GENE	GENOTYPE	GRADE
rs1042714	**ADRB2**	CC	
rs1801282	**PPARG**	CG	
rs8192678	**PPARGC1A**	TT	

✧ rs1042714 — ADRB2 Genotype: CC

WHAT DOES YOUR GENE DO?

The same receptor that mobilises fat during exercise can withdraw from the cell surface when repeatedly stimulated. This gene sets how fast that withdrawal happens, which affects sustained fat mobilisation in fat tissue.

WHAT DOES YOUR GENETICS SAY?

Resilient receptors mean fat mobilisation is sustained through long sessions rather than fading.

✧ rs1801282 — PPARG Genotype: CG

WHAT DOES YOUR GENE DO?

As the master regulator of fat cells, this gene controls both how they form and how sensitively they respond to insulin. This dual role makes it relevant to how your body composition changes with training.

WHAT DOES YOUR GENETICS SAY?

A review pooling all published studies linked the Ala form to lower type 2 diabetes risk. Your variant improves insulin sensitivity, which helps your body direct nutrients to muscle rather than fat.

✧ rs8192678 — PPARGC1A Genotype: TT

WHAT DOES YOUR GENE DO?

Mitochondria are where fat is actually burned, so how many you have directly affects your body's capacity to use fat as fuel. This gene controls how readily you build new mitochondria in response to training, linking it to body composition change.

WHAT DOES YOUR GENETICS SAY?

Because you build mitochondria slowly, exercise alone is a weaker lever for changing your body composition than for most people. This direction has been consistent enough to hold even when study groups are pooled.

27. Carbohydrate Response

RS	GENE	GENOTYPE	GRADE
rs7903146	**TCF7L2**	CT	
rs1260326	**GCKR**	TT	

✧ rs7903146 — TCF7L2 Genotype: CT

WHAT DOES YOUR GENE DO?
This gene affects how well your pancreas releases insulin in response to a carbohydrate load. This makes it one of the more meaningful genetic inputs into how your body handles carbohydrate specifically.

WHAT DOES YOUR GENETICS SAY?
Pooling 121,174 people, this variant is one of the most extensively tested blood-sugar variants in the genome. One copy slightly reduces your insulin response, extending how long blood sugar stays high after a meal.

✧ rs1260326 — GCKR Genotype: TT

WHAT DOES YOUR GENE DO?
This gene helps balance blood sugar and triglycerides (blood fats). It affects both metabolic health and fuel use in endurance.

WHAT DOES YOUR GENETICS SAY?
You carry two copies of the more active version at this position; this is linked to fasting blood fats running near the upper end of the normal range.

28. Fat Response

RS	GENE	GENOTYPE	GRADE
rs5082	**APOA2**	GA	

✧ rs5082 — APOA2 Genotype: GA

WHAT DOES YOUR GENE DO?
This gene affects how your body responds to dietary saturated fat. Some variants gain more weight from saturated fat than others.

WHAT DOES YOUR GENETICS SAY?
Your two versions give a balanced response to dietary saturated fat, without the exaggerated effect of the other genotype. This variant is unusual among nutrition variants: its saturated-fat effect has been replicated in three separate populations.

29. Caffeine Metabolism / Response

RS	GENE	GENOTYPE	GRADE
rs762551	**CYP1A2**	AA	
rs5751876	**ADORA2A**	TC	
rs4410790	**AHR**	TC	

✧ rs762551 — CYP1A2 Genotype: AA

WHAT DOES YOUR GENE DO?

Almost all the caffeine you consume is broken down by a single liver enzyme, and this gene sets how fast that enzyme works. It is one of the clearest examples of genetics giving a directly actionable answer.

WHAT DOES YOUR GENETICS SAY?

A cycling time-trial study split athletes by this genotype and found caffeine helped fast metabolizers most. You clear caffeine fast, so it delivers its performance benefit and then leaves your body.

✧ rs5751876 — ADORA2A Genotype: TC

WHAT DOES YOUR GENE DO?

This gene controls one of caffeine's targets in the brain; it determines how caffeine affects you (energized or anxious).

WHAT DOES YOUR GENETICS SAY?

Your version produces a mild reaction at this receptor, which usually means caffeine is comfortably tolerated. Caffeine's jittery/tense side was linked to this adenosine receptor variant in a controlled study of anxiety and alertness.

✧ rs4410790 — AHR Genotype: TC

WHAT DOES YOUR GENE DO?

This gene affects how much caffeine your body 'wants' and tolerates daily.

WHAT DOES YOUR GENETICS SAY?

Your version gives a moderate caffeine drive; you sit mid-range in how strongly caffeine intake reinforces itself. A large genome-wide study of habitual coffee intake found this region among the gene regions that set how much people consume.

30. Vitamin D Tendency

RS	GENE	GENOTYPE	GRADE
rs2282679	**GC**	TG	
rs10741657	**CYP2R1**	GA	
rs12785878	**DHCR7**	TT	

✧ rs2282679 — GC Genotype: TG

WHAT DOES YOUR GENE DO?

Vitamin D cannot travel in the blood on its own; it needs a carrier protein. This gene makes that carrier, so it directly determines how much vitamin D shows up in your blood test.

WHAT DOES YOUR GENETICS SAY?

A genome-wide scan of 79,366 Europeans mapped what sets blood vitamin D levels, and the carrier gene region was at its centre. Slightly less carrier protein means your blood vitamin D tends to run a little lower than your intake would suggest.

✧ rs10741657 — CYP2R1 Genotype: GA

WHAT DOES YOUR GENE DO?

This gene activates vitamin D in your liver. It affects how well your body converts vitamin D from sun/supplements into its active form.

WHAT DOES YOUR GENETICS SAY?

Your vitamin D activation step runs at normal speed, so this gene neither helps nor hinders conversion of the raw vitamin. This activation-step variant is among the genetic determinants used to model circulating vitamin D.

✧ rs12785878 — DHCR7 Genotype: TT

WHAT DOES YOUR GENE DO?

This gene affects how much vitamin D your skin can make when exposed to sunlight.

WHAT DOES YOUR GENETICS SAY?

You carry the more productive version at this position, placing you at the upper end of the range for this pathway step. Studies of vitamin D pathway genes have shown this variant contributes to measured blood levels.

31. Iron Status Tendency

RS	GENE	GENOTYPE	GRADE
rs1800562	**HFE (C282Y)**	GA	
rs1799945	**HFE (H63D)**	CG	
rs855791	**TMPRSS6**	GA	

✧ rs1800562 — HFE (C282Y) Genotype: GA

WHAT DOES YOUR GENE DO?

This gene controls how much iron your body absorbs. One variant leads to iron overload (haemochromatosis), a hidden risk in endurance athletes with high meat intake.

WHAT DOES YOUR GENETICS SAY?

You carry one copy of the main hereditary iron-overload variant; this makes you a carrier, not affected. Population screening studies identified it as the main variant behind hereditary iron overload.

✧ rs1799945 — HFE (H63D) Genotype: CG

WHAT DOES YOUR GENE DO?

Another iron-related variant; milder than C282Y but still increases iron absorption.

WHAT DOES YOUR GENETICS SAY?

You carry one copy of this change, which slightly raises the amount of iron you absorb from food. It is the milder of the two HFE changes studied in population iron-overload screening.

✧ rs855791 — TMPRSS6 Genotype: GA

WHAT DOES YOUR GENE DO?

This gene controls hepcidin, the main iron hormone. It affects blood iron levels and can create a predisposition to low ferritin (iron deficiency) in athletes.

WHAT DOES YOUR GENETICS SAY?

You carry one copy of the version linked to lower circulating iron, so your available iron tends to run slightly below average. A genome-wide scan of what sets blood iron identified this as one of the strongest common effects.

32. Appetite / Satiety

RS	GENE	GENOTYPE	GRADE
rs1137101	**LEPR**	AA	
rs6265	**BDNF**	CC	
rs17782313	**MC4R**	AG	

✧ rs1137101 — LEPR Genotype: AA

WHAT DOES YOUR GENE DO?

This gene senses leptin, the hormone that tells your brain 'you're full'. It affects appetite and your body-weight set point.

WHAT DOES YOUR GENETICS SAY?

Your receptor senses the satiety hormone leptin sensitively, which is linked to steadier appetite control. A study pooling Asian and European populations tested this leptin receptor variant against obesity risk.

✧ rs6265 — BDNF Genotype: CC

WHAT DOES YOUR GENE DO?

The protein this gene makes is best known for supporting brain cells, but it also acts in the brain regions that regulate eating. This gives it a real role in appetite control alongside its better-known mental functions.

WHAT DOES YOUR GENETICS SAY?

A review of all studies questioned whether this variant truly affects thinking and concluded 'somewhat, but less than claimed'. You produce this protein efficiently, which supports appetite-regulating brain circuits and usually means steadier eating habits.

✧ rs17782313 — MC4R Genotype: AG

WHAT DOES YOUR GENE DO?

The receptor near this variant is part of the brain circuit that senses fullness and stops eating. This makes the gene less about metabolism than about the signal telling you you've eaten enough.

WHAT DOES YOUR GENETICS SAY?

Your satiety signal is typical. The per-copy effect is small, but it has come up repeatedly since the first scan.

33. Lipid / Triglyceride Response

RS	GENE	GENOTYPE	GRADE
rs7412	**APOE (ε proxy)**	TT	
rs1532624	**CETP**	GG	
rs10096633	**LPL**	TT	

✧ rs7412 — APOE (ε proxy) Genotype: TT

WHAT DOES YOUR GENE DO?
This gene manages cholesterol in your blood, so it sits behind both heart disease risk and how you process dietary fat.

WHAT DOES YOUR GENETICS SAY?
Here you carry two copies of the protective version, a rare combination linked to lower cholesterol. Detailed follow-up studies of cholesterol genes place this variant among those with the clearest effect.

✧ rs1532624 — CETP Genotype: GG

WHAT DOES YOUR GENE DO?
This gene controls a shuttle that moves cholesterol between different carrier particles in the blood. How active it is determines how much cholesterol stays in the protective versus the harmful carrier.

WHAT DOES YOUR GENETICS SAY?
A comprehensive review of HDL cholesterol genetics covers the CETP region containing this variant. Your shuttle runs at standard activity, giving a typical distribution of cholesterol across carriers.

✧ rs10096633 — LPL Genotype: TT

WHAT DOES YOUR GENE DO?
This gene makes the enzyme that pulls fat particles from your bloodstream after meals and passes them to tissues that can use or store them. How well it works sets your baseline blood fat levels.

WHAT DOES YOUR GENETICS SAY?
Slower clearance means fat particles stay longer in circulation and fasting triglycerides tend to run higher.

34. Micronutrient Traits

RS	GENE	GENOTYPE	GRADE
rs492602	**FUT2 (proxy)**	CC	
rs7946	**PEMT**	CT	

✧ rs492602 — FUT2 (proxy) Genotype: CC

WHAT DOES YOUR GENE DO?
This gene determines whether certain sugars attach to your gut lining. These sugars affect which bacteria settle there, which in turn affects how well some micronutrients are absorbed.

WHAT DOES YOUR GENETICS SAY?
A genome-wide scan of what determines blood vitamin B12 identified this FUT2 variant as a major factor. You do not attach these sugars, giving you a distinctly different gut bacteria profile that affects absorption of some micronutrients, especially vitamin B12.

✧ rs7946 — PEMT Genotype: CT

WHAT DOES YOUR GENE DO?
This gene makes phosphatidylcholine, needed for cell membranes, brain function and transporting fat out of the liver.

WHAT DOES YOUR GENETICS SAY?
Your conversion capacity is slightly reduced, so more of your need for this building block falls on your diet rather than your body's own production.

35. Folate / Homocysteine

RS	GENE	GENOTYPE	GRADE
rs1801133	**MTHFR (C677T)**	AA	
rs492602	**FUT2 (proxy)**	CC	

✧ rs1801133 — MTHFR (C677T) Genotype: AA

WHAT DOES YOUR GENE DO?
This gene helps process folate (vitamin B9) and keeps homocysteine in check. Weak function raises homocysteine, a cardiovascular risk marker.

WHAT DOES YOUR GENETICS SAY?
You carry two copies of the reduced-activity version, so the enzyme runs at about thirty percent of full capacity. Many studies, pooled with a deliberate correction for publication bias, link the TT form to higher homocysteine.

✧ rs492602 — FUT2 (proxy) Genotype: CC

WHAT DOES YOUR GENE DO?
Folate and vitamin B12 work together to keep homocysteine, a molecule that damages blood vessels when it builds up, in check. This gene affects B12 absorption, making it part of the same system.

WHAT DOES YOUR GENETICS SAY?
Because your B12 absorption differs, your folate and homocysteine pathway has one more possible weak point than usual. The same gene shapes gut-lining chemistry, the likely route of its effect on B12.

36. Glucose / Insulin Response

RS	GENE	GENOTYPE	GRADE
rs7903146	**TCF7L2**	CT	
rs5219	**KCNJ11**	TT	
rs1801282	**PPARG**	CG	

✧ rs7903146 — TCF7L2 Genotype: CT

WHAT DOES YOUR GENE DO?
Long-term blood sugar health depends on your pancreas keeping up with demand over decades. This gene affects that capacity, so it matters more for lifelong health than for today's performance.

WHAT DOES YOUR GENETICS SAY?
Slightly reduced secretion capacity creates a slightly raised long-term risk; regular exercise offsets this substantially. Though the per-person effect is modest, the scale of the data leaves the direction here largely undisputed.

✧ rs5219 — KCNJ11 Genotype: TT

WHAT DOES YOUR GENE DO?
This gene affects how well your pancreas releases insulin when blood sugar rises.

WHAT DOES YOUR GENETICS SAY?
You carry two copies of the reduced-secretion version, which blunts the insulin release triggered by a meal. Forty-nine studies comparing people with and without diabetes were pooled to test this potassium channel variant.

✧ rs1801282 — PPARG Genotype: CG

WHAT DOES YOUR GENE DO?
Insulin sensitivity determines how little insulin your body needs to manage blood sugar, and this gene is one of the regulators that tune it. Better sensitivity usually means better long-term metabolic health.

WHAT DOES YOUR GENETICS SAY?
Improved insulin sensitivity is a genuinely favourable finding and lowers your long-term risk of blood sugar problems. This insulin sensitivity result comes from diabetes risk data pooled across many studies.

37. Exercise Blood Pressure Response

RS	GENE	GENOTYPE	GRADE
rs5370	**EDN1**	GG	
rs2070744	**NOS3**	TC	
rs3918226	**NOS3 (proxy)**	GG	

✧ rs5370 — EDN1 Genotype: GG

WHAT DOES YOUR GENE DO?
This gene produces endothelin-1, one of the body's strongest vessel-constricting signals, and helps set your blood pressure and baseline vascular tone.

WHAT DOES YOUR GENETICS SAY?
You carry the version at the high-output end of the gene for this vessel-constricting signal.

✧ rs2070744 — NOS3 Genotype: TC

WHAT DOES YOUR GENE DO?
Nitric oxide is your body's main tool for widening vessels to lower blood pressure. How much you produce affects both your resting pressure and how steeply pressure rises during exercise.

WHAT DOES YOUR GENETICS SAY?
Slightly lower output may nudge your blood pressure up both at rest and during effort. The pooled evidence is on blood pressure; the exercise vessel-widening interpretation extends the same biology.

✧ rs3918226 — NOS3 (proxy) Genotype: GG

WHAT DOES YOUR GENE DO?
During exercise your blood pressure rises, and how far depends on whether your vessels widen to accommodate increased flow. This gene affects that widening, so it features in exercise blood pressure and hypertension risk studies.

WHAT DOES YOUR GENETICS SAY?
Your vessels adapt well to increased flow, so your blood pressure response to exercise tends to be well controlled.

38. Resting Heart Rate

RS	GENE	GENOTYPE	GRADE
rs452036	**MYBPC3**	TT	
rs9398652	**GJA1**	AC	

✧ rs452036 — MYBPC3 Genotype: TT

WHAT DOES YOUR GENE DO?
This gene makes a protein in heart muscle; it affects the heart's response to endurance training.

WHAT DOES YOUR GENETICS SAY?
Your genotype here is the altered form, common in athletes and without meaningful functional consequence.

✧ **rs9398652 — GJA1** Genotype: **AC**

WHAT DOES YOUR GENE DO?
This gene forms cell-to-cell connections in the heart; it affects heart rate and rhythm regulation.

WHAT DOES YOUR GENETICS SAY?
Your version is linked to a slightly raised resting heart rate.

39. Exercise Lipid Response

RS	GENE	GENOTYPE	GRADE
rs1800588	**LIPC**	CC	
rs1532624	**CETP**	GG	
rs10096633	**LPL**	TT	

✧ **rs1800588 — LIPC** Genotype: **CC**

WHAT DOES YOUR GENE DO?
This gene clears fat particles from your blood; it affects triglyceride and HDL cholesterol balance.

WHAT DOES YOUR GENETICS SAY?
This gene contributes to standard-rate fat clearance from your bloodstream, so it neither speeds up nor holds back your blood fat profile.

✧ **rs1532624 — CETP** Genotype: **GG**

WHAT DOES YOUR GENE DO?
One of the clearest effects of regular exercise is raising protective cholesterol (HDL). Because this gene sets your protective cholesterol starting point, it determines how much room there is for that.

WHAT DOES YOUR GENETICS SAY?
Starting from standard levels, exercise will raise your protective cholesterol at the usual rate. Although the health meaning of higher HDL is still debated, CETP is the gene with the best-proven link to HDL.

✧ **rs10096633 — LPL** Genotype: **TT**

WHAT DOES YOUR GENE DO?
Exercise is one of the most effective ways to lower blood fats, largely by boosting this gene's enzyme activity in muscle. So this variant affects how much lipid benefit you get from each session.

WHAT DOES YOUR GENETICS SAY?
Because your baseline clearance is slower, there is more room for exercise to help; the blood-fat-lowering effect of regular aerobic training tends to be meaningful at this genotype.

40. Cardiorespiratory Fitness

RS	GENE	GENOTYPE	GRADE
rs10921078	**PPARGC1B**	AG	
rs6552828	**ACSL1**	AG	

✧ **rs10921078 — PPARGC1B** Genotype: **AG**

WHAT DOES YOUR GENE DO?
This gene helps build more mitochondria (energy factories) in your muscles, supporting endurance and metabolic health.

WHAT DOES YOUR GENETICS SAY?
Here you carry the enhanced version, linked to a stronger endurance response to aerobic work.

✧ **rs6552828 — ACSL1** Genotype: **AG**

WHAT DOES YOUR GENE DO?
This profile looks not at your current fitness but at how your heart and lungs change in response to training. This gene affects the cellular fat-processing machinery that must keep pace as your cardiovascular system adapts.

WHAT DOES YOUR GENETICS SAY?
Your adaptation timeline is typical; your heart and lungs respond to training at the rate seen in most people.

41. Sleep Traits

RS	GENE	GENOTYPE	GRADE
rs1801260	**CLOCK**	AA	
rs73598374	**ADA**	GA	
rs228697	**PER3 (proxy)**	GG	

✧ **rs1801260 — CLOCK** Genotype: **AA**

WHAT DOES YOUR GENE DO?
This gene sets your biological clock; it determines whether you are naturally a morning person or a night owl.

WHAT DOES YOUR GENETICS SAY?
Your clock gene points to a morning chronotype, meaning you are naturally set up to be an early riser. This clock gene variant has been studied in adults alongside sleep timing, meal timing and chronotype.

✧ rs73598374 — ADA Genotype: GA

WHAT DOES YOUR GENE DO?
Adenosine is the molecule that builds up while you are awake and creates sleep pressure. This gene makes the enzyme that breaks down adenosine, so it directly affects how deep your sleep is.

WHAT DOES YOUR GENETICS SAY?
Sleep lab recordings showed that carriers of the rare form sleep more deeply and score lower on attention tests. Slower adenosine breakdown means sleep pressure stays higher, giving you more deep sleep than average.

✧ rs228697 — PER3 (proxy) Genotype: GG

WHAT DOES YOUR GENE DO?
This gene fine-tunes how much sleep you need and how sensitive you are to sleep loss.

WHAT DOES YOUR GENETICS SAY?
You carry the more sensitive version of this gene, which is linked to stronger build-up of sleep pressure through the day.

42. Pain Sensitivity

RS	GENE	GENOTYPE	GRADE
rs4680	**COMT**	CC	
rs6746030	**SCN9A**	AA	
rs1799971	**OPRM1**	AA	

✧ rs4680 — COMT Genotype: CC

WHAT DOES YOUR GENE DO?
This gene clears dopamine and related signalling molecules from the brain; the speed of this clearance affects how the nervous system processes pain signals. Fast clearance has been linked to different pain thresholds than slow clearance.

WHAT DOES YOUR GENETICS SAY?
A review of the chronic pain literature examined this variant in fibromyalgia, migraine and muscle or joint pain. Slower clearance is linked to higher pain sensitivity, meaning you feel discomfort earlier and more intensely than others under the same tissue stress.

✧ rs6746030 — SCN9A Genotype: AA

WHAT DOES YOUR GENE DO?
This gene affects how strongly your nervous system feels pain signals.

WHAT DOES YOUR GENETICS SAY?
You carry the version at the high-tolerance end of this gene, which is linked to perceiving discomfort more mildly. Five separate patient cohorts were used to show that this sodium channel variant alters pain perception.

✧ **rs1799971 — OPRM1** Genotype: **AA**



WHAT DOES YOUR GENE DO?

This gene affects opioid receptors; it determines how your body responds to endorphins (natural painkillers).

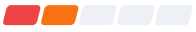
WHAT DOES YOUR GENETICS SAY?

Your genotype is the standard form, meaning this receptor responds as it does in most people rather than at either extreme. Pooled studies of post-operative pain have examined this opioid receptor variant together with COMT.

43. Stress Response

RS	GENE	GENOTYPE	GRADE
rs1360780	**FKBP5**	CC	
rs324420	**FAAH**	AA	
rs6265	**BDNF**	CC	

✧ **rs1360780 — FKBP5** Genotype: **CC**



WHAT DOES YOUR GENE DO?

After a stressful event your body must switch its stress hormone response back off. This gene controls the sensitivity of that off switch, which determines how quickly your cortisol settles once the pressure lifts.

WHAT DOES YOUR GENETICS SAY?

Participants underwent a dexamethasone test with cortisol measured; the genotype at this position altered the response. Your off switch is sensitive, so your cortisol settles quickly once the stressor passes.

✧ **rs324420 — FAAH** Genotype: **AA**



WHAT DOES YOUR GENE DO?

This gene affects your endocannabinoid system, home to the natural mood regulators behind the 'runner's high'.

WHAT DOES YOUR GENETICS SAY?

You carry the version at the upper end of this gene for exercise-induced mood lift via the body's own cannabis-like signalling system. A review pooled the body weight evidence for this variant in the context of the body's own cannabis-like signalling system.

✧ **rs6265 — BDNF** Genotype: **CC**



WHAT DOES YOUR GENE DO?

This protein lets your brain adapt and reorganise itself, the biological basis of coping with stress. How much you produce affects how resilient your mental state is under pressure.

WHAT DOES YOUR GENETICS SAY?

Efficient production supports good brain adaptability, showing up as solid resilience under psychological stress and faster mental recovery after hard periods. Pooled thinking and memory data show the effect is smaller than early studies implied.

44. Endurance Training Adaptation

RS	GENE	GENOTYPE	GRADE
rs7181866	**NRF2 (GABPB1 proxy)**	GG	

✧ rs7181866 — NRF2 (GABPB1 proxy) Genotype: GG

WHAT DOES YOUR GENE DO?
This gene is a master switch for antioxidant defences and mitochondrial production during endurance training.

WHAT DOES YOUR GENETICS SAY?
You carry the most responsive version, which is linked to very high endurance training potential.

45. Strength or Endurance? Training Response

RS	GENE	GENOTYPE	GRADE
rs1815739	**ACTN3**	CC	
rs4253778	**PPARA**	GC	
rs1130214	**AKT1**	GG	

✧ rs1815739 — ACTN3 Genotype: CC

WHAT DOES YOUR GENE DO?
This profile asks a practical question: which type of training gives you the most return for the hours you put in? This gene is one of the clearest genetic inputs because it shifts whether your muscle is built to respond to heavy loading or to sustained work.

WHAT DOES YOUR GENETICS SAY?
In this genotype, loading converts to adaptation more efficiently on the strength side of the spectrum. Pooled data across sports support not only race outcomes but also the fibre-level explanation given here.

✧ rs4253778 — PPARA Genotype: GC

WHAT DOES YOUR GENE DO?
Different training types rely on different fuel systems. This gene tilts your metabolism towards fat or carbohydrate, which affects which type of training your body supports more comfortably.

WHAT DOES YOUR GENETICS SAY?
Your metabolism favours neither training type, giving you freedom to build your programme around your goals rather than your fuel preferences. Pooled endurance athlete data support the direction of this reading; the variant acts as one of many contributors.

✧ rs1130214 — AKT1 Genotype: GG

WHAT DOES YOUR GENE DO?

Resistance and endurance training activate partly competing signalling pathways in muscle. This gene sits on the resistance side of that competition, so it helps show which direction your muscle responds to more readily.

WHAT DOES YOUR GENETICS SAY?

This signalling pathway works efficiently in your muscle, so a given load produces a relatively large muscle-building response. The defined biology is metabolic; the muscle growth reading is an inference from the same signalling pathway.

46. Strength Training Adaptation

RS	GENE	GENOTYPE	GRADE
rs4341	**ACE (I/D proxy)**	GG	
rs1805086	**MSTN**	TT	

✧ rs4341 — ACE (I/D proxy) Genotype: GG

WHAT DOES YOUR GENE DO?

Adaptation happens not during training but in the days after. This gene affects the hormonal environment in which your muscle recovers, which determines how much of each session turns into lasting change.

WHAT DOES YOUR GENETICS SAY?

Your pattern supports adaptation towards maximal strength and muscle size, making the heavy, low-rep end of training especially productive. ACE has been studied in athletes for twenty years; pooled together, the signal is small but stubbornly persistent.

✧ rs1805086 — MSTN Genotype: TT

WHAT DOES YOUR GENE DO?

Every time you lift, growth signals compete with signals that limit growth. This gene produces the limiting side of that contest, so it affects how much of each training block turns into new tissue.

WHAT DOES YOUR GENETICS SAY?

Your growth-limiting signal is at a normal level, so your strength training adaptation follows the usual pattern: gradual, progressive and dependent on consistent loading. Athletes' strength and muscle mass data have been pooled across studies for exactly this change.

47. High Intensity + Endurance Interaction

RS	GENE	GENOTYPE	GRADE
rs11549465	**HIF1A**	AA	
rs4880	**SOD2**	TT	

✧ rs11549465 — HIF1A Genotype: AA



WHAT DOES YOUR GENE DO?

High-intensity work creates short, severe oxygen deficits, while endurance work creates long, mild ones. This gene's sensor responds to both, so it sits at the intersection of these two training types.

WHAT DOES YOUR GENETICS SAY?

Because you have the most sensitive sensor, both high-intensity and endurance stimuli trigger strong adaptive responses, an excellent position for combined training. As the supporting study covers a single athlete group, the effect size should be treated as provisional.

✧ rs4880 — SOD2 Genotype: TT



WHAT DOES YOUR GENE DO?

Combining hard intervals with high endurance volume creates reactive load from two directions at once. This gene determines your capacity to neutralise that combined load, which affects how well the two training types can coexist in your programme.

WHAT DOES YOUR GENETICS SAY?

Reduced defence capacity means stacking high intensity on top of high volume costs you more than others; this is where overload is most likely to leak in. This variant's effect is seen most clearly in the blood chemistry of elite athletes.

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GENOTYPING PLATFORM

53 Illumina. Infinium Global Screening Array v3.0 data sheet

54 Illumina. Infinium Global Screening Array v4.0 data sheet

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