



Muscle Composition

Sprinters and endurance athletes differ in the composition and the capabilities of their muscles. These differences may be influenced by both training decisions and genetic factors.

Your Wellness Result

Jamie, your genetic muscle composition is **common in elite power athletes**.

Studies have found that almost all elite power athletes (including sprinters, throwers, and jumpers) have a specific genetic variant in a gene related to muscle composition. You have the same genetic variant as these elite athletes.



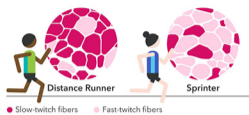
What this means for you

For most people, lifestyle and training factors drive athletic performance. At the national and international levels of competition, the genetic variant in this report seems to make a difference in athletic success, but its role for non-elite athletes isn't completely understood.

Genetics and Muscle Composition

What's in a muscle?

Our muscles are made up of two main types of fibers, called slow-twitch and fast-twitch. Fast-twitch fibers allow rapid, forceful muscle contraction – the sort of contraction required for sprinting. Slow-twitch fibers contract more slowly, but they also tire less easily. Endurance athletes tend to have more slow-twitch fibers, while power athletes (including sprinters, throwers, and jumpers) tend to have more fast-twitch fibers – a difference that may reflect both their genetics and their training habits.



Muscles and genetics

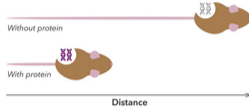
This report is based on a genetic marker in the **ACTN3** gene. This marker controls whether muscle cells produce a protein (called alpha-actinin-3) that's found in fast-twitch muscle fibers. While some people don't produce this protein at all, almost all of the elite power athletes who have been studied have a genetic variant that allows them to produce the protein. This suggests that the protein may be beneficial at least at the highest levels of power-based athletic competition.

	Genetic result	What it means
You	CC	Common result for elite power athletes
	CT	Common result for elite power athletes
	TT	Uncommon result for elite power athletes

[See the percentage of customers with these results](#)

About endurance athletes

Most of the elite power athletes who have been studied have a genetic variant that allows them to produce the alpha-actinin-3 protein in their muscles. Does that mean that people who don't produce this protein are more likely to be endurance athletes? Studies in mice suggest that the answer may be yes: young mice who don't make any of this protein are able to run farther without getting tired. But studies in humans have not consistently shown an endurance advantage for people who don't produce the alpha-actinin-3 protein.



Genetics isn't everything

Differences in the genetic marker used in this report may only explain about 2-3% of the difference in muscle performance between different people. In elite athletes who work intensely to reach the upper limits of their potential, that 2-3% may mean the difference between qualifying for the Olympics and missing the cut. But for the rest of us, the choices we make about how to train will far outweigh the contribution of our genetic result at this marker.



This report does not diagnose any health conditions or provide medical advice. Consult with a healthcare professional before making any major lifestyle changes or if you have any other concerns about your results.

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Muscle Composition

Scientific Details

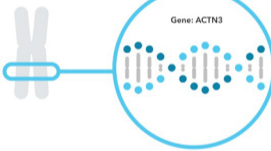
Sprinters and endurance athletes differ in the composition and the capabilities of their muscles. These differences may be influenced by both training decisions and genetic factors.

Muscle composition is influenced by a genetic marker in the ACTN3 gene.

ACTN3

The **ACTN3** gene contains instructions for making alpha-actinin-3, a protein found in certain types of fast-twitch muscle fibers. Some people have a non-functional variant of the ACTN3 gene and do not produce the alpha-actinin-3 protein. However, most of the elite power athletes who have been studied (including sprinters, throwers, and jumpers) have the functional ACTN3 variant and do produce this protein.

Chromosome 11



You have two copies of the C variant.

Variants Detected		View All Tested Markers															
Marker Tested	Your Genotype*	Additional Information															
RS77X Gene: ACTN3 Marker: rs1815739	C Typical copy from one of your parents C Typical copy from your other parent	<p>Biological explanation</p> <p>The marker we tested comes in two different forms: C and T. The T version is non-functional, which means the ACTN3 gene can't produce the alpha-actinin-3 protein. This marker has been studied the most in individuals of European descent.</p> <p>Typical vs. variant DNA sequence(s)</p> <p></p> <p>Percent of 23andMe customers with variant</p> <p>Variant: T</p> <table border="1"> <tbody> <tr><td>European</td><td>68.7%</td></tr> <tr><td>African American</td><td>38.5%</td></tr> <tr><td>Ashkenazi Jewish</td><td>69.0%</td></tr> <tr><td>East Asian</td><td>69.8%</td></tr> <tr><td>Hispanic or Latino</td><td>76.0%</td></tr> <tr><td>South Asian</td><td>84.2%</td></tr> <tr><td>Middle Eastern</td><td>70.2%</td></tr> </tbody> </table> <p>References 1, 3, 4, 7, 11, 15 ClinVar*</p>		European	68.7%	African American	38.5%	Ashkenazi Jewish	69.0%	East Asian	69.8%	Hispanic or Latino	76.0%	South Asian	84.2%	Middle Eastern	70.2%
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*This test cannot distinguish which copy you received from which parent. This test also cannot determine whether multiple variants, if detected, were inherited from only one parent or from both parents. This may impact how these variants are passed down.

23andMe always reports genotypes based on the "positive" strand of the human genome reference sequence (Build 37). Other sources sometimes report genotypes using the opposite strand.

References

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Change Log

Your report may occasionally be updated based on new information. This Change Log describes updates and revisions to this report.

Date	Change
March 31, 2017	Revised content and design.
Feb. 18, 2016	Due to improvements in data analysis, some customers who previously received a "Not Determined" result for this report may see an updated result.
Oct. 21, 2015	Muscle Composition report created.



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