

Do elite 'power sport' athletes have a genetic advantage?

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A specific gene variant is more frequent among elite athletes in power sports, reports a study in the October issue of [The Journal of Strength and Conditioning Research](#), official research journal of the National Strength and Conditioning Association (NSCA).

A "functional polymorphism" of the angiotensinogen (AGT) gene is two to three times more common in elite power athletes, compared to nonathletes or even elite endurance athletes, according to the new research by Paweł Ciżczyk, PhD, of University of Szczecin, Poland, and colleagues. They write, "[T]he M23T variant in the AGT may be one of the [genetic markers](#) to investigate when an assessment of predisposition to power sports is made."

Gene Variant More Common in Elite Power Athletes...

The researchers analyzed DNA samples from two groups of elite Polish athletes: 100 power-oriented athletes, from sports such as power-lifting, short-distance runners, and jumpers; and 123 endurance athletes, such as long-distance runners and swimmers and rowers. All athletes competed at the international level—eg, World and European Championships, World Cups, or Olympic Games. A group of 344 nonathletes were studied for comparison.

The analysis focused on the genotype of the M235T polymorphism of the gene AGT. "Polymorphisms" are genes that can appear in two different forms (alleles). A previous study found that the "C" allele of the AGT gene (as opposed to the "T" allele) was more frequent among [elite athletes](#) in power sports.

The genetic tests found that elite power athletes were more likely to have two copies of the C allele—in other words, they inherited the C allele from both parents. This "CC" genotype was found

40 percent of the power athletes, compared to 13 percent of endurance athletes and 18 percent of nonathletes.

Power athletes were three times more likely to have the CC genotype compared to endurance athletes, and twice as likely compared to nonathletes. At least one copy of the C allele was present in 55.5 percent of power athletes, compared to about 40 percent of endurance athletes and nonathletes.

...But Functional Significance Not Yet Clear

In a further analysis, the researchers found no differences in genotype between "top-elite" athletes who had won medals in international-level competition, compared to elite-level athletes who were not medalists.

The new study is the first to replicate previous, independent research showing an increased rate of the CC genotype of the AGT gene among power athletes on Spanish national teams. That study also found about a 40 percent prevalence of the CC genotype among elite power athletes.

The AGT gene is part of the renin-angiotensin system, which plays essential roles in regulating blood pressure, body salt, and fluid balance. There are several possible ways in which the CC [genotype](#) might predispose to improved power and strength capacity—including increased production of angiotensin II, which is crucial for muscle performance. However, the researchers emphasize that the "functional consequences" of the M235T polymorphism remain to be determined.

The study contributes to the rapidly evolving body of research on genetic factors related to exercise, fitness, and performance—which may one day have implications for identification and training of potential elite-level [athletes](#). Dr Ciżczyk and coauthors conclude, "Identifying genetic characteristics related to athletic excellence or

individual predisposition to types of sports with different demands (power or endurance oriented) or even sport specialty may be decisive in recognizing athletic talent and probably will allow for greater specificity in steering of sports training programs."

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