

Quiz Policies

Eligibility

The NCSF online quizzes are open to any currently certified fitness professional, 18 years or older.

Deadlines

Course completion deadlines correspond with the NCSF Certified Professionals certification expiration date. Students can obtain their expiration dates by reviewing either their certification diploma or certification ID card.

Cancellation/Refund

All NCSF continued education course studies are non-refundable.

General Quiz Rules

- You may not have your quiz back after sending it in.
- Individuals can only take a specific quiz once for continued education units.
- Impersonation of another candidate will result in disqualification from the program without refund.

Disqualification

If disqualified for any of the above-mentioned reasons you may appeal the decision in writing within two weeks of the disqualification date.

Reporting Policy

You will receive your scores within 4 weeks following the quiz. If you do not receive the results after 4 weeks please contact the NCSF Certifying Agency.

Re-testing Procedure

Students who do not successfully pass an online quiz have the option of re-taking. The fees associated with this procedure total \$15 (U.S) per request. There are no limits as to the number of times a student may re-test.

Special Needs

If special needs are required to take the quiz please contact the NCSF so that appropriate measures can be taken for your consideration.

Quiz Rules

What Do I Mail Back to the NCSF?

Students are required to submit the quiz answer form.

What do I Need to Score on the Quiz?

In order to gain the .5 NCSF continued education units students need to score 80% (8 out of 10) or greater on the CEU quiz.

Where Do I Mail My Quiz Answer Form?

You will mail your completed answer form to:

NCSF

Attn: Dept. of Continuing Education

5915 Ponce de Leon Blvd., Suite 60

Coral Gables, FL 33146

How Many CEUs Will I Gain?

Professionals who successfully complete the any continuing education quiz will gain .5 NCSF CEUs per quiz.

How Much does each quiz cost?

Each quiz costs the student \$15.00.

What Will I Receive When The Course Is Completed?

Students who successfully pass any of the NCSF online quizzes will receive their exam scores, and a confirmation letter.

How Many Times Can I Take The Quizzes For CEUs?

Individuals can take each NCSF quiz once for continuing education credits.

Decoding Athletic Genetics

A December 1st article in the New York Times reports that in Boulder, Colorado parents have been given the opportunity to genetically test their children through Atlas Sports Genetics. A \$149 test is now available, which aims to “predict a child’s natural athletic strengths.” Atlas states that focusing this testing on children from infancy to about 8 years in age is ideal, because “physical tests to gauge future sports performance at that age are, at best, unreliable.” Research primarily performed at the University of Sydney and published in 2003 regarding the gene ACTN3, prompted this business endeavor. This single gene, of the more than 20,000 in the human genome, is being touted as a reliable predictor for whether a person would be well-suited for speed and power sports versus endurance activities.

Some consider the test a good investment for their children, as it could lead to a college scholarship or career as a professional athlete. However, can testing one gene be enough to determine someone’s particular sports niche or end capabilities? Dr. Theodore Friedmann, director of the University of California – San Diego Medical Center’s interdepartmental gene therapy program disagrees, calling it “an opportunity to sell new versions of snake oil.” He added that “I don’t deny that these genes have a role in athletic success, but it’s not that black and white.”

The director of the functional genomics laboratory at the University of Maryland, Dr. Stephen M. Roth, who has studied ACTN3, stated that “the idea that it will be one or two genes that are contributing to the Michael Phelps or the Usain Bolts of the world I think is shortsighted, because it’s much more complex than that.” He added that “athletic performance is already known to be affected by more than 200 genes.”

Yang et al. reported in the American Society of Human Genetics that ACTN3 is associated with human elite athletic performance. The specific *alleles* found at this gene locus code for the presence or absence of α -actinin-3, a protein that is highly specific to fast-twitch type II fibers. For clarification, alleles are the different versions of a gene (for example, one allele may code for brown hair, while another may code for blonde hair). A locus is the location on gene that the alleles influencing a particular trait can be found. The possible genotypes are either 577X, 577RX, or 577R. 577X is a stop codon, a sequence of nucleotides that terminates the production of a specific protein; in other words, it terminates translation. Individuals with this genotype do not produce α -actinin-3 and the absence of a disease state for these individuals is thought to be attributable to compensation by α -actinin-2, a similar protein found in slow-twitch type I fibers. Simply stated, individuals with the 577X genotype readily express the form of the actinin protein more characteristic of slow-oxidative type I muscle fibers. The opposite is true of individuals with the 577R genotype. They readily express the α -actinin-3 protein found in faster-twitch type II fibers. 577RX are heterozygotes that will exhibit α -actinin-3 to some extent.

The α -actinins are a family of actin-binding proteins related to dystrophin, a vital structural protein whose absence is the underlying pathology of muscular dystrophy. The α -actinins are components of the Z-line in the sarcomere that crosslink the actin (thin) filaments. They are believed to perform the static function of maintaining an ordered myofibrillar array, coordinating myofibril contractions. The study authors argue that the advantages of this protein lie in three major mechanisms. Sarcomeric α -actinins are associated with glycogen phosphorylase and other glycolytic enzymes which could shift glucose metabolism to the more anaerobic or aerobic pathways. The actinins are also associated with signaling factors that aid in the determination of fiber types. Finally, α -actinin-3 may be evolutionarily optimized for the minimization of damage caused by eccentric contractions. Therefore, their presence or absence may result in the conferral of specific advantages associated with fast-twitch or slower-twitch activities, respectively.

Eighteen percent of healthy white individuals were found to be completely absent of α -actinin-3. Interestingly, 25% of Asian populations were found to be α -actinin-3 deficient, while <1% of the African Bantu population were characterized by the 577X genotype. More significantly, the research scientists analyzed elite sprint/power and endurance athletes as well. The ACTN3 gene of 107 total elite-level (international-competition) athletes, 72 male and 35 female, were determined. Fifty of those athletes had competed in the Olympic games.

The results found that male sprint athletes had a lower frequency of the 577X genotype (lacking α -actinin-3) compared to the non-athletic population, while even more significant was the finding that no female sprint athlete lacked the α -actinin-3 protein altogether. Sprint athletes altogether had a lower frequency of the heterozygous RX genotype (45% vs. 52%) in comparison to controls. Elite endurance athletes had a higher frequency of the 577X gene than controls did (24% vs. 18%). These results led the researchers to conclude that the 577R allele at the ACTN3 gene provides an advantage for power and sprint activities. The fact that it was not as profound in males was believed to be due to the androgenic hormone response to training in males. However, all male Olympian power athletes did have at least one copy of the 577R gene (they were at a minimum heterozygous and did not completely lack α -actinin-3) suggesting that at the most elite levels of competition, “every variable counts.”

The study researchers admitted that at least 73 genetic loci have been associated with fitness and performance phenotypes, suggesting that Dr. Roth’s estimate of 200 may be inflated, although it would be naïve to believe that we have identified them all. This paints the picture that ACTN3 may be a very minor piece of the picture; but a definite piece nonetheless. Now, as to whether this research can justify paying \$149 to determine whether this one piece is present and what implications can be drawn about placing a child in football versus soccer is up to parents. More importantly, parents should focus on whether the child gets enough physical activity and derives enjoyment from those activities. The bottom line may be that unless you are attempting to breed an Olympic athlete this information has very limited relevance. Dr. Roth concedes “is it going to

affect little Johnny when he participates in soccer, or Suzy's ability to perform sixth grade track and field?, there's very little evidence to suggest that.”



Decoding Athletic Genetics C.E.U. Quiz

1. Atlas Sports Genetics' test focuses on infants and children through what age?
 - a. 5
 - b. 8
 - c. 10
 - d. 18

 2. The human genome is composed of _____ genes.
 - a. 149
 - b. 2,000
 - c. > 20,000
 - d. 300 kb

 3. α -actinin-3 and α -actinin-2 are characteristic of _____ and _____ muscle fibers, respectively.
 - a. Type I; Type II
 - b. Type II; Type III
 - c. Type I; Type III
 - d. Type II; Type I

 4. Which of the following has the fastest twitch/contraction speed and therefore facilitates powerful/high velocity movements?
 - a. Type II
 - b. Type III
 - c. Type I
 - d. All of the above have the same twitch speed.

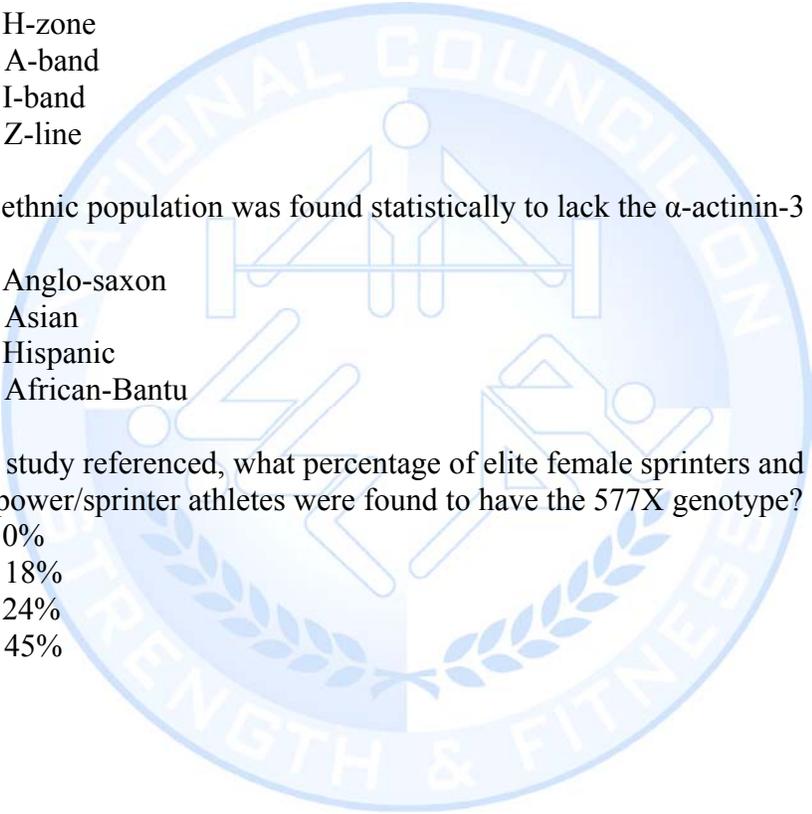
 5. What are alleles?
 - a. Different versions of a gene, inherited by biological parents.
 - b. The specific location on a gene where alleles influencing a particular trait can be found.
 - c. Unfertilized ova.
 - d. Combinations of nucleotides that code cause translation to halt.

 6. Which of the following genotypes codes for complete blockage of production of α -actinin-3?
 - a. 577S
 - b. 577R
 - c. 577X
 - d. 577RX
-
-

7. The lack of which structural protein is the underlying cause of Duchenne's Muscular Dystrophy?
 - a. α -actinin-3
 - b. dystrophin
 - c. α -actinin-2
 - d. titin

 8. Where within the sarcomere are the α -actinins found?
 - a. H-zone
 - b. A-band
 - c. I-band
 - d. Z-line

 9. Which ethnic population was found statistically to lack the α -actinin-3 protein the least?
 - a. Anglo-saxon
 - b. Asian
 - c. Hispanic
 - d. African-Bantu

 10. In the study referenced, what percentage of elite female sprinters and Olympic level male power/sprinter athletes were found to have the 577X genotype?
 - a. 0%
 - b. 18%
 - c. 24%
 - d. 45%
- 

Quiz Answer Form

FIRST NAME _____ LAST NAME _____ M.I. _____

TITLE _____

ADDRESS _____ APT. _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

COUNTRY _____ POSTAL CODE _____

CERTIFICATION NO. _____ CERTIFICATION EXP. ____/____/____

MEMBERSHIP NO. _____ MEMBERSHIP EXP. ____/____/____

Quiz Name	Member Price	Total
	\$15	



Discover



Visa



Mastercard



Amex



Check/Money Order

Account No. _____

Exp. Date _____

Security Code _____

Signature _____

Date _____

Quiz Answers

- | | |
|----------|-----------|
| 1. _____ | 6. _____ |
| 2. _____ | 7. _____ |
| 3. _____ | 8. _____ |
| 4. _____ | 9. _____ |
| 5. _____ | 10. _____ |

Fill in each blank with the correct choice on the answer sheet. To receive 0.5 CEUs, you must answer 8 of the 10 questions correctly.

Please mail this Quiz answer form along with the proper enclosed payment to:

NCSF
5915 Ponce de Leon Blvd., Suite 60
Coral Gables, FL 33146

Questions? 800-772-NCSF