

# 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.

WHAT'S NOT TO  
LOVE ABOUT

# Caffeine

THE PERFORMANCE,  
LIFESPAN, AND  
HEALTHSPAN  
ENHANCER



**F**or centuries, caffeine has been the stimulant of choice among humans. Evidence suggests that even in Upper Paleolithic times (10,000 years ago), the raw fruit of the coffee plant (*Coffea Arabica*) was used to brew a beverage with stimulant properties. Caffeine naturally originates in 63 species of plants as various types of methylated xanthenes, but the most common forms consumed today include coffee beans, tea leaves, cocoa beans, and cola nuts. The compound is readily absorbed after ingestion; serum levels tend to peak in approximately 60 minutes. The half-life of caffeine is reported to be between 2-10 hours, during which time it is metabolized within the liver, and eliminated in the urine or sweat. Its positive effects on sport performance and cognitive functioning have been extensively examined in previous research. Contemporary investigations seem to point toward caffeine also having a positive impact on lifespan, healthspan (currently defined as the period of a person's life during which they are generally healthy and free from serious or chronic illness) and a reduction in the risk for neurodegenerative pathologies such as Alzheimer's disease. Research related to these numerous benefits are addressed in detail below.

As it relates to enhancing sports performance, it is well-documented that consuming caffeine can improve endurance and maximal-intensity exercise, cognitive functioning, concentration, response time, and even carbohydrate absorption. The primary means by which caffeine is believed to exert its ergogenic effects are summarized in the graphic on the next page.

As it relates to endurance exercise performance, caffeine has been shown to improve endurance capacity with dosages as low as 1.0-3.2 mg/kg of body weight. With prolonged training at intensities  $>85\%$   $VO_2\text{max}$ , exercisers typically see 10%-20% improvements in time to exhaustion. Essentially, caffeine seems to reduce the rate of perceived exertion (RPE) for most forms of exercise. As it relates to maximal-intensity exercise, caffeine use improves work performed near 100% of  $VO_2\text{max}$  for approximately five minutes. This improvement is believed to be the effect of the compound on neuromuscular pathways that facilitate muscle fiber recruitment, or increase total fiber recruitment, as well as lower RPE. Of note, the effects of caffeine on short-term supramaximal exercise (above 100% of  $VO_2\text{max}$ ) are uncertain. During repeated Wingate tests and 15-second sprints, caffeine appeared to have no positive effects, but the number of investigations exploring this topic is limited.

### Increases lipolysis and spares muscle glycogen



- Increases circulating epinephrine levels, stimulating lipolysis
- Antagonizes adenosine receptors that normally inhibit fatty acid oxidation by hindering the actions of hormone-sensitive lipase
- May handle metabolites and ions in a way that allows for energy sparing

### Increases excitability of muscle fibers



- Has a direct effect on key regulatory enzymes such as phosphorylase
- Increases the influx of calcium from the extracellular space
- Increases the release of calcium from the sarcoplasmic reticulum
- Increases the sensitivity of myofilaments to calcium

### Influences signals from the brain to motor neurons



- Stimulates catecholamine and neurotransmitter release, which may lower the perception of effort
- May lower the excitation threshold for motor neuron recruitment
- Alters excitation/contraction coupling
- Increases ion transport within the muscle
- Facilitates transmission of nervous signals

As it relates to cognitive functioning, early research demonstrated caffeine added to a carbohydrate-electrolyte beverage consumed before and during exercise greatly improves attention, psychomotor skills and memory measures. A more recent study examined the effects of consuming 100mg of caffeine and 45g of carbohydrate in an energy bar before and during 2.5 hours of cycling at 60% of  $VO_2\text{max}$ , followed by a time to exhaustion test at 75% of  $VO_2\text{max}$ . The participants experienced extended times to exhaustion as well as improved concentration, response time, and performance measures while completing complex cognitive tasks during and after the event. These benefits were elevated compared to consuming an energy bar without caffeine or nothing at all.

It is well-established that caffeine is proven to exert physiological effects that may improve performance in a variety of physical events, lower RPE during exercise, and increase cognitive functioning, but new research published in *Longevity and Lifespan* (December, 2012) has demonstrated that caffeine may also positively affect both total lifespan and healthspan. The research team examined the effects on a primitive type of worm (or nematode) commonly used in studies concerning genetic analysis. They found that caffeine administration positively influenced two known factors associated with longevity among the worms including dietary restriction and reduced insulin signaling. Two primary theories exist concerning the mechanisms behind insulin's effects on longevity. One theory is that insulin programs metabolic parameters that prolong or reduce lifespan. The other is that insulin determines the cell's ability to endure oxidative stress from respiration, thereby determining the rate of aging. Caffeine treatment was also found to delay the progression of a nematode model of polyglutamine disease, suggesting that consumption may enhance resistance to proteotoxic stress – essentially an impairment of cell function due to the misfolding, or breakdown, of structural proteins – increasing its relevance in developing treatments for human diseases, such as Huntington's or Alzheimer's disease. The study authors concluded that caffeine consumption is important to consider when developing clinical interventions designed to mimic dietary restriction or modulate insulin/IGF-1-like signaling. The team noted that future work addressing the relevant targets of caffeine in models of aging and healthspan will help to clarify the underlying mechanisms, potentially identifying new molecular targets for disease intervention. ●

# CEU Quiz

## Caffeine

- Caffeine reaches its peak circulating concentration in which of the following periods after consumption?
  - 15 minutes
  - 30 minutes
  - 45 minutes
  - 60 minutes
- Chronic caffeine consumption may reduce the risk for which of the following pathologies?
  - Cancer
  - Immunological disease
  - Neurodegenerative disease
  - Gastrointestinal disorders
- Caffeine has been shown to have a positive impact on all of the following, except:
  - Endurance exercise performance
  - Protein absorption
  - Cognitive functioning
  - All of the above
- True or False? Caffeine can increase the release of sodium from the sarcoplasmic reticulum, which in turn increases the excitability of the associated muscle fiber.
  - True
  - False
- True or False? Caffeine stimulates catecholamine and neurotransmitter release during exercise, which may lower the overall perception of effort.
  - True
  - False
- In which of the following ways has caffeine been shown to increase an individual's healthspan?
  - By enhancing resistance to proteotoxic stress
  - By enhancing glycogen storage
  - By reducing lymph tissue inflammation
  - By reducing carbohydrate absorption
- In the study concerning caffeine and lifespan, the investigators found that caffeine administration positively influenced two known longevity interventions including dietary restriction and \_\_\_\_\_?
  - The misfolding of structural proteins
  - Improved maximal-intensity exercise performance
  - Reduced insulin signaling
  - Improved fatty acid oxidation
- One theory behind insulin's effects on longevity is that it can determine a cell's ability to endure \_\_\_\_\_.
  - The misfolding of structural proteins
  - Oxidative stress from respiration
  - Polyglutamine absorption
  - IGF-1 metabolism
- True or False? Caffeine consumption may be relevant to developing treatments for diseases such as Alzheimer's disease.
  - True
  - False
- When consumed simultaneously, which of the following nutrients appear to enhance the ergogenic effects of caffeine?
  - Protein
  - Fat
  - Carbohydrates
  - Alcohol

### CEU Quiz Answer Sheet

### Caffeine

**Directions:** 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.

1. \_\_\_\_\_ 4. \_\_\_\_\_ 7. \_\_\_\_\_ 10. \_\_\_\_\_

2. \_\_\_\_\_ 5. \_\_\_\_\_ 8. \_\_\_\_\_

3. \_\_\_\_\_ 6. \_\_\_\_\_ 9. \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_

Phone \_\_\_\_\_

Member# \_\_\_\_\_

**Questions? 800-772-NCSF**

# 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