



# The Effects of Arginine on the Rate of Blood Lactate Removal following Multiple Wingate Tests.

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## Abstract

**INTRODUCTION:** During the first few minutes of high intensity exercise, the body relies on the glycolytic system for energy. A byproduct of this system is lactic acid, or blood lactate. As blood lactate levels increase in the muscles, muscle contraction and energy output decreases as a result of overall elevated acidity. Therefore, an athlete in successive high intensity events may be interested in supplementation that could rid the body more quickly of blood lactate. One supplement that might be beneficial in this task is Arginine, a common pre-workout vasodilator.

**PURPOSE:** To determine what effects Arginine, a vasodilator, had on blood lactate removal after high intensity exercise.

**METHODS:** 5 male UT Arlington students (M; age  $22 \pm 0.4$  yrs, weight  $82.28 \pm 14.016$  kg, height  $177.8 \pm 5.08$  cm) agreed to participate in the study. The experimental setup was a single blind study, so the participants were not aware of which mixture they were receiving, but the researchers did. Upon entering the lab for testing, an initial blood lactate measure was taken, the first of four to be taken each testing session. A 20-minute timer was set after the measurement, during which the participant drank either the placebo or supplement drink within the first five minutes, and other physiological measurements were taken during that time (blood pressure, resting heart rate). Once the initial 20 minutes concluded, a second blood lactate measure was taken, and participants immediately performed the formulated Wingate protocol. At the conclusion of exercise, another 20-minute timer was started, and blood lactate was measured at the 5-minute and 20-minute mark. Each testing session took around 50 minutes, and each participant tested 2 days. At the conclusion of research, t-tests were performed and conclusions were made.

**RESULTS:** At the 5-minute post-Wingate mark, blood lactate levels had very little variation, with the Arginine group averaging 13.94 mmol/L, and the placebo group averaging 14.0 mmol/L. However, at the 20-minute post testing mark, blood lactate levels with the Arginine group had dropped to an average of 11.56 mmol/L, while the placebo group levels continued hovering around 14.24 mmol/L. A t-test calculated that there was no significant difference ( $p = 0.243$ ), with  $p$  being larger than the set alpha level ( $p > 0.05$ ). Other variables tested included peak power (Arginine:  $749.1 \pm 84.7$  watt; Placebo:  $729.2 \pm 76.4$  watt), peak power / body mass (Arginine:  $8.97 \pm 0.98$  watt/kg; Placebo:  $8.83 \pm 1.42$  watt/kg), mean power (Arginine:  $588.4 \pm 60.18$  watt; Placebo:  $555.43 \pm 50.90$  watt), and mean power / body mass (Arginine:  $7.08 \pm 0.60$  watt/kg; Placebo:  $6.73 \pm 0.81$  watt/kg). Preformed t-tests calculated that these findings did not qualify as significantly different, either ( $p > 0.05$ ).

**CONCLUSION:** Our calculations indicated that while there was an observable decrease of blood lactate levels with Arginine supplementation, the decrease was not statistically significant. Furthermore, variables such as peak power and mean power differed between supplementation, but not to significant levels.

## Purpose

To determine if arginine supplementation has an effect on blood lactate removal following bouts of anaerobic exercise.

## Methods

- 5 male UTA students were recruited for this study. There were two days of testing, with 48-72 hours between testing days.
- On the first day of testing, initial demographic measurements were taken (height, weight, age, BMI). After demographic variables were recorded, the subject's resting blood lactate was measured.
- Immediately following the blood lactate measurement, the subject was given either an arginine mixture or placebo drink. Each drink was saturated with a flavor additive, specifically Mio Liquid Water Enhancer, so that both the placebo and arginine mixture tasted similar.
- After ingesting either the mixture or placebo, participants waited 20 minutes to allow absorption. After absorption, another blood lactate measurement was taken before exercise. After the second blood lactate measurement, the participant would sit on a bicycle for a Wingate test.

## Methods (cont'd)

- The participant began the 30 second Wingate test. Upon completion, the participant would wait 4 minutes, and then perform a second Wingate test. The Wingate was repeated to increase blood lactate levels to more perceivable levels.
- During the 4 minute break, participants rested on a chair without moving their legs as to not actively remove lactate.
- After the second Wingate test, blood lactate levels were taken at 5 minutes and 20 minutes post-exercise while the participant sat still without moving their legs.
- On the second study day, the participants received the opposite drink, and performed the same pattern of testing.
- After data from all participants on both days were collected, t-tests were performed to look for significance between the two drinks and their rate of blood lactate removal.

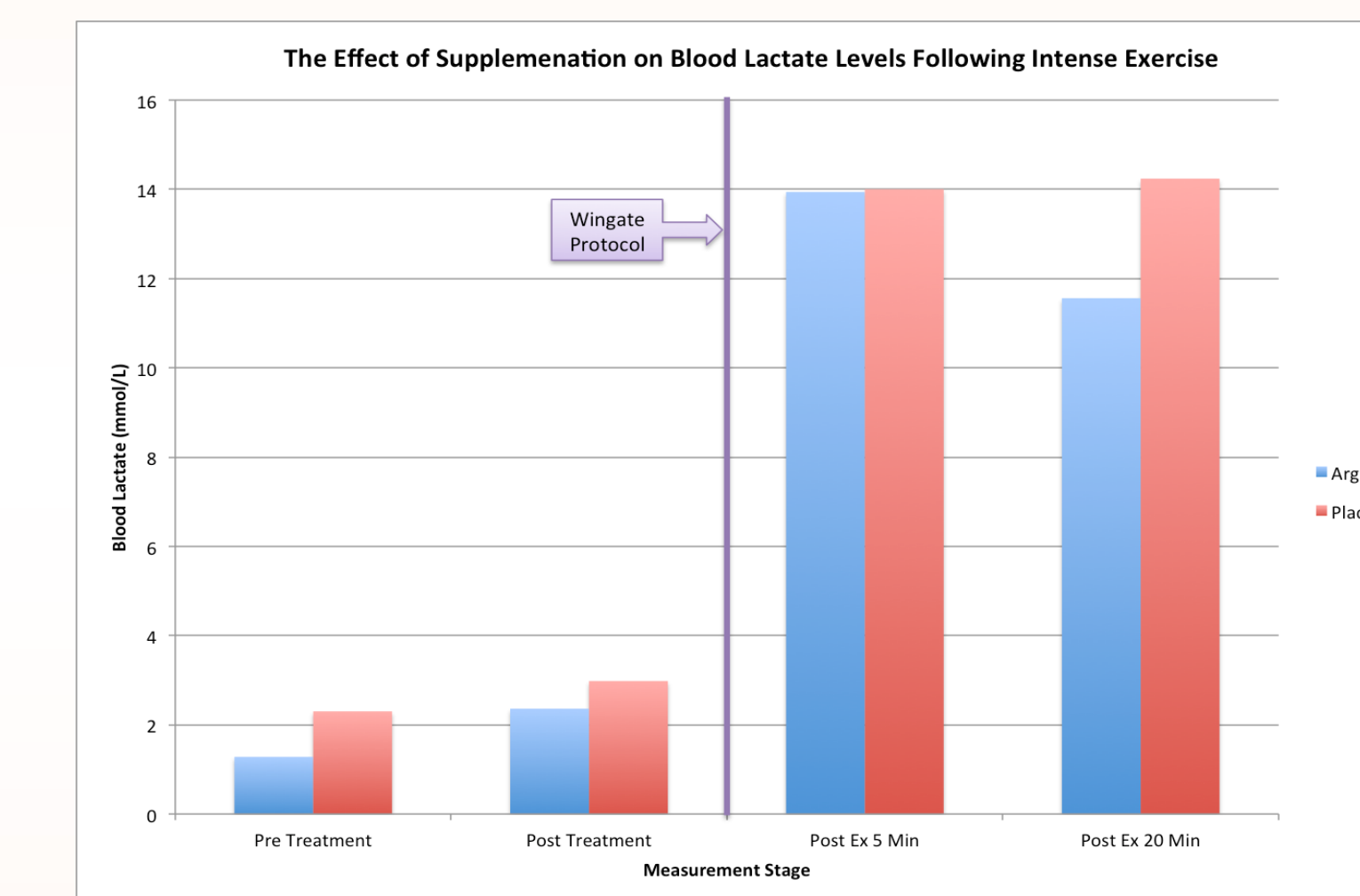


## Results

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## Results (cont'd)

	Average	Standard Deviation	Minimum	Maximum
Age	22	0.7	21	23
Height (cm)	177.6	7.5	165	185
Weight (kg)	82.3	17.6	59.4	102.1
BMI	25.9	11.3	21.8	31.4



Wingate Performance Variables				
	Peak Power (Watt)	Peak Power / Body Mass (Watt/kg)	Mean Power (Watt)	Mean Power / Body Mass (Watt/kg)
Arginine	$749.1 \pm (84.7)$	$9.0 \pm (1.0)$	$588.4 \pm (60.2)$	$7.1 \pm (0.6)$
Placebo	$729.2 \pm (76.4)$	$8.8 \pm (1.4)$	$555.4 \pm (50.9)$	$6.7 \pm (0.8)$
t-test Results	0.689	0.826	0.468	0.573

## Conclusions

Our analyses indicated that while there was an observable decrease of blood lactate levels with Arginine supplementation, the decrease was not statistically significant. Furthermore, variables such as peak power and mean power differed between supplementation, but not to significant levels.

- t-test results showed that there was no significant difference ( $p = 0.243$ ),
- Other variables tested included peak power (Arginine:  $749.1 \pm 84.7$  watt; Placebo:  $729.2 \pm 76.4$  watt), peak power / body mass (Arginine:  $8.97 \pm 0.98$  watt/kg; Placebo:  $8.83 \pm 1.42$  watt/kg), mean power (Arginine:  $588.4 \pm 60.18$  watt; Placebo:  $555.43 \pm 50.90$  watt), and mean power / body mass (Arginine:  $7.08 \pm 0.60$  watt/kg; Placebo:  $6.73 \pm 0.81$  watt/kg).
- Performed t-tests showed that these findings did not qualify as significantly different, either ( $p > 0.05$ ).