

**Project Proposal
Biology 3B
Saddleback College
Spring 2009**

Proposal Title: Lactate Threshold and Correlation to Recovery Rate in Male Marines

Principal Investigators: Elisha Fabrycky and Katie Hernandez

Investigator Background: Mr. Elisha Fabrycky is currently a student at Saddleback College. He has a High School Diploma and is majoring in biological sciences. Ms. Katie Hernandez is also a student at Saddleback College majoring in Biology and has received a High School Diploma.

Project Summary

After investigating multiple peer-reviewed references, it was apparent that lactate levels in the bloodstream after intense exercise could indicate how an individual processes and uses this lactic acid (Brooks, 1999; Chiappa, 2008; Denadai, 2000; Gatten, 1984; Gladden, 2004; Kemper, 2000). The experiment to be performed will determine lactate threshold of individuals by using a method of inspection of the blood lactate versus the work rate relationship (Davis, 2007). Also, examination of the lactate recovery rate will be used to corroborate any relationship with the lactate threshold (Tomlin, 2001). This experiment may develop a better understanding of how the lactate threshold is affected by the body's ability to metabolize lactic acid. It is hypothesized that there will be a significant relationship in the way the recovery rate relates to the lactate threshold.

Project Description

The project will be conducted aboard Marine Corps Base, Camp Pendleton in the 64 area (Camp Talega) fitness center. Ten male marines age 22-36 will be used as the subjects for the test. The controlled exercise will be performed on a bicycle ergometer with a work rate monitor and controlled resistance. A blood lactate reading will be conducted prior to the commencement of the exercise to establish a baseline reading for the recovery test. This reading will be achieved by cleaning the side of the subject's ring finger with an alcohol swab and puncturing the finger with a lancet to obtain a drop of blood for the Lactate Scout to analyze. The participants will start the exercise at 20% of their resting heart rate for two minutes with a blood lactate reading conducted the last 30 seconds. The lactate reading will be obtained in a similar manner as in the baseline reading. During the exercise the subjects will keep their hand in a heat pad to increase circulation. The exercise will continue with a 20% increase of the at-rest heart rate every two minutes and a reading at the end for fourteen minutes, totaling seven readings. At the conclusion of the exercise portion, the subject will have their lactate reading taken at 15, 30 and 60 minutes to determine the lactate recovery time. These readings will be taken following the same procedure as the baseline reading. Once all data is collected it will be analyzed using simple linear regression to determine the significance in the relationship of lactate threshold and lactate recovery.

References

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Budget

There will be a need for two bicycle ergometers on the testing days, located at the Camp Talega fitness center. Two Lactate Scouts will be necessary to test the lactate levels of the participants, as well as two heart rate monitors. The other testing supplies needed for the tests include alcohol swabs, bandages, gloves, a sharps container, lancets, and stopwatches, all to be obtained with permission through Saddleback College's Department of Biology. Miscellaneous cost will be minimal for the primary researchers.

Age	Target HR Zone 50-85 %	Average Maximum Heart Rate 100 %
20 years	100-170 beats per minute	200 beats per minute
25 years	98-166 beats per minute	195 beats per minute
30 years	95-162 beats per minute	190 beats per minute
35 years	93-157 beats per minute	185 beats per minute
40 years	90-153 beats per minute	180 beats per minute
45 years	88-149 beats per minute	175 beats per minute
50 years	85-145 beats per minute	170 beats per minute
55 years	83-140 beats per minute	165 beats per minute
60 years	80-136 beats per minute	160 beats per minute
65 years	78-132 beats per minute	155 beats per minute
70 years	75-128 beats per minute	150 beats per minute