

AD _____

Award Number: W81XWH-11-2-0040

TITLE: AltitudeOmics: The Basic Biology of Human Acclimatization to High Altitude

PRINCIPAL INVESTIGATOR: Dr. Robert Roach

CONTRACTING ORGANIZATION: The University of Colorado
Aurora, CO 80045

REPORT DATE: January 2012

TYPE OF REPORT: Annual

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

DISTRIBUTION STATEMENT: Approved for public release; distribution unlimited

The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision unless so designated by other documentation.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. **PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

1. REPORT DATE (DD-MM-YYYY) 01-01-2012		2. REPORT TYPE Annual		3. DATES COVERED (From - To) 1 JAN 2011 - 31 DEC 2011	
4. TITLE AND SUBTITLE AltitudeOmics: The Basic Biology of Human Acclimatization to High Altitude				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER W81XWH-11-2-0040	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Dr. Robert Roach E-Mail: robert.roach@ucdenver.edu				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) The University of Colorado Aurora, CO 80045				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Medical Research and Materiel Command Fort Detrick, Maryland 21702-5012				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for Public Release; Distribution Unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT Progress is being made on all aspects of this projects The 65 page protocol and 25 page informed consent documents have been prepared, vetted by TATRC pre-review and now approved by University of Colorado and University of Oregon. Those documents are currently at DOD-HRPO for review. Data analysis systems have been designed and are currently being tested. Logistics will be a major task for the early part of 2012 as we have to move our entire laboratory first to Oregon for pre-testing then to Bolivia for the experiments. No major roadblocks are apparent at this time. We fully expect to meet all future milestones and to successfully complete the field portion of this study in September 2012.					
15. SUBJECT TERMS Hypoxia, High Altitude Acclimatization, systems biology, epigenetics, gene expression, proteomics, metabolomics					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 4	19a. NAME OF RESPONSIBLE PERSON USAMRMC
a. REPORT U	b. ABSTRACT U	c. THIS PAGE U			19b. TELEPHONE NUMBER (include area code)

Table of Contents

	<u>Page</u>
Introduction.....	4
Body.....	4
Key Research Accomplishments.....	4
Reportable Outcomes.....	4
Conclusion.....	4
References.....	4
Appendices.....	4

INTRODUCTION:

The goal of this project is to advance high-altitude medical research by discovering the basic molecular mechanisms of acclimatization and de-acclimatization that protect soldiers from high-altitude illness.

BODY:

In this first year we have accomplished most of the tasks outlined in the statement of work for months 1-12.

- We have obtained IRB approvals from University of Colorado Denver and the University of Oregon where our subjects will be recruited. Our submission is currently being reviewed by DOD-HRPO.
- We have also started the logistical preparations for this complex field study. We have made a first preparatory visit to Bolivia to inspect the status of the laboratory and housing we will use, and have started the process for necessary approvals and improvements.
- We have also begun to practice the data analysis pipeline. We have developed an optimized plan for all AltitudeOmics data analysis. Given the fact that we will generate more than 3.5 million data points for gene expression only, this has been a critical accomplishment.
- We have drafted the first two papers from this study.

According to our milestones we should have started screening and recruiting subjects in Q4. However, since we have not received HRPO approval, we have not been able to start this process. We are prepared to start the day we receive approval. Like the AMS Prediction study, we really are able to move quickly once approvals are in place. If the HRPO process runs smoothly, we should catch up by the end of the 2nd quarter 2012.

KEY RESEARCH ACCOMPLISHMENTS:

The goal of this stage of the planning is put all procedures into place that will allow us to complete this multi-faceted, multi-investigator, multi-national project in between Phase I and Phase II of our other funded TATRC project: AMS Prediction. I've led or been part of dozens of research expeditions in my career. AltitudeOmics is more organized, with a better chance of scientific success than any of our previous expeditions. Our emphasis on pre-planning analysis and interpretation leaves room for innovation and new discoveries, but also will speed up the production of results from the study.

The key papers that will come out of the physiology portion of the study will be published first, and then in a few months after returning from Bolivia the first round of OMICS papers will come out. Toward the end of the project performance period the papers integrating the results from the standalone physiology and OMICS papers will be integrated into several new reports that should surpass anything previously done in this field in terms of integrating physiology and the cellular and molecular biology of acclimatization.

REPORTABLE OUTCOMES:

Having just laid the groundwork for this study, which we hope to conduct during the summer of 2012, we do not have any reportable outcomes yet.

CONCLUSION:

There are no conclusions to be drawn yet from the work performed to date.