

AWARD NUMBER: W81XWH-19-1-0023

TITLE: Biopsychosocial Mechanisms of Chronic Pain Recovery and Maintenance

PRINCIPAL INVESTIGATOR: Dr. Krista Highland, PhD

CONTRACTING ORGANIZATION: Uniformed Services University of the Health Sciences (USUHS)

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13. SUPPLEMENTARY NOTES					
14. ABSTRACT This study seeks to understand the mechanisms that sustain or resolve chronic pain within a biopsychosocial framework. The objective of the present study is to identify biopsychosocial markers of chronic pain maintenance (Maintained) and recovery/improvement (Improved).					
15. SUBJECT TERMS NONE LISTED					
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1. INTRODUCTION: *Narrative that briefly (one paragraph) describes the subject, purpose and scope of the research.*

Many military service members, veterans, and their family members have chronic pain; which in turn, negatively impacts quality of life, retention, and readiness. Though many studies show how people develop chronic pain, less is known about how people recover from it. To improve chronic pain management, the goal of this study is to understand how emotional, social, and biological factors predict who recovers from chronic pain and who does not. Samples and self-report data of 150 individuals (50 chronic pain maintained, 50 chronic pain improved, 50 controls) will be analyzed to identify biopsychosocial markers that predict chronic pain resolution.

2. KEYWORDS: *Provide a brief list of keywords (limit to 20 words).*
Chronic pain, biomarkers, microRNA, integrative pain management

3. ACCOMPLISHMENTS:
What were the major goals of the project?

- CY19 Goals**
Functionality tests of integrated firmware and software (complete)
- CY20 Goals**
Obtain IRB approval (complete)
Obtain Biobank sample request forms (complete)
Complete agreements (complete)
- CY20 Goals**
Identify psychosocial/behavioral factors distinguishing groups
- CY21 Goals**
All samples banked and aliquoted
- CY22 Goal**
All samples transferred and begin biomarker analysis
- CY23 Goal**
Complete biomarker analysis
Complete psychological/behavioral group analysis
Complete two manuscripts

What was accomplished under these goals?

	Timeline	% Completed
Major Task 1: Procure Pain Biobank data and biospecimens	Months	
Subtask 1: Gain HRPO approval by submitting an IRB exempt protocol to obtain Biobank data and samples	1-6	100%
Subtask 2: Submit request to Pain Biobank for data and biospecimens	2-3	100%
Subtask 3: Transfer and structure obtained Pain Biobank data	6-7	100%
<i>Milestone #1: IRB approval</i>	6	100%
Major Task 2: Analyze obtained Pain Biobank data		

Subtask 1: Conduct bivariate tests examining relationships between groups and participant characteristics, psychosocial outcomes, and opioids at BL & F/U	8-10	50%
<i>Milestone #2: Identification of psychosocial and behavioral factors distinguishing groups.</i>	6-12	50%
Major Task 3: Procure and prepare Pain Biobank specimens		
Subtask 1: Transfer Pain Biobank samples to WRAIR	6-8	100%
Subtask 2: Store and aliquot samples for each purification procedure	6-8	100%
<i>Milestone #3: All samples banked and aliquoted.</i>		100%
Subtask 3: RNA purification and mRNA sequencing of RNA Paxgene samples, for all specimens.	9-14	75%
Subtask 4: Exosomal isolation, miRNA purification and sequencing of serum/plasma samples, for all specimens.	9-14	25%
Subtask 5: Isolation and global identification of metabolites from a subset of serum/plasma samples.	14-19	25%
Subtask 6: Isolation and targeted identification of proteins from a subset of serum/plasma samples.	14-19	25%
Subtask 7: Bioinformatic analysis and integration of omic data	20-22	10%
Subtask 8: Validation of identified miRNA biomarkers	14-22	0%
Subtask 9: Conduct analyses	18-24	0%
<i>Milestone #4: Manuscript on the biopsychosocial predictors of chronic pain maintenance and recovery.</i>	24-28	10%

What opportunities for training and professional development has the project provided?

Nothing to Report

How were the results disseminated to communities of interest?

Nothing to Report

What do you plan to do during the next reporting period to accomplish the goals?

1. Complete biomarker and psychosocial/behavioral analyses.
2. Complete validation component
3. Complete 2 manuscripts

4. IMPACT: What was the impact on the development of the principal discipline(s) of the project?

Nothing to report

What was the impact on other disciplines?

Nothing to report

What was the impact on technology transfer?

Nothing to report

What was the impact on society beyond science and technology?

Nothing to report

5. CHANGES/PROBLEMS:

Changes in approach and reasons for change

Nothing to report

Actual or anticipated problems or delays and actions or plans to resolve them

No cost extension (NCE) was approved through 29 Sep 2024.

The COVID19 Pandemic is having large impact on the timeline of this study, not only for obtainment of samples, but also the continued progress on other study aims and goals; as employee time and laboratory access will be limited (COVID-related studies are taking precedent in the current environment; as such, there will be a deluge of backlog items that the study team will need to complete once operations are back to normal). Though NMC-SD Pain Registry Biobank site was recruiting prior to the COVID19 Pandemic, recruitment was then halted at NMC-SD (Pain Clinic) due to COVID19 Pandemic. To mitigate these challenges, the PI has worked extensively with the Pain Registry Biobank to develop logistics for recruitment to enable fastidious recruitment into the Pain Biobank that target the samples needed for the present study, whenever the COVID19 Pandemic impact is no longer present. Moreover, the Biobank's WRNMMC recruitment site incurred significant challenges in recruiting both controls and cases due to the COVID-19 Pandemic. As a result and given the PI's excellent relationship with the WRNMMC Department of Research Programs, they discussed alternative recruitment strategies that could be used by any WRNMMC study, including the Biobank. As such, the research manager of the Biobank is now awaiting an amendment determination and signature to allow for "passive" recruitment (e.g., having a table in the hallway of the WRNMMC America building ground floor and in the different recruitment clinics, as well as leveraging a partial HIPAA waiver to be able to consent participants over the phone prior to their scheduled appointment. We have also established a relationship with the Duke University Murdock Study in order to obtain control biospecimens and data from their existing biobank repository, after agreements are complete. Obtaining control samples was the most difficult recruitment target for the Pain Biobank. **Note:** due to the COVID19 Pandemic, study activities were placed on hold and then restarted, but at a much lower pace. As such, study funds have not been able to be used.

Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents

Nothing to report

Significant changes in use or care of human subjects

Nothing to report

Significant changes in use or care of vertebrate animals

Nothing to report

Significant changes in use of biohazards and/or select agents

Nothing to report

6. PRODUCTS:

Publications, conference papers, and presentations

Nothing to report

Journal publications.

Nothing to report

Books or other non-periodical, one-time publications.

Nothing to report

Other publications, conference papers and presentations.

Nothing to report

Website(s) or other Internet site(s)

Nothing to report

Technologies or techniques

Nothing to report

Inventions, patent applications, and/or licenses

Nothing to report

Other Products

Nothing to report

7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

Name: Krista Highland

Project Role: Co-PI

Research Identifier: NA

Nearest person month worked: 2.4

Contribution to Project: no change

Name: Germaine Herrera

Project Role: Protocol Coordinator

Research Identifier: NA

Nearest person month worked: 2.4

Contribution to Project: no change

Name: Mary Jo Lindl

Project Role: Research Activity Coordinator

Research Identifier: NA

Nearest person month worked: 1.2

Contribution to Project: no change

Name: Dr. Rasha Hammamieh

Project Role: Current PI

Research Identifier: NA
Nearest person month worked: 0.01
Contribution to Project: no change

Name: Dr. Aarti Gautam
Project Role: Project Co-I
Research Identifier: NA
Nearest person month worked: 0.01
Contribution to Project: no change

Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?

Dr. Highland's active (and future active) support will not have any impact on the effort required for the present award.

What other organizations were involved as partners?

Nothing to report

8. SPECIAL REPORTING REQUIREMENTS

COLLABORATIVE AWARDS: *N/A*

QUAD CHARTS: *N/A*

9. APPENDICES: *N/A*