LARA Quarterly Progress Report: 01/01/2026-03/31/2026
2022 Veteran Marijuana Research Grant

Investigating the Therapeutic Impact of Cannabinoids on Neuroinflammation and Neurobiological Underpinnings of Suicide Ideation in Veterans with PTSD

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Project Aims:

This study, referred to here as the 'Neuroimaging Study,' is a supplement (add-on) to our ongoing VMR study (Wayne State Warriors Marijuana Clinical Research Program: Investigating the Impact of Cannabinoids on Veterans' Behavioral Health", PIs: Lundahl and Ledgerwood), which will be referred to as the 'Parent Study'. **The Neuroimaging Study will be the first-ever neuroimaging study of cannabis treatment in US armed forces veterans with PTSD, or in any population.** The Parent Study involves randomizing 200 Michigan veterans with PTSD into one of four different THC (∆9-tetrahydrocannabinol) : CBD (cannabidiol) dose conditions (High THC:High CBD; HighTHC:Low CBD; Low THC:High CBD, and Low THC:Low CBD) for a 12-week treatment phase. For this Neuroimaging Study, half of the 200 participants from the Parent Study (N=100; 25 of the 50 participants in each dose condition) will additionally complete two brain imaging assessments: one before (i.e., 'baseline' scan) and one after the 12-week treatment period (i.e., 'post-treatment' scan). **Primary outcomes include:** A) neuroinflammatory state as measured via positron emission tomography (PET) imaging with the radiotracer, 1-(2-[+F]fluoroethyl)-L-tryptophan or [^{18}F]FETrp; B) resting or 'basal' neural network communication as measured via functional magnetic resonance imaging (fMRI); and C) brain activation during well-validated inhibitory control (Go/No-Go) and emotion regulation (Emotional Stroop) tasks as measured via fMRI. We will focus on brain regions that are consistently linked to both PTSD symptom severity and suicidal ideation, and that are densely populated with cannabinoid receptors (which are modulated by acute cannabis/cannabinoid administration). Further, the collection of whole-brain, multi-modal neuroimaging data (structural MRI, functional MRI, and PET imaging data) during the same session will allow us to explore the impact of cannabis/cannabinoid administration on the relationship between neuroinflammatory state and neural network activation and interactions throughout the brain, and link these brain metrics to clinical outcomes (e.g., reduction in suicidal ideation or PTSD/depression symptoms over time). This highly innovative approach will provide unprecedented insight into the neurobiological underpinnings of PTSD and suicidal ideation and the potential therapeutic effects of cannabis (and associated brain mechanisms) on these and other critical outcomes (e.g., quality of life, depressive symptoms). Findings from this Neuroimaging Study may also identify veterans who will benefit most from cannabinoid therapeutics and specific THC:CBD dose combinations therein, and thus, may inform a personalized medicine approach for veterans with PTSD in the future.

1. **Project Milestones**

• Percent (%) completion of the project objectives

Preparation for Neuroimaging Study Launch: 100%
Neuroimaging Study Progress: 0%
Neuroimaging Study Analyses/Findings Communication: 0%

• Project Progress – Brief outline of the work accomplished during the reporting period and the work to be completed during the subsequent reporting period(s).

The study team meets approximately weekly, in addition to attending parent study meetings. To date, we have screened three participants from the parent study for the Neuroimaging Study, including two who met Neuroimaging Study criteria. Four screening visits are scheduled in the upcoming weeks.

Given that MRI and PET scanner time must be reserved in advance, scan dates have been tentatively scheduled through June 2026.

• Noteworthy Accomplishments – Identify and describe any milestones reached or noteworthy accomplishments completed during the period.

None.

1. **Delays – Brief description of problems or delays, real or anticipated, which should be brought to the attention of the Grant Administrator.**

None.

2. **Statement concerning any significant deviation from previously agreed-upon Statement of Work.**

None.

• Attachments and Other Materials – Provide project materials developed and implemented during the reporting period (e.g. newspaper articles, newspaper advertisements, forms, brochures, announcements, studies, reports, analyses, audits, etc.).”

None.

3. **Financial expenditures of grant money and other contributions to the project, in-kind and/or direct funding.**

Sent separately by Sponsors Program Administration (SPA).

Respectfully submitted,

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April 6, 2025