REPORT DOCUMENTATION PAGE

Form Approved OMB NO. 0704-0188

1. REPORT DATE (DD-MM-YYYY)	2. REPORT TYPE	3. DATES COVERED (From - To)
15-07-2016	Final Report	1-Feb-2015 - 31-Jan-2016

4. TITLE AND SUBTITLE
Final Report: Acquisition of a Laser Scanning Confocal Microscope to Examine CNS Activity of Antidotal Oximes and to Enhance Undergraduate Research Training Across the Sciences

5a. CONTRACT NUMBER
W911NF-15-1-0054

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER
106012

6. AUTHORS
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5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAMES AND ADDRESSES
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8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS (ES)
U.S. Army Research Office
P.O. Box 12211
Research Triangle Park, NC 27709-2211

10. SPONSOR/MONITOR'S ACRONYM(S)
ARO

11. SPONSOR/MONITOR'S REPORT NUMBER(S)
66377-LS-REP.1

12. DISTRIBUTION AVAILIBILITY STATEMENT
Approved for Public Release; Distribution Unlimited

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

14. ABSTRACT
The project utilized funding to acquire a confocal laser scanning microscope (Olympus FV1200) to support research examining the ability of antidotal oximes to rescue organophosphate (OP)-induced CNS toxicity and training across the sciences and social sciences at Whittier College. In particular the acquisition of the FV 1200 allows the PI, Dr. Erica Fradinger, to extend her research of blood-brain-barrier (BBB) penetrant oxime antidotes to investigate their effects on both OP-induced PNS and CNS toxicity. Additionally, this instrument will support interdisciplinary research activities in the Center for Science, Health, and Policy, support pedagogical advances

15. SUBJECT TERMS
Confocal laser scanning microscope, Organophosphate toxicity, Oxime antidotes

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	15. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Erica Fradinger
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Report Title

Final Report: Acquisition of a Laser Scanning Confocal Microscope to Examine CNS Activity of Antidotal Oximes and to Enhance Undergraduate Research Training Across the Sciences

ABSTRACT

The project utilized funding to acquire a confocal laser scanning microscope (Olympus FV1200) to support research examining the ability of antidotal oximes to rescue organophosphate (OP)-induced CNS toxicity and training across the sciences and social sciences at Whittier College. In particular the acquisition of the FV 1200 allows the PI, Dr. Erica Fradinger, to extend her research of blood-brain-barrier (BBB) penetrant oxime antidotes to investigate their effects on both OP-induced PNS and CNS toxicity. Additionally, this instrument will support interdisciplinary research activities in the Center for Science, Health, and Policy, support pedagogical advances, and expose students to cutting edge technologies. Users come from the biology, chemistry, physics, and psychology departments. The requested FV 1200 expands the research capacity of four faculty, enhance eight courses in the biology, chemistry and psychology departments, and expand the capstone research projects of students across the sciences. While the research and teaching interests of the participants are diverse, all are able to use the equipment to detect, quantify, or visually localize gene expression products to study protein function at the cellular and sub-cellular levels.

Enter List of papers submitted or published that acknowledge ARO support from the start of the project to the date of this printing. List the papers, including journal references, in the following categories:

(a) Papers published in peer-reviewed journals (N/A for none)

Received Paper

TOTAL:

Number of Papers published in peer-reviewed journals:

(b) Papers published in non-peer-reviewed journals (N/A for none)

Received Paper

TOTAL:

Number of Papers published in non peer-reviewed journals:

(c) Presentations

Number of Presentations: 0.00

Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received Paper

TOTAL:

Number of Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received Paper

TOTAL:

Number of Peer-Reviewed Conference Proceeding publications (other than abstracts):

(d) Manuscripts

Received Paper

TOTAL:

Number of Manuscripts:

Books

Received Book

TOTAL:

Received	Book Chapter

TOTAL:

Patents Submitted

Patents Awarded

Awards

Graduate Students

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Names of Post Doctorates

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Names of Faculty Supported

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Names of Under Graduate students supported

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Student Metrics

This section only applies to graduating undergraduates supported by this agreement in this reporting period

The number of undergraduates funded by this agreement who graduated during this period: 0.00

The number of undergraduates funded by this agreement who graduated during this period with a degree in science, mathematics, engineering, or technology fields:..... 0.00

The number of undergraduates funded by your agreement who graduated during this period and will continue to pursue a graduate or Ph.D. degree in science, mathematics, engineering, or technology fields:..... 0.00

Number of graduating undergraduates who achieved a 3.5 GPA to 4.0 (4.0 max scale):..... 0.00

Number of graduating undergraduates funded by a DoD funded Center of Excellence grant for Education, Research and Engineering:..... 0.00

The number of undergraduates funded by your agreement who graduated during this period and intend to work for the Department of Defense 0.00

The number of undergraduates funded by your agreement who graduated during this period and will receive scholarships or fellowships for further studies in science, mathematics, engineering or technology fields: 0.00

Names of Personnel receiving masters degrees

NAME

Total Number:

Names of personnel receiving PHDs

NAME

Total Number:

Names of other research staff

NAME	PERCENT_SUPPORTED

FTE Equivalent:

Total Number:

Sub Contractors (DD882)

Inventions (DD882)

Scientific Progress

The laser scanning confocal microscope was ordered and received on campus Fall 2015. During Spring 2016, renovations to the room in which the instrument will be installed were conducted to meet the temperature control and electrical requirements for the instrument.

Experimentally, Dr. Erica Fradinger has conducted preliminary proteomics experiments to identify protein targets altered due to organophosphate exposure and identify additional phosphorylation targets for organophosphates. This work will extend our understanding of both acetylcholineasterase-dependent and -independent pathways for organophosphate toxicity. These preliminary experiments will inform in vivo work using the confocal microscope.

To expand educational outreach, Dr. Erica Fradinger has made connections with a local Whittier High School. In the coming year, students from La Serna High School will utilize the instrument to conduct mini-research projects.

Technology Transfer

Not Applicable