Final Examination of

Robert Warren Gould

B.S., Davidson College
Davidson, NC

For the Degree of

DOCTOR OF PHILOSOPHY
Physiology and Pharmacology
DECEMBER 2011
Winston-Salem, NC

COMMITTEE IN CHARGE

Beth A. Reboussin, Ph.D. Chairperson
Biostatistics Social Sciences and Health Policy

Michael A. Nader, Ph.D., Advisor
Physiology and Pharmacology

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Physiology and Pharmacology

Kristen G. Jordan, Ph.D.
Behavioral Pharmacology Division, Targacept

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Physiology and Pharmacology

Piedmont Triad Community Research Center
Auditorium
October 21, 2011, 9:00 a.m.
PROFESSOR IN CHARGE OF RESEARCH

Michael A. Nader, Ph.D.
Professor
Physiology and Pharmacology
Wake Forest University School of Medicine

FIELDS OF GRADUATE STUDY
Major Subject: Physiology and Pharmacology

Behavioral Pharmacology
Cognitive Neuroscience

SUMMARY OF DISSERTATION

COCAINE SELF-ADMINISTRATION IN RHESUS MONKEYS: EFFECTS ON NEUROBIOLOGY AND COGNITION AND EVALUATION OF COGNITIVE ENHANCEMENT FOR ADDICTION TREATMENT

No effective drug treatments for cocaine dependence exist, although combined behavioral and pharmacological interventions may lead to better treatment outcomes. The goal of the current research is to characterize neurobiological and cognitive deficits associated with cocaine use in monkeys, and examine cognitive enhancement as a pharmacotherapeutic approach to compliment behavioral methods.

Cocaine users show cognitive deficits in working memory (WM) and behavioral flexibility that persist into abstinence. Cognitive performance was assessed in rhesus monkeys with an ~6 year cocaine self-administration (SA) history and compared to cocaine-naive monkeys. Cocaine SA monkeys performed significantly worse and FDG-PET imaging showed lower neuronal activity in areas associated with error-detection, memory, and reward compared to cocaine-naive monkeys during set shifting, a measure of behavioral flexibility. High-dose cocaine SA in afternoon sessions resulted in impairments on WM in subsequent morning sessions; across 30 days of abstinence, WM performance improved. Nicotinic acetylcholinergic receptor agonists improved WM in both groups of monkeys. In addition to effectively modeling cognitive deficits in monkeys, these data suggest pharmacological interventions may ameliorate cocaine-related deficits in neural function and cognition.
SCHOLASTIC VITAE

EDUCATION

Ph.D. Physiology and Pharmacology, 2011
Wake Forest University School of Medicine
Winston-Salem, North Carolina

B.S., Biology, 2004
Davidson College
Davidson, NC

PROFESSIONAL MEMBERSHIPS AND SERVICE

2011-present  Member of the Society for Neuroscience

2009-2010  Student Councilor, Executive Committee of the Division of Behavioral Pharmacology of American Society of Pharmacology and Experimental Therapeutics (ASPET)

2009-present  Member of the Western North Carolina Chapter of the Society for Neuroscience

2007-present  Member of ASPET

AWARDS

2010  Selected to attend the 2010 NIH National Graduate Student Research Festival (10/24-10/26/10)

2010  Selected as WFUHS graduate student representative to apply for US delegation to attend the annual meeting of Nobel Laureates in Lindau, Germany (10/2010)

2009  1st Place, Graduate Student Poster Competition, Division of Behavioral Pharmacology, American Society for Pharmacotherapy and Experimental Therapeutics (4/19/09)

2009, 2011  Graduate Student Travel Award, American Society for Pharmacotherapy and Experimental Therapeutics
PUBLICATIONS

CHAPTERS:


JOURNAL ARTICLES:


