

Assembling an Interdisciplinary Team to Engage in Health Equity Research at an HBCU

Robert H. Newman, Ph.D.
Antoinette Maldonado-Devincci, Ph.D.
Caroline Booth, Ph.D.
Vivian Barnette, Ph.D.

Overview of Short Presentations

- “An Introduction to NC A&T: Challenges and Opportunities for Health Equity Research”; Dr. Rob Newman, Department of Biology
- “Preclinical Analysis of Age and Sex-specific Alcohol-Induced Changes in Affective Behaviors”, Dr. Antoinette Maldonado-Devincci, Department of Psychology
- “Achieving Health Equity in Clinical Training”, Dr. Caroline Booth, Department of Counseling
- “Achieving Equity in Collegiate Recovery”, Dr. Vivian Barnette, Counseling Services

An Introduction to NC A&T

Challenges and Opportunities for Health Equity Research

Robert H. Newman, Ph.D.
Nathan F. Simms Distinguished Professor
Department of Biology
North Carolina A&T State University

Mission

North Carolina A&T State University advances knowledge through scholarly exchange and transforms society with **exceptional teaching, learning, discovery, and community engagement**. An 1890 land-grant doctoral research institution with a distinction in STEM and commitment to excellence in all disciplines, North Carolina A&T creates innovative solutions that address the challenges and economic needs of North Carolina, the nation, and the world.



Vision

North Carolina A&T State University is a preeminent land-grant institution where high-achieving scholars are engaged in **transformative teaching and learning, civic outreach, interdisciplinary research**, and innovative solutions to global challenges.



Existing and Emerging Strengths in Biomedical Research

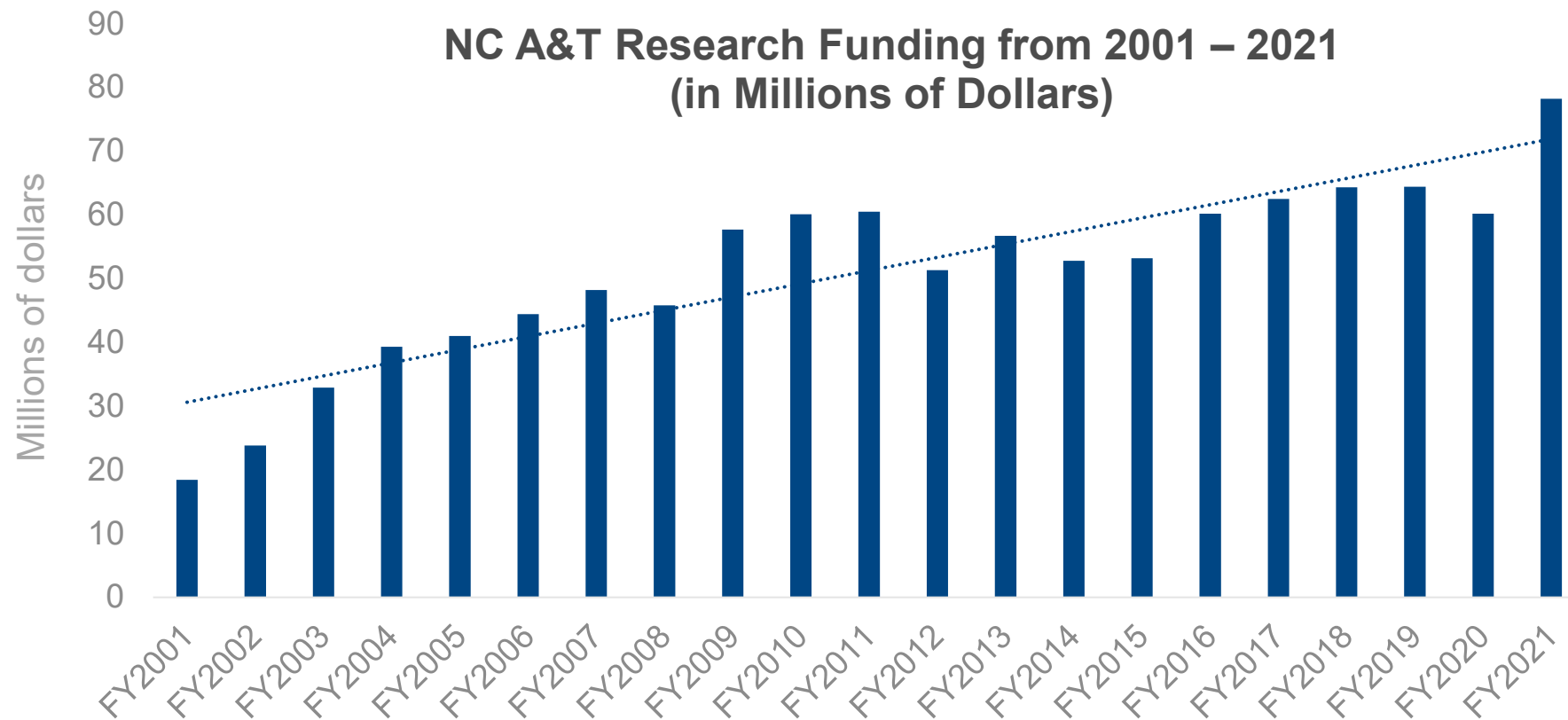
Basic and translational science. Neuroscience, Psychology, Diabetes, Cancer, Cardiovascular Disease, Bioinformatics, Computational Biology, Data Analytics, Health Disparities Research

Biomaterials and device development. Nanoengineering, Biomedical Engineering, Chemical Engineering, Molecular Modeling



Research Funding at NC A&T (2001-2021)

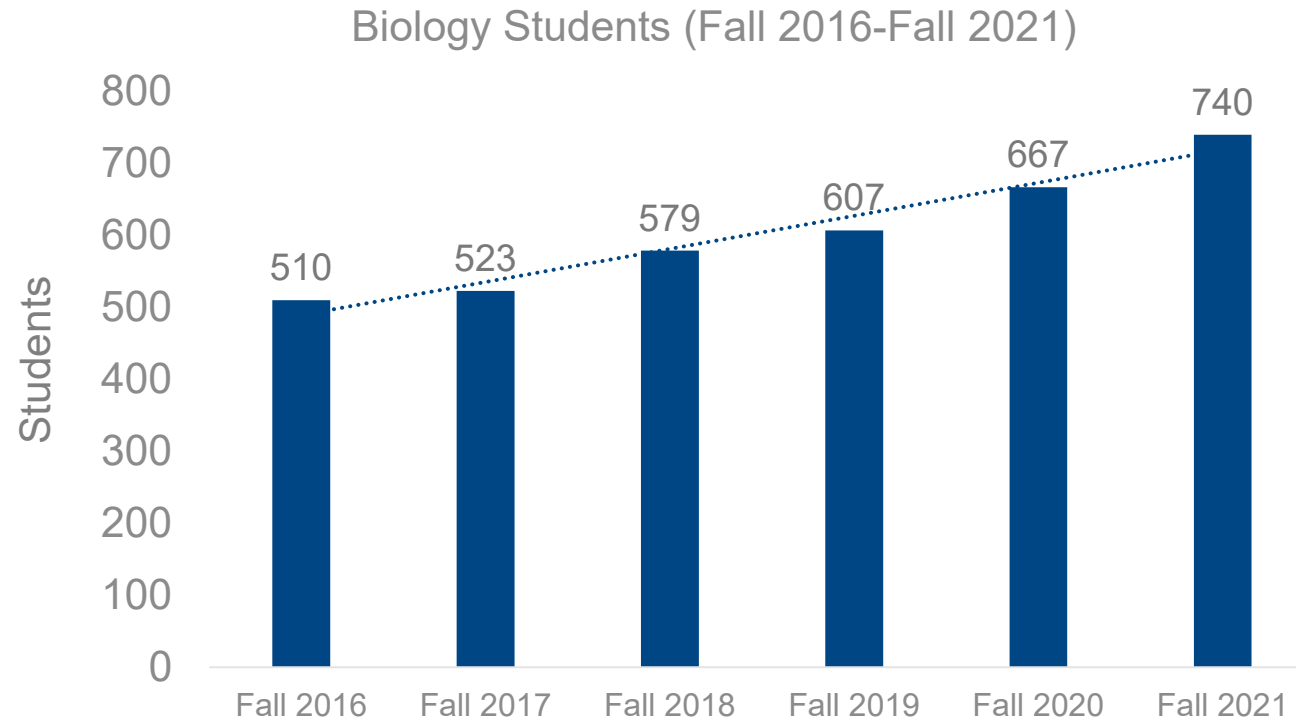
Research funding at NC A&T has increased steadily over the past 20 years



Challenges and Opportunities for Health Equity Research at NC A&T

Growth

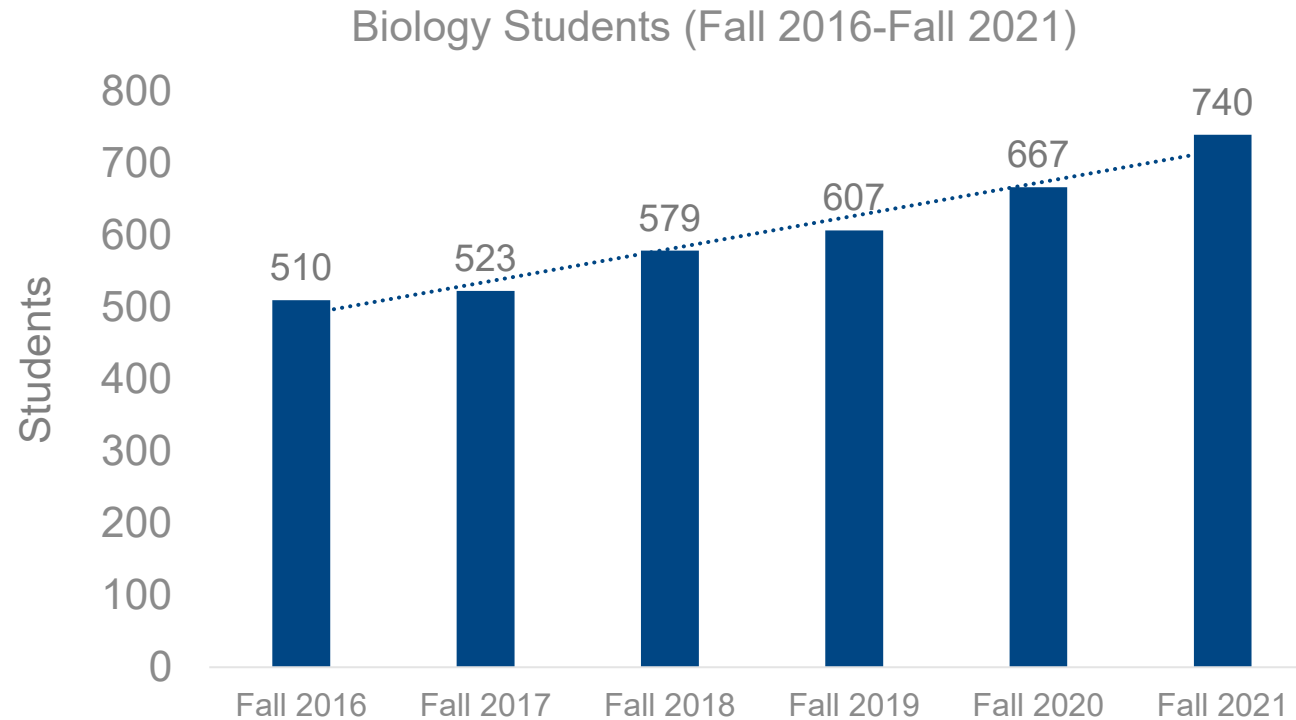
Recent increases in the number of Biology students has outpaced our capacity, both with respect to human resources (e.g., tenure-track faculty) and physical resources



Unit	F2016	F2021	Growth rate
Biology	510	740	45%

Growth

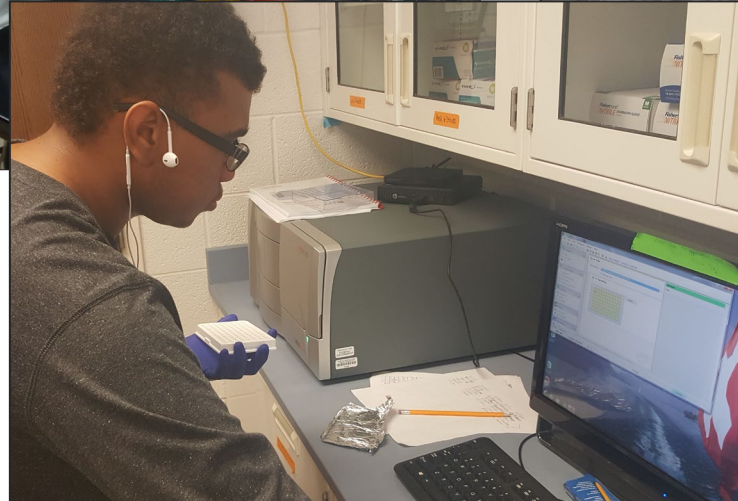
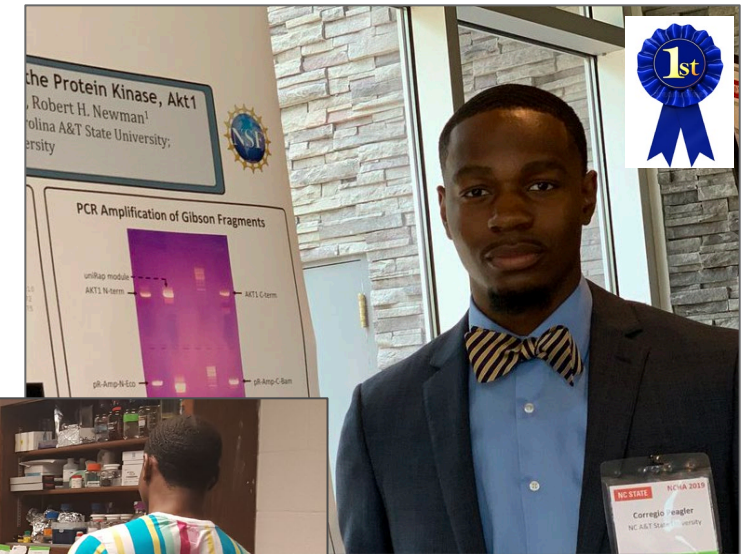
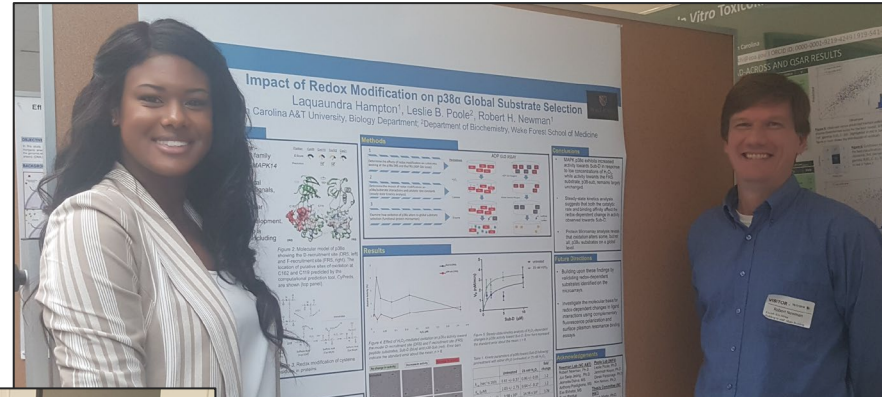
Recent increases in the number of Biology students has outpaced our capacity, both with respect to human resources (e.g., tenure-track faculty) and physical resources



Unit	F2016	F2021	Growth rate
Biology	510	740	45%
Chemistry	88	115	35%
Psychology	486	715	47%
CBBE	232	399	72%
NC A&T (overall)	11,177	13,322	19%

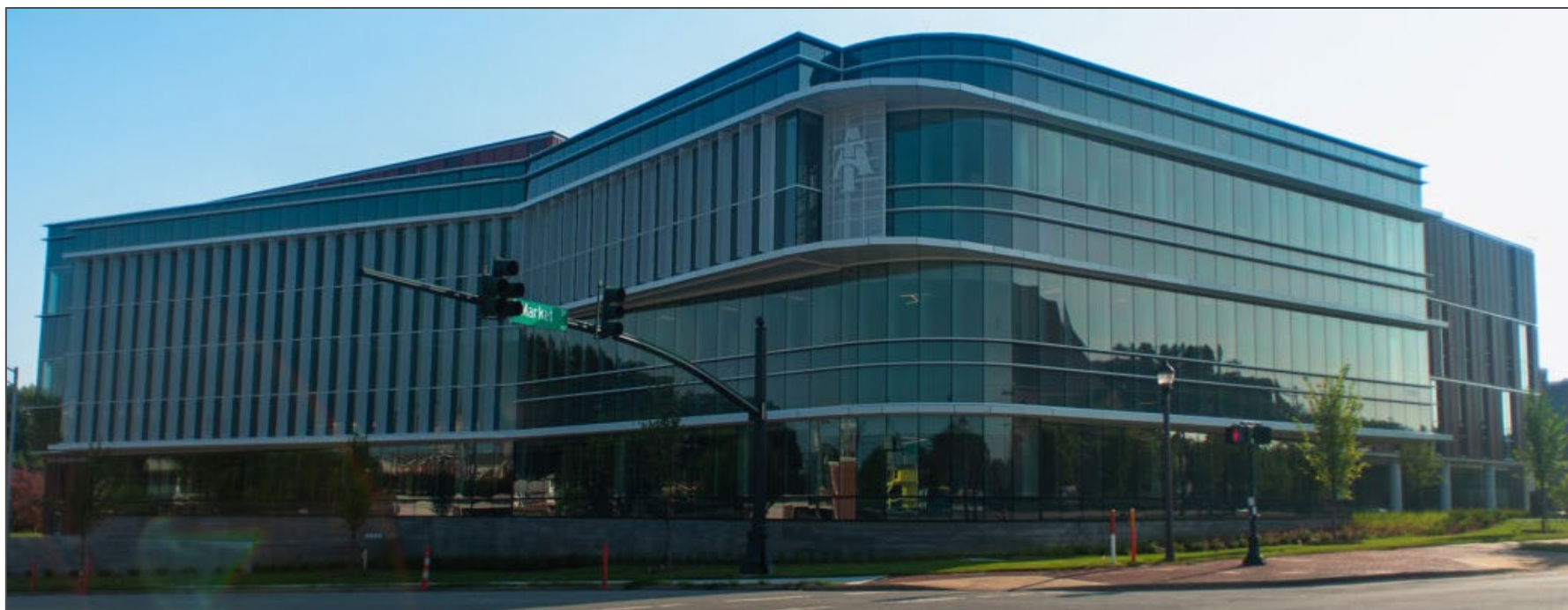
Growth Brings New Opportunities

Such growth provides exciting opportunities to engage students in authentic research, both inside the classroom and in the laboratory



Growth Brings New Opportunities

The new Martin Engineering Research and Innovation Complex (MERIC) is a 130,000 sq. ft. research center designed to promote leading-edge research and innovation at NC A&T.



Absence of an Affiliated Hospital/Medical School

The lack of an affiliated hospital or medical school on campus makes human subjects research more challenging (e.g., recruiting, sample collection, etc.)



Partnerships with local healthcare providers

We have built partnerships with Cone Health, the largest healthcare provider in the NC Triad region. These partnerships have been leveraged for participant recruitment and educational outreach activities.



Silos

Until recently, research was organized primarily around academic units, without much interaction between units.



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As a result, research silos were reinforced, making interdisciplinary research projects more difficult to initiate and maintain



Interdisciplinary Research

Over the past decade, the university has put infrastructure in place to connect academic units and promote interdisciplinary research across the campus



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Center for Interdisciplinary Health Disparities and Equity Research (CIHDER)

Center for Outreach in Alzheimer's, Aging and Community Health (COAACH)



Center for Behavioral Health and Wellness

DOD Center of Excellence in Biotechnology (CoEB)

Interdisciplinary Research

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Center for Interdisciplinary Health Disparities and Equity Research (CIHDER)

Center for Outreach in Alzheimer's, Aging and Community Health (COAACH)

Center for Addiction Research Excellence among Underrepresented Populations (CARE-UP)

Center for Behavioral Health and Wellness

DOD Center of Excellence in Biotechnology (CoEB)

Interdisciplinary Projects in the CARE-UP

- “Preclinical Analysis of Age and Sex-specific Alcohol-Induced Changes in Affective Behaviors”, Dr. Antoinette Maldonado-Devincci, Department of Psychology
- “Achieving Health Equity in Clinical Training”, Dr. Caroline Booth, Department of Counseling
- “Achieving Equity in Collegiate Recovery”, Dr. Vivian Barnette, Counseling Services

Preclinical Analysis of Age and Sex-specific Drug and Alcohol-Induced Changes in Affective Behaviors



Antoinette Maldonado-Devincci, Ph.D.
Associate Professor
Department of Psychology, NC A&T State University



Physiology & Behavior 84 (2005) 321–326

Handling alters cocaine-induced activity in adolescent but not adult male rats

Antionette M. Maldonado^a, Cheryl L. Kirstein^{a,b,*}



Physiology & Behavior 86 (2005) 568–572

Cocaine-induced locomotor activity is increased by prior handling in adolescent but not adult female rats

Antionette M. Maldonado^a, Cheryl L. Kirstein^{a,b,*}

PHYSIOLOGY
&
BEHAVIOR



Alcohol 44 (2010) 57–66

Alcohol during adolescence selectively alters immediate and long-term behavior and neurochemistry

Antionette M. Maldonado-Devincci^a, Kimberly A. Badanich^b, Cheryl L. Kirstein^{a,c,*}

Pharmacology, Biochemistry and Behavior 96 (2010) 476–487



Contents lists available at ScienceDirect

Pharmacology, Biochemistry and Behavior

journal homepage: www.elsevier.com/locate/pharmbiochembeh



Repeated binge ethanol administration during adolescence enhances voluntary sweetened ethanol intake in young adulthood in male and female rats

Antionette M. Maldonado-Devincci^a, Kent K. Alipour^a, Laura A. Michael^a, Cheryl L. Kirstein^{a,b,*}

Investigation of Age-Specific Behavioral and Proteomic Changes in an Animal Model of Chronic Ethanol Exposure

Antionette M. Maldonado-Devincci, Stanley M. Stevens Jr., and Cheryl L. Kirstein

ALCOHOLISM: CLINICAL AND EXPERIMENTAL RESEARCH

Vol. 43, No. 12
December 2019

Social Interaction With an Alcohol-Intoxicated or Cocaine-Injected Peer Selectively Alters Social Behaviors and Drinking in Adolescent Male and Female Rats

Danielle N. Gamble, Chloe C. Josephson, Mary K. Hennessey, Ashley M. Davis, Renee C. Waters, Brooke N. Jones, Destiny M. Belton, Nzia I. Hall, Taylor J. Costen, Cheryl L. Kirstein, and Antionette M. Maldonado-Devincci

ALCOHOL

ALCOHOLISM: CLINICAL AND EXPERIMENTAL RESEARCH

Vol. 31, No. 5
May 2007

Chronic Ethanol Exposure During Adolescence Increases Basal Dopamine in the Nucleus Accumbens Septi During Adulthood

Kimberly A. Badanich, Antionette M. Maldonado, and Cheryl L. Kirstein

ALCOHOLISM: CLINICAL AND EXPERIMENTAL RESEARCH

Vol. 32, No. 9
September 2008

Voluntary Ethanol Consumption Differs in Adolescent and Adult Male Rats Using a Modified Sucrose-Fading Paradigm

Antionette M. Maldonado, Lauren M. Finkbeiner, Kent K. Alipour, and Cheryl L. Kirstein



Alcohol 42 (2008) 641–648

ALCOHOL

Social interaction and partner familiarity differentially alter voluntary ethanol intake in adolescent male and female rats

Antionette M. Maldonado^a, Lauren M. Finkbeiner^a, Cheryl L. Kirstein^{a,b,*}



Article

Chronic Ethanol Exposure during Adolescence Increases Voluntary Ethanol Consumption in Adulthood in Female Sprague Dawley Rats

Antionette M. Maldonado-Devincci^{1,*} and Cheryl L. Kirstein^{2,3}

Kimberly A. Badanich¹
Antionette M. Maldonado¹
Cheryl L. Kirstein^{1,2}

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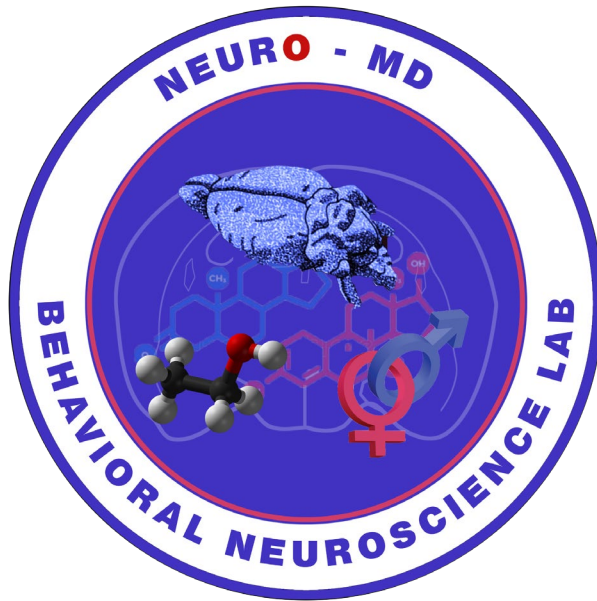
²Department of Pharmacology &
Therapeutics, University of
South Florida College of
Medicine, Tampa, FL 33612

Early Discoveries

- Adolescents respond in a unique manner compared to adults
- Females are uniquely responsive to alcohol and cocaine exposure
- Environmental factors influence drug responsivity
 - > Handling
 - > Social interaction
 - > Dosing regimen
 - > Age of exposure

NeuroMD Behavioral Neuroscience Laboratory

- Established in 2016 in the Department of Psychology at North Carolina A&T State University
- Trained over 40 undergraduate students across Psychology, Biology, Animal Science, Chemistry, Bioengineering, and Nursing



NeuroMD Lab Alumni



Danielle Gamble, B.A. 2017

Kanisa Davidson, B.A. 2018

Renee Waters, B.A. 2019

Bryce White, B.S. 2019

Nzia Hall, B.S. 2020

Janae A Baker 2022

Virginia State University

Univ. Alabama Birmingham

Princeton University

Georgetown University

UNC Chapel Hill

Virginia Commonwealth U

Ph.D. Clinical Health Psychology

Ph.D. Behavioral Neuroscience
Lynn Dobrunz

Ph.D. Neuroscience
Liz Gould, NSF GRF

Ph.D. Physiology & Pharmacology

Medical School

Ph.D. Counseling Psychology

Central Goal of the NeuroMD lab

**Increase the number of diverse scholars
conducting neuroscience research
focused in substance use disorders**

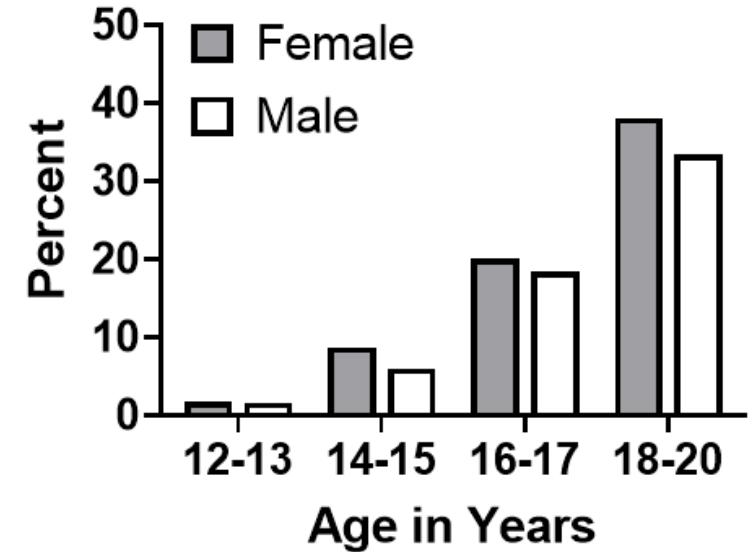
Overview

- Background
- AIE induced changes in
- Drinking
- Cognition
- Potential mechanistic targets for sex differences in affective behaviors and drinking
- Conclusions
- Future Directions
- Acknowledgements

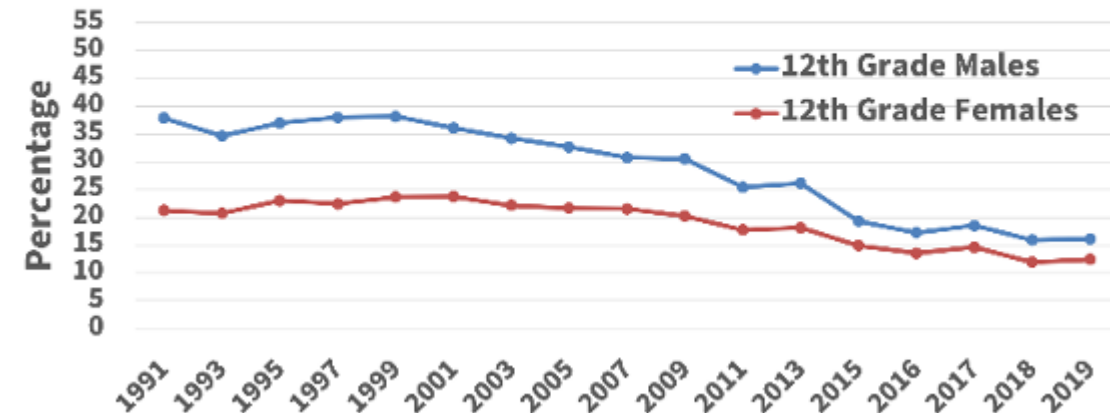
Adolescents readily consume alcohol

- Over 91% of adolescent consumption is binge drinking
- Recent data indicates adolescent females are binge drinking more than males
- Women report a shorter time from casual drinking to dependence-telescoping
- Important to determine effects in females

Past Month Use (2019)



Rates of Binge Drinking in the Past 2 Weeks among Male and Female 12th Graders



Long-term AIE induced changes in affective behaviors and cerebellar FMR1 gene



Aims and Hypotheses

- Determine AIE effects on long-term changes in affective behaviors and epigenetic regulation of the Fmr1 gene and its glutamatergic targets
- We expected AIE to alter affective behaviors in a sex-specific manner.
- We also expected changes in FMR1 expression and histone acetylation and methylation at specific sites on the FMR1 gene

AIE Vapor
Inhalation
Exposure

Abstinence

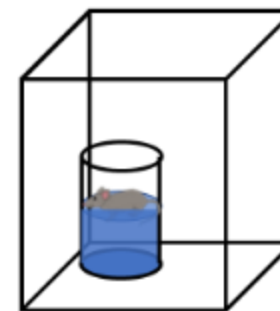
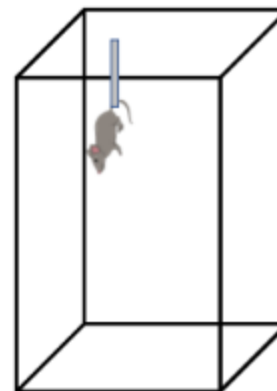
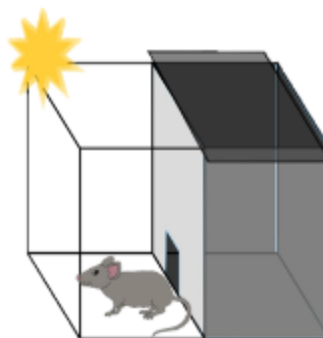
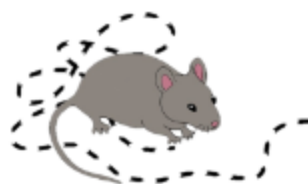
Open
Field Test

Light/Dark
Test

Tail
Suspension
Test

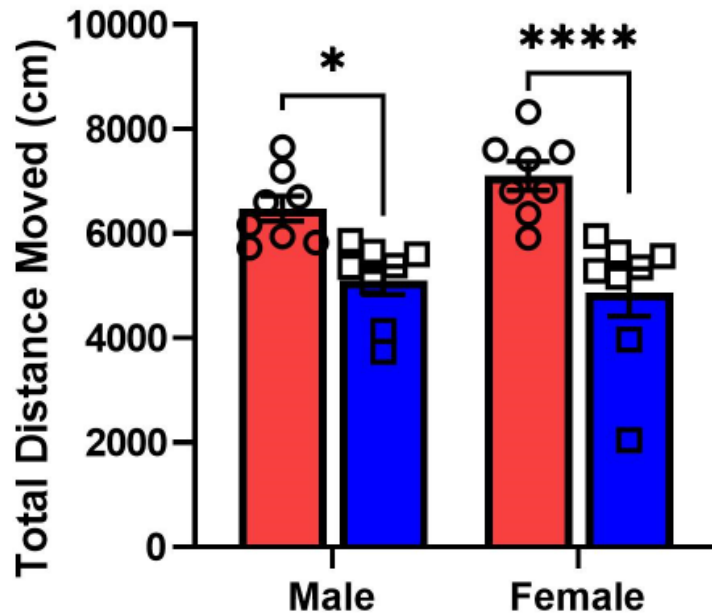
Forced
Swim
Stress

Collect
Brains

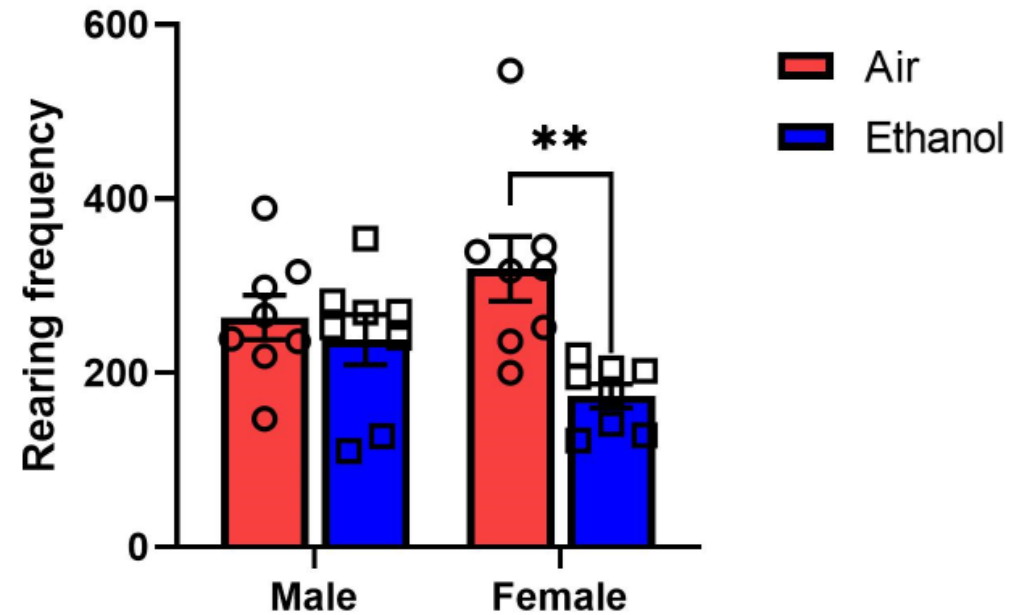


Open Field Test

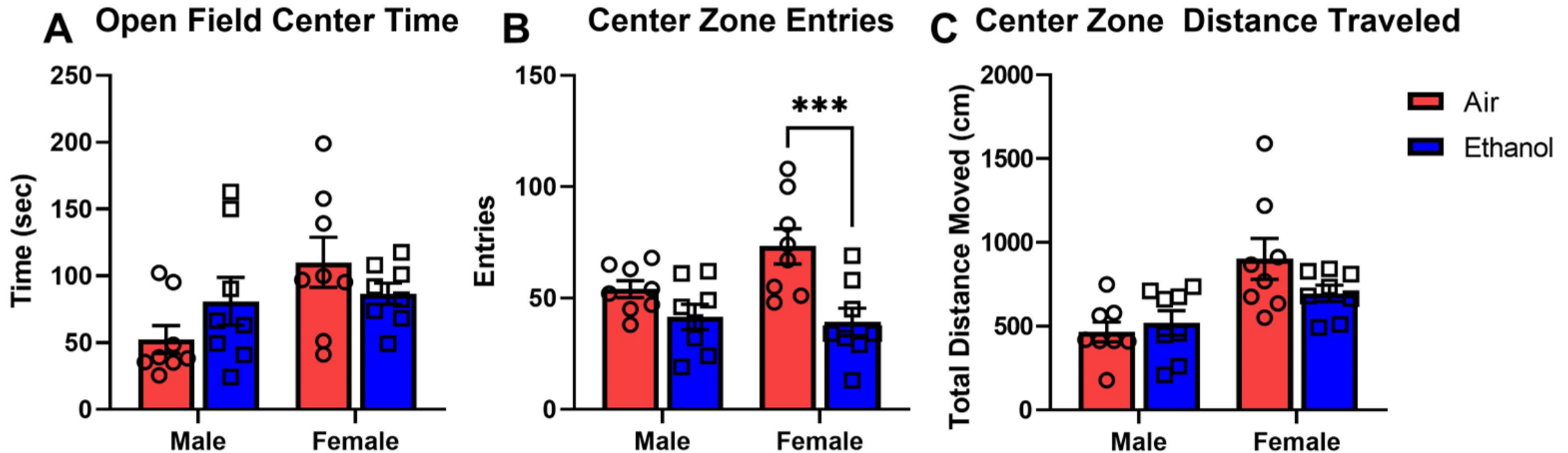
A Open Field Distance Traveled



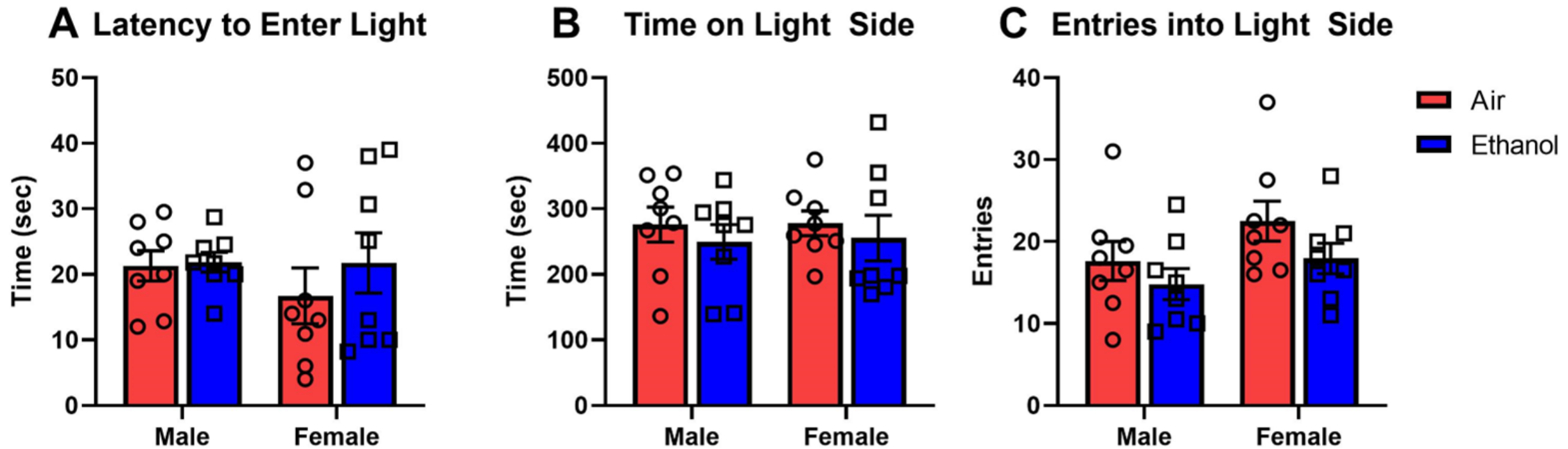
B Open Field Rearing



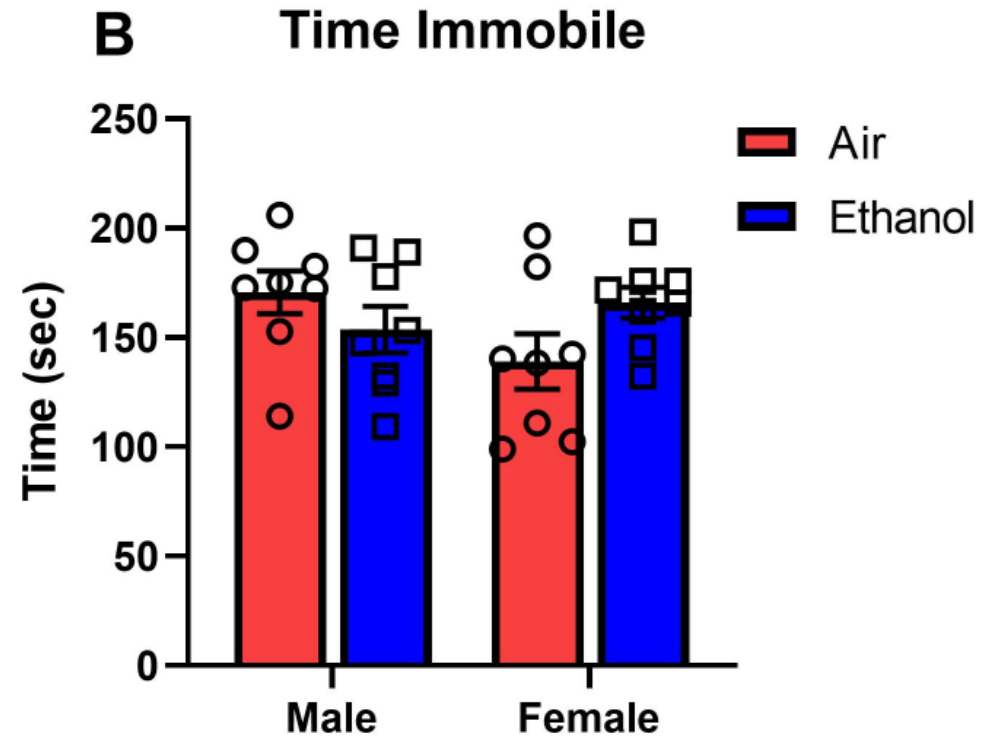
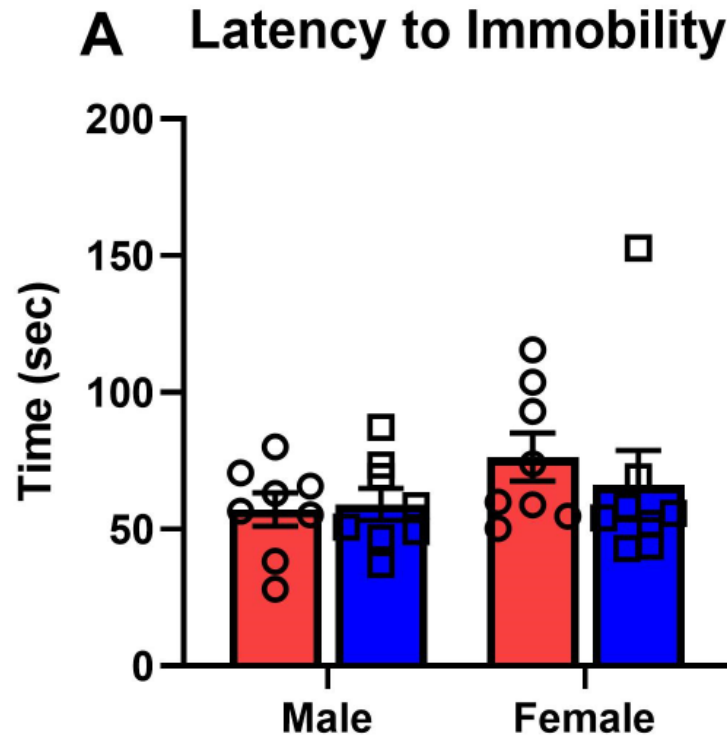
Open Field Center Zone



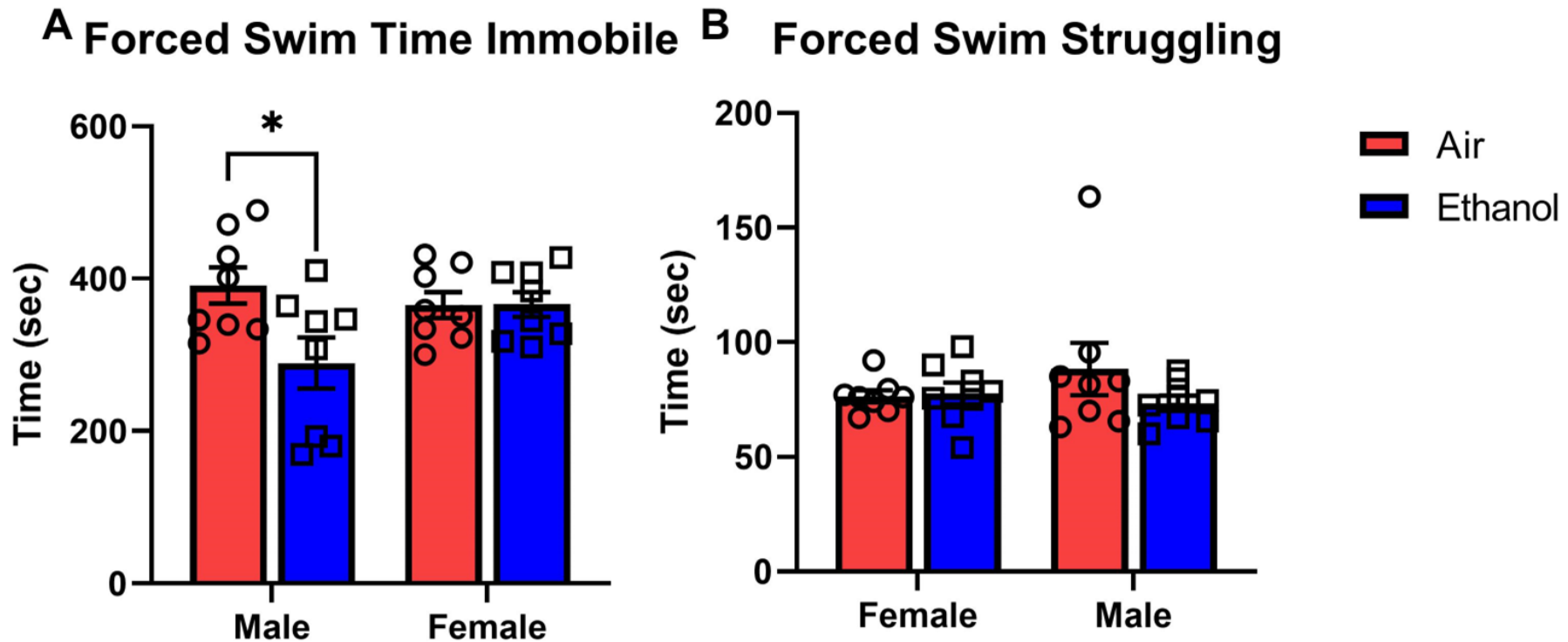
Light/Dark Test



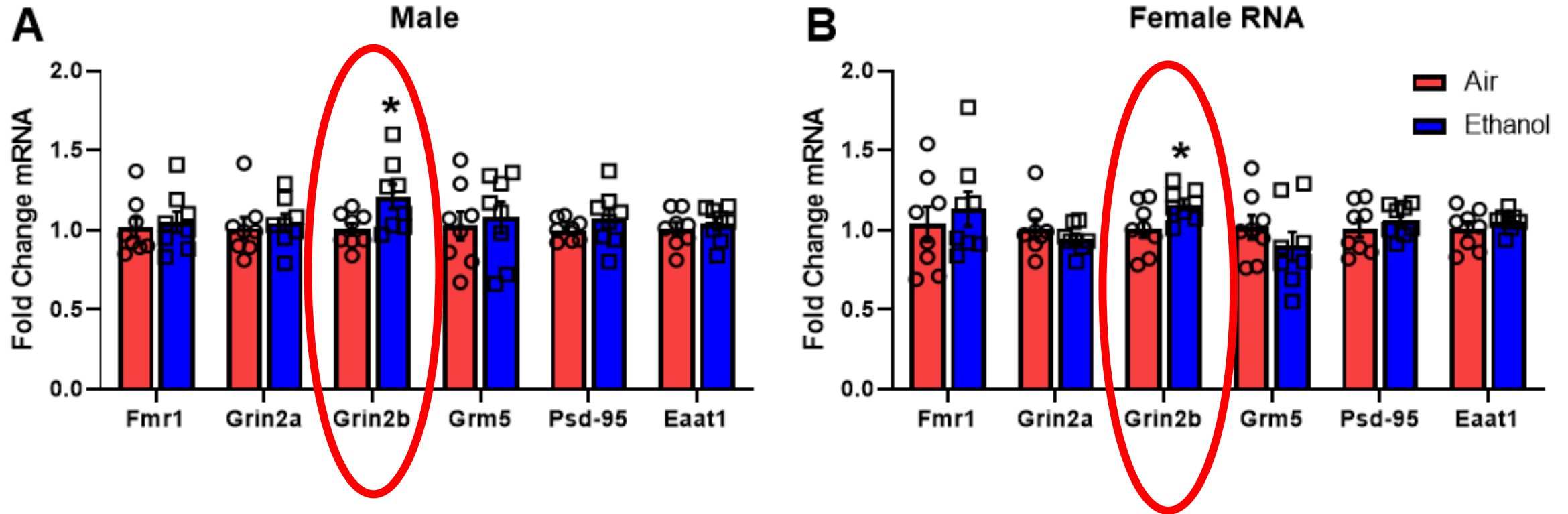
Tail Suspension Test



Forced Swim Stress



Fmr1 gene and its glutamatergic targets



Behavioral and Epigenetic Conclusions

- Robust changes in anxiety-like behaviors in the female AIE-exposed mice
- Modest changes in AIE-exposed male mice in the forced swim stress
- Following long-term abstinence, AIE-exposed male and female mice showed modest increased Grin-2B levels in the cerebellum
- Next Steps:
- We will continue to examine these changes in cerebellum that are modified following AIE and re-exposure to ethanol
- e.g. shorter withdrawal time point to determine robustness of effect

Moving Forward in CARE-UP

Preclinical Research

- Research focused on the neurobiology underlying cannabis-induced disruptions in sleep
- Behavioral Neuroscience
- Molecular Biology
- Preclinical animal models
- Interdisciplinary approach

Funding:

National Center for
Advancing Translational
Sciences, NIH, through
Grant KL2TR002490
National Institutes of
Health NADIA grant
3U01AA019925

NeuroMD Lab Alum

Mariah Shobande, Bioengineering
Anjali Kumari, Biology
Janae Baker, Psychology
Nzia Hall, Biology
Renee Waters, Psychology
Sherilynn Knight, Biology
Brooke Jones, Biology
Chrystal Davis, Bioengineering
Jalen Matthews, Bioengineering
Maritza Martinez, Chemistry
Chloe Emehel, Biology
Alex Chang, Early College at Guilford

NeuroMD Lab

Tiffany Dean, Biology, Grad Student
India Thomas, Psychology
Jason Dennis, Biology
Kailyn Sellers, Biology
Ariyonn Banner, Psychology
Kaylie Shoffner, Early College
Skyy Nunn, Biology
Jaela Melton, Biology
Jackson Lee, Biology
Sharla Kirkpatrick, Sociology/Psychology
Alexa Adams, Psychology
Alyssa Lopez, Biology
Kemper Waston, Psychology
Aniyah Harris, Psychology
Damion Ware, Psychology
Tramond Cobb, Biology
Iyona Barnes, Nursing



Collaborators

Dr. Scott Swartzwelder (Duke Univ.)
Dr. Kati Healey (Duke Univ.)
Dr. Subhash Pandey (UIC)
Dr. Jeff Weiner (Wake Forest Univ.)
Dr. John Meitzen (NC State Univ.)
Dr. Reginald Cannady (NCAT)



Achieving Equity in Clinical Training



Caroline S. Booth, Ph.D., LCMHC-S, NCC
Associate Professor and Chair
Department of Counseling, NC A&T State University

About Us – Department of Counseling

Who are We?

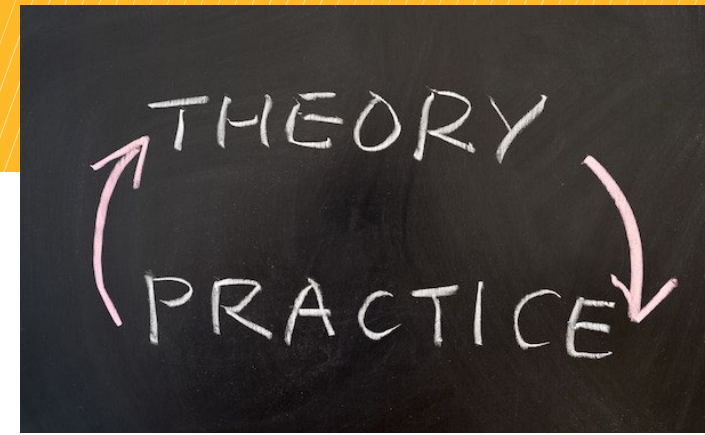
- We have been training counselors who work with mental health and substance use with all populations for over 50 years
- Thousands of counselors have been trained and millions of clients impacted as a result of our clinicians
- We are dedicated to equity, access, and advocacy



Mission and Vision of the Department of Counseling

- The **mission** of the Department of Counseling is to prepare future counselors and counselor educators to use clinical skills, research, and instruction to serve ethnically and culturally diverse students, clients, and the community in a globally changing society.
- The **vision** of the Department of Counseling is to be the premier institution in the preparation of multicultural and social justice counselors and counselor educators.

How Do We Do This?



- Student-Centered Approach – HBCU Legacy
 - > Balance support and accountability
 - > Heavy emphasis on mentoring
- Multiculturally sensitive program design (creation of our own best practices)
 - > Personal counseling for students (reduce stigma)
 - > Faculty led domestic and abroad service and study experiences
 - > "That doesn't work for our students"
- Diverse faculty who teach from their own worldview perspectives
- Our community supports the program and vice versa
 - > Former students most commonly serve as field placement supervisors
 - > Connectivity



How Do We Do This?

- Instruction of Eurocentric Counseling and Treatment Theories (individual) and more Culturally Competent approaches (collective, intersectionality, systemic racism)
- Robust faculty and student research on diverse, marginalized and understudied populations
 - > Research to practice
 - > Grant funding to train counselors to work with underserved populations
- Commitment to advocacy, social justice, and creation of a safe space to challenge – we all learn together
- Students arrive with a passion to serve their respective communities and we give them the tools to do so – they are the change agents

Who Informs our Best Practices

- Our Community (local, state, regional, national, global)
- State, National, and International Counseling Organizations
- Federal, state, and local grant funding organizations
- Local and state for-profit and non-profit agencies
- Our campus research partners
- Our campus clinical partners
- Our clinical partners and their clients



Achieving Equity in Collegiate Recovery



Vivian Barnett, PhD, APBB
Executive Director and Licensed Psychologist
Counseling Services, NC A&T State University

Recovery Movement in the African American Community

- Is not widely known
- There are thousands of African Americans in Recovery but they enlarge numbers and don't talk about their experiences due, in large part, to public perception of addict
- Common Stigmas with admitting that one has a substance use problem
 - > “Once an addict always an Addict “
 - > Fear of others “grabbing their purses or looking at them strange”

Recovery in a Campus Community

- Collegiate Recovery Programs (CRPs) started at a few universities in the 1980s to meet recovering students' support needs, as part of a broader effort to address substance use on campus.
- CRPs generally offered onsite sober housing, self-help meetings (e.g., 12-step), and counseling provided by a small staff
- CRPs strive to create a campus-based “recovery friendly” space and a supportive social community to enhance educational opportunities while supporting students' recovery and emotional growth.
- The model fits into the continuing care paradigm of a “recovery management” system These programs belonged to no consortium and thus their models varied substantially from one to another.

Recovery in a Campus Community

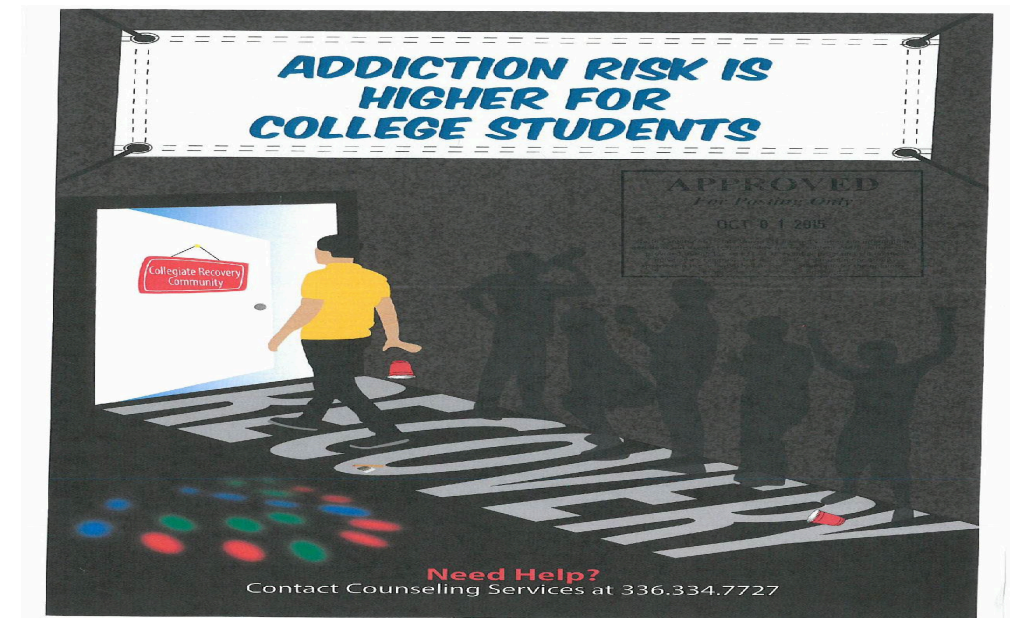
- All aimed to improve outcomes for students who had developed dependencies on alcohol and other substances. Students participating in these trailblazing early programs had superior outcomes to those were not participants, which was later confirmed by an emerging body of research.
- In 2014, NC A & T became the first HBCU in North Carolina and the country to establish a CRC.

CRC Street Team

- Assist with outreach planning and promotion
- Identify SWAG
- Act as our liaisons to students on campus
- Keeps us updated on student popular culture
- Assist with decreasing the stigma of seeking help with alcohol/drug recovery
- Change the culture around partying
- Encourage help-seeking behaviors

Collegiate Recovery Program

- Higher rates of addictive disorders
- Lower rates of treatment and participation
- Lack of culturally relevant practices and treatment



Recovery: Substance Use and Addictive Disorders

- NC was the 1st state to use public funds to support collegiate recovery
- 1st HBCU in NC and possibly the country to have a CRC
- Recovery resources were expanded
- Campus-wide involvement for greater participation
- Most students would relapse given college freedom and environments
- From 12 step to SMART Recovery
- Move from abstinence to harm reduction
- Use of allies for a peer support for normalizing vs stigma
- Housed in Counseling Services: Dually diagnosed

Funding Results

- Establishment or Creation of CRC in 6 Schools in the UNC System
 - > UNC-Charlotte
 - > UNC-Chapel
 - > ECU
 - > UNCG
 - > **NCAT**
 - > NCSU
- Make progress reports each semester to the ABC Board
- Designated Space
- Hired Street Team
- Developed an Advisory Board
- Training for Staff and Students

Assessments/Surveys Used

- Substance Abuse Subtle Screening Inventory
- BASICS
- CASICS
- eCheck-up to go and Marijuana eCheck-up to go (eToke)
- Have used Biofeedback

THANK YOU!

