

Description of Research Expertise and NSF Project Specific Research

Mark A. Melton, Ph.D.

Areas of General Research Expertise

I have technical and research experience in a number of areas of biotechnology including the pharmacology of neuronal acetylcholine receptors (nAChRs) signal transduction and their possible role in the onset of Alzheimer's Disease. I also have an interest in the molecular genetics of nucleotide excision repair mechanisms, particularly the role of UvrABC endonuclease enzyme complex activity. Most recently I have gained an interest in the genetic regulation of genes expressed during embryonic development of the central nervous system. Below are recent collaborative articles on nAChRs and UvrA activity.

Elaine A. Gay, Rebecca C. Klein, **Mark A. Melton**, Perry J. Blackshear and Jerrel L. Yakel (2008). Inhibition of Native Nicotinic Acetylcholine Receptors by Myristoylated Alanine-Rich C Kinase Substrate Peptide *Journal of Pharmacology and Experimental Therapeutics* 237(3): 884-890.

Deborah L. Croteau, Matthew J. DellaVecchia, Hong Wang, Rachelle J. Bienstock, **Mark A. Melton** and Bennett Van Houten (2006). The C-terminal Zinc Finger of UvrA Does Not Bind DNA Directly but Regulates Damage-specific DNA Binding *Journal of Biological Chemistry* 281(36): 26370-26381.

Lamb, P.W., **Melton, M.A.** and Yakel, J.L. (2005). Inhibition of neuronal nicotinic acetylcholine receptor channels expressed in *Xenopus* oocytes by B-amyloid 1-42 peptide *Journal of Molecular Neurosciences* 207:13-21.

Specific Research Involvement for this NSF Project

I will organize and coordinate two special lab 'hands-on' sessions on bioinformatics each year at Saint Augustine's College. NCSU project people will teach these sessions. In this project, I will be responsible for recruiting and selecting students from Saint Augustine's College for summer internships and be an active participant with students working in the lab on microarray based gene expression analysis and other related methods. I will also be actively involved in research activities with the postdoc and graduate students in the Cheng lab during the academic year. I will attend the monthly progress review meetings during the summer, and during the academic year to discuss results and evaluate student progress. I also have some experience in tissue culture and am interested in becoming more current with genetic transformation technologies by participating in the transgenic production tasks of the project. I will use this participation as an opportunity to incorporate some aspects of this genomics and systems research into the classroom learning environment at St. Augustine's College.

MARK ANTHONY MELTON

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7514 Montibillo Parkway
Durham, NC 27713
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EDUCATION:

Postdoc	University of North Carolina - CH	1996 Cell & Molecular Biochemistry
Ph.D.	University of Maryland	1992 Developmental Neurobiology
M.S.	North Carolina A&T State University	1987 Developmental Biology
B.A.	University of North Carolina - CH	1982 Biology

RESEARCH EXPERIENCE:

2009-current	North Carolina State University Department of Genetics-Visiting Scientist Laboratory of Developmental Genetics: Director – Patrica A. Estes, Ph.D.
2007-2008	National Institute of Environment Health Sciences-Visiting Scientist Laboratory of Signal Transduction: Director – Jerrel Yakel, Jr. Ph.D.
2005-2006 (Summer)	National Institute of Environment Health Sciences-Visiting Scientist Laboratory of Molecular Genetics: Director – Ben VanHouten, Jr. Ph.D.
2002-2003	National Institute of Environment Health Sciences-Visiting Scientist Laboratory of Signal Transduction: Director – Jerrel Yakel, Jr. Ph.D.
2001-2002	National Institute of Environment Health Sciences-Visiting Scientist Laboratory of Molecular Genetics: Director - Leroy Worth, Jr. Ph.D.
1997-1998	North Carolina Central University Dept. of Biology-Visiting Scientist Molecular Microbiology Lab-Director: Goldie S. Byrd, Ph.D. Electron Microscopy Lab-Director: John E. Mayfield, Ph.D.
1993-1996	UNC-CH School of Medicine Dept. of Physiology-Research Associate Molecular Biol. & Biochemistry Lab-Director: Stanley Froehner, Ph.D.
1987-1992	University of Maryland Dept. of Zoology-Research Assistant Cell Biology & Neurobiology lab-Advisor: Anthony Olek, Ph.D.
1991 (Summer)	National Institute of Child Health & Human Development at the National Institutes of Health (NICHD/NIH), Bethesda, Maryland Dev. Neurobiology Lab-Director: Phillip G. Nelson, M.D., Ph.D.
1984-1987	N.C. A&T State University Dept. of Biology-Research Assistant NASA Space Shuttle Project – Dev. Biol. Lab-Advisor: Jerry Bennett, Ph.D.

TECHNICAL EXPERIENCE:

Electrophysiology & Patch-Clamp: Whole-cell/voltage clamp recording on *Xenopus* oocytes, transfected HEK and NG108 cells.

Molecular Biochemistry: Western, Southern & Northern blot gel electrophoresis. Protein purification via precipitation & ion exchange chromatography. SDS-PAGE, antibody production & immunoprecipitation.

Molecular Biology: Subcloning preparations, DNA & RNA isolation & purification, Site-Directed Mutagenesis, PCR amplification.

Cell & Tissue Culture: Dissociation, growth & maintenance of primary skeletal muscle and spinal cord neurons *in vitro*. Growth & maintenance of bacterial cell cultures.

Scanning & Transmission Electron Microscopy: Preparation & mounting of various types of specimens for observation & training in electron microscopy operation.

Fluorescence & Video Microscopy: Antibody staining & fixation of cells for protein localization & observation of living cells in culture, respectively.

Microinjection Manipulation: Microinjection of mRNA into oocytes for expression.

TEACHING & ADMINISTRATIVE EXPERIENCE:

2006-present St. Augustine's College – Chair – Dept. of Biological & Physical Sciences

2004-present St. Augustine's College – Director of the NIH-MARC U*STAR Program

2003-2006 St. Augustine's College – Director of the Honors Program

2001-2003 St. Augustine's College – Chair – Department of Biology

2001-present St. Augustine's College – Associate Professor of Biology

1998-2001 Bennett College - Assistant Professor of Biology

1996-1998 North Carolina Central University - Assistant Professor of Biology

1998-2004 North Carolina Central University - Design & Teach Recombinant DNA
(Summers) Technology course in the Summer Ventures in Science & Math Program

1986-1991 University of Maryland-Teaching Assistant - Dept. of Zoology

1985-1986 N.C. A&T State University-Teaching Assistant - Dept. of Biology

FUNDED GRANT AWARDS

National Science Foundation – ROA Supplement **Award** – 2009 - \$34,563 (NC State)

NIH MARC U*STAR Student Training Award (NIH) – 2004-09 - \$1.075 Million

NASA Opportunities for Visionary Academics (NOVA) **Award** - 2002-03 - \$27K

NIH Intramural Research Training Associate Grant **Award** – 2001 - \$10K

NASA Opportunities for Visionary Academics (NOVA) **Award**-2000-01 - \$30K

RESEARCH AWARDS/FELLOWSHIPS:

1994-1996 National Science Foundation Research Fellowship (\$105K)
1993-1994 UNC Postdoctoral Scholars Program Fellowship (\$65K)
1991(summer) National Institutes of Health Intramural Research Training Fellowship
(\$12K)
1990-1992 Center for Neuroscience Fellow - University of Maryland
1988-1992 University of Maryland Graduate Student Dissertation Fellowship (\$85K)
1978-1982 University of North Carolina Academic Scholarship (Fully Funded)

PROFESSIONAL DEVELOPMENT/CONTINUING EDUCATION

New York University – Faculty Research Network Workshop – Summer 2007
Dartmouth College Human Genome Project – Ethical, Legal & Social Issues
Faculty Institute – Summer 2004
NOVA Grant Proposal Writing Workshop Series - NASA - 1999-present
Professional Development/Proposal Writing Workshop Series - NSF/QEM - 1998-
present
Current Topics in Genetics Short Course - Human Genome Project - NIH - Summer 1999
Polymerase Chain Reaction Techniques Short Course- Life Technologies - Summer 1999

COMMITTEE/PANELIST SERVICE:

“The Human Genome Project-Are We Playing God?”- Panelist - Bennett College -2000
Jefferson/Hemings Roundtable Discussion -UNC Greensboro - Genetics Expert -1999
National Science Foundation-NATO Fellowship Review Panel - 1996
53rd Annual Joint Meeting of NIS/Beta Kappa Chi/BSP- NCA&T - Panel Judge - 1996
Graduate Studies Policy Committee-Graduate Student Representative - 1990-1992
Neurobiology Faculty Search Committee-Graduate Student Representative - 1991
Zoology Department Graduate Student Association- Chairperson - 1989-1990
Campus-wide Graduate Student Association - President - 1985-1986

PUBLICATIONS:

Research Articles

Elaine A. Gay, Rebecca C. Klein, **Mark A. Melton**, Perry J. Blackshear and Jerrel L. Yakel (2008). Inhibition of Native Nicotinic Acetylcholine Receptors by Myristolated Alanine-Rich C Kinase Substrate Peptide *Journal of Pharmacology and Experimental Therapeutics* 237(3): 884-890.

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Melton, M.A., Yu, N.-X., Dutton, E.K. and Olek, A.J. (1993) Local Induction of Acetylcholine Receptor Aggregates on Cultured Rat Myotubes by a Partially Purified Protein from Fetal Pig Brain *Exp. Cell Res.* 208:378-386.

Melton, M.A., A.J. Olek, and E.K. Dutton (1990) Neural Factor-Induced Acetylcholine Receptor Aggregation: A Model for Local Induction. **Society for Neuroscience Abstracts.** (Volume 16) p. 1004.

A. Olek, N. Yu, E. Dutton, and **M. Melton** (1990) Partial Purification of an Acetylcholine Receptor Aggregating Factor From Fetal Pig Brain. **Society for Neuroscience Abstracts** (Volume 16) p. 1004.

Book Chapter

Jackson, C.R., **Melton, M.A.**, and Jackson, S.C. (2009) African American Males in US Science. In Black American Males in Higher Education: Research, Programs and Academe – Diversity in Higher Education (Volume 7). Chapter 8.

INVITED SEMINAR PRESENTATIONS:

Joint NASA/NSF Research & Education Opportunities Conference for PIs, Faculty & Partners - *Promotion & Tenure for Junior Faculty* – Washington, DC - 2007
St. Augustine's College, Alpha Kappa Mu National Honor Society Induction Ceremony
Keynote Address -2004

St. Augustine's College, Division of Natural Sciences Career Day Seminar - 2001
Biotechnology Conference - 16 Institutions Health Sciences Consortium (Greensboro) -

1999

Fourth Annual Life & Physical Sciences Research Symposium -NCA&T State -1999
North Carolina Central University, Department of Biology - 1996
Winston-Salem State University, Department of Biology - 1996
North Carolina A&T State University, Department of Biology - 1995

OTHER ACADEMIC ACTIVITIES

Kappas of Durham Foundation 501(c)(3) – Treasurer – 2008-present
<http://www.kodf.org/bios/melton.htm>

Kappa Alpha Psi Fraternity Faculty Advisor – 2003- present

Pre-Health Professions/Graduate School Advisor - 2001-present

Pre-Med Club Advisor – 2001-2003

Biomedical Associates Program (MBRS) Faculty Presenter – 1999-2001

Health Careers Mentoring Program Co-coordinator - 1999-2001

Bennett Scholars Program Faculty Advisor –1999-2001

Biology Club Advisor - 1998-2001

Sophomore Class Advisor - 1999

Bennett College Faculty Senate - 2000-2001

PROFESSIONAL AFFILIATIONS:

Society for Neuroscience

American Society for Cell Biology

American Association for the Advancement of Science

Sigma XI National Science Honor Society

Beta Kappa Chi National Science Honor Society

REFERENCES: Available Upon Request