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The Beat



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College of Medicine

JULY 1997

ROLE OF THE INTRINSIC CARDIAC NERVOUS SYSTEM IN CONTROL OF THE HEART

Dr. Jeffrey Ardell, Professor of Physiology, has been awarded a five-year grant totaling \$1,392,964 from the National Institutes of Health [Heart, Lung and Blood Institute]. Ardell's research project is titled "Role of Intrinsic Cardiac Neurons in Cardiac Control." Dr. Ardell received his Ph.D. degree in physiology at the University of Washington in 1980. His research career began at Michigan State University and Loyola University where he mastered neurophysiological techniques as applied to cardiovascular mechanisms. In 1984, Ardell moved to the University of South Alabama College of Medicine as an Assistant Professor of Physiology and is currently focusing on how nerves and neurohumoral agents interact to control the heart.

Cardiac ganglia form the principal final common pathway for autonomic modulation of regional cardiac function, explains Ardell. Though recent studies have identified some of the neuroanatomical and functional characteristics of these cardiac neurons little is known about how neural activity is generated and coordinated within the intrinsic cardiac nervous system. Data from Dr. Ardell's research laboratory have demonstrated that the intrinsic cardiac nerve plexus acts as much more than a simple relay station for extrinsic autonomic projections to the heart. Rather, it functions as a local integrative neural network capable of modulating extrinsic autonomic projections to the heart and in mediating local cardiac reflexes.

Loss of descending neural inputs to autonomic ganglia (termed decentralization) is initially associated with marked suppression of peripheral autonomic nerve activity. Within weeks following decentralization of the intrinsic cardiac nervous system, high levels of spontaneous activity return to cardiac neurons and that activity contributes to the maintenance of heart function. Many of these intrinsic cardiac neurons are influenced by activation of cardiac mechano- and chemosensitive receptors, suggesting that intrinsic

cardiac ganglia contain afferent neurons in addition to the expected efferent postganglionic neurons. Thus, the decentralized heart has its own intrinsic "brain" to reflexly control cardiac function separate from the central nervous system. Intracellular recordings from cardiac ganglia support this concept. Studies from Dr. Ardell's laboratory on intrinsic cardiac ganglia have characterized resting membrane potentials of approximately -60 mV, and thresholds for generation of action potentials of approximately -40 mV. These properties are consistent with neurons which express low excitability. The data indicate further that intrinsic cardiac neurons possess at least two additional receptor subtypes (muscarinic and adrenergic) in addition to the expected nicotinic receptors, though the physiological function of most of the interneuronal interactions within the ganglia remains to be determined.

Neurohumoral agents can modulate regional cardiac function by acting directly on myocytes or indirectly by modifying activity arising within the autonomic nervous system. Dr. Ardell is currently focusing on two neurohumoral systems, the renin-angiotensin system and circulating catecholamine released by the adrenal medulla. Angiotensin II augments cardiac function in part due to activation of peripheral sympathetic nerves. Circulating epinephrine, taken up by sympathetic nerve terminals, contributes to augmentation of cardiac function and modulates presynaptic neurotransmitter release. Chronic loss of extrinsic nerve inputs to the intrinsic cardiac nervous system (decentralization) combined with loss of circulating catecholamine support subsequent to adrenalectomy results in a severely compromised heart. Dr. Ardell states "the long-term goal for our laboratory is to identify the specific deficits within the intrinsic cardiac ganglia and at the myocyte-receptor synaptic junctions that occur subsequent to decentralization of the heart and/or adrenalectomy."

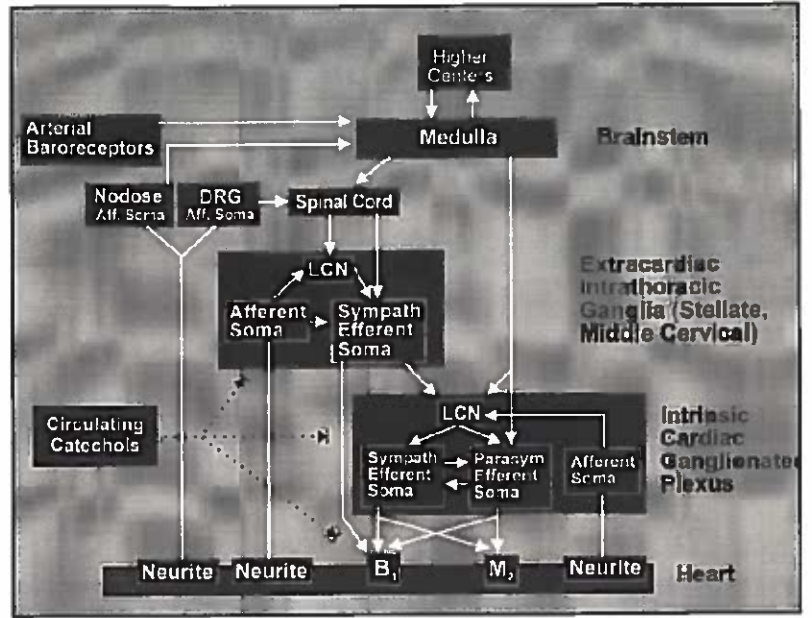
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INSIDE:

1997 Residency Appointments
Convocation Awards

Slovakian Visitors
New Ph.D. Graduates

Acknowledgments: The continued success of Dr. Ardell's research program is do in large part to the combined efforts of their multi-disciplinary neuro-cardiology workgroup, which includes investigators from USA (Scott McGuirt, Drs. Dyess, Thompson, Downey and Cohen) as well as collaborators at the University of Kentucky (Drs. Dave Randall and Brown), East Tennessee State (Dr. Don Hoover), Hospital du Sacre-Coeur de Montreal (Dr. Rene Cardinal), and Dalhousie University, Halifax, Nova Scotia (Drs. Drew Armour, Frank Smith, and David Hopkins). In addition to NHLBI, Ardell is grateful for the generous support that the American Heart Association has provided to his research laboratory over the years.



Schematic representation of the putative connectivity among various intrathoracic neurons and central neurons which are involved in cardiac regulation. Arterial Baroreceptors = carotid bulb mechanosensory neurites; Nodose = nodose ganglion afferent neurons; DRG = dorsal root ganglion afferent neurons; LCN = local circuit neurons; Sympath Efferent = sympathetic efferent postganglionic neurons; Parasymp Efferent = parasympathetic efferent postganglionic neurons; β_1 = cardiac myocyte β_1 -adrenoceptors; M_2 = cardiomyocyte M_2 -muscarinic receptors; Catechols = catecholamines.

SLOVAKIANS VISIT COLLEGE OF MEDICINE

The College of Medicine extended an invitation to a group of medical faculty from P.J. Safarik University in Kosice, Slovakia to visit the campus and university hospitals and clinics. A total of fourteen faculty, in several basic science and clinical disciplines, spent a week in Mobile to exchange medical knowledge with members of the medical and university community. While at USA, the group toured several different facilities in the College of Medicine and hosted individually by various departments, according to their area of speciality.

It is expected that the visitors from Safarik University left Mobile with a greater appreciation and understanding of academic medicine in the United States. Their visit to Mobile was sponsored by the Mobile Kosice Association, an organization created to promote cultural exchanges between the two sister cities.

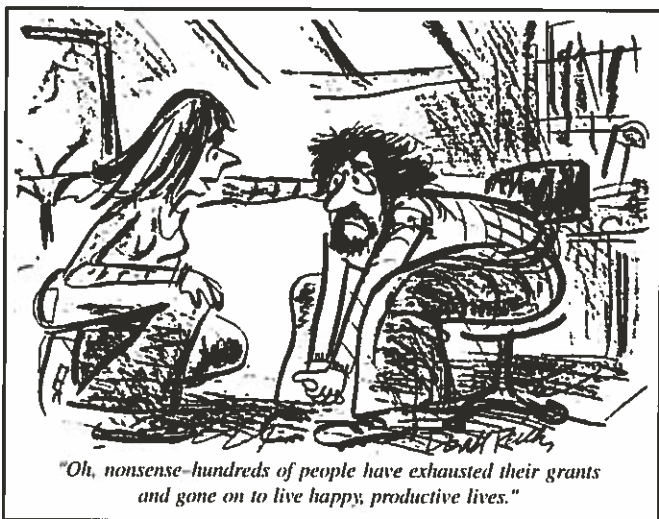


NEW INVESTIGATORS BATTLE THE ODDS IN PURSUIT FOR FUNDS

The Federal Grants and Contracts Weekly reported in the March 3, 1997 issue that new investigators applying to key research agencies have about half the success rate of their experienced senior colleagues. The situation is so severe that NIH has set up a special committee to examine ways to help young investigators. The Federal Grants and Contracts Weekly included some helpful tips for new investigators. They are as follows:

- ✓ Use capacity-building mechanisms, such as small grants, that provide experience and the chance to obtain preliminary data critical in application review;
- ✓ Search for grants and fellowship specially tailored to encourage young investigators; and
- ✓ Use available but often overlooked strategies to improve chances of the most appropriate review, such as requesting assignment of an application to a particular National Institutes of Health review group.

For more information on grants, please contact Mrs. Marion Leach, College of Medicine Research Office, 460-6307.



UNIQUE RESEARCH RESOURCES

– USA Primate Research Laboratory –

The University of South Alabama Primate Research Laboratory maintains a breeding colony and research resource of Bolivian squirrel monkeys (*Saimiri boliviensis boliviensis*) totaling more than 500 animals. The breeding colony is an unique national resource established at the Primate Research Laboratory in 1980. Although this effort was initially intended to be a breeding resource specifically for the Bolivian squirrel monkey (*Saimiri boliviensis boliviensis*), it has become the only federally supported breeding and research resource of squirrel monkeys of any type in the United States. In addition to breeding resource activities, the Primate Research Laboratory maintains a squirrel monkey tissue and biological fluid bank as a national research resource. There is an active research program at the laboratory which has generated more than 100 published scientific papers and abstracts dealing with various aspects of primate biology and medicine. The laboratory receives more than 200 telephone calls per year from scientists, veterinarians, research administrators, and representatives of government agencies in the United States and overseas who need information about squirrel monkeys. For further information, contact Dr. Christian R. Abee, Center Director, (334)460-6239.

– USA Comprehensive Sickle Cell Center –

The University of South Alabama Comprehensive Sickle Cell Center is one of ten federally funded Sickle Cell Centers in the United States. They perform basic and clinical research on sickle cell disease, care for approximately 600 pediatric and adult sickle cell patients, and help families and individuals with sickle cell disease cope with problems related to this disorder. Their goals are: (1) to improve our understanding of the pathophysiology and management of sickle cell disease through high quality basic and clinical research; (2) to develop new approaches for diagnosis and treatment of sickle cell disease; (3) to transfer the knowledge and skills to health professionals and to the community through education programs; and (4) to enhance our ability to provide counseling and support in the community for individuals with sickle cell disease and trait in the Mobile area and the Central Gulf Coast region. For further information, contact Dr. Steven R. Goodman, Center Director, (334)460-7334.

University of South Alabama College of Medicine

Class of 1997 Residency Appointments

Anesthesiology

Wayne M. Gabriel	University of Alabama, Birmingham, AL (1998)
David B. Jones	Duke University, Durham, NC (1998)
William T. O'Byrne, III	University of Washington, Seattle, WA (1998)

Emergency Medicine

William D. Gibson	University of Arkansas, Little Rock, AR
Parag A. Mahatekar	University of Louisville, Louisville, KY

Family Practice

Jay R. Allen	University of Colorado, Denver, CO
Charles G. Baldwin	University of South Alabama, Mobile, AL
Daniel E. Banach	Bowman Gray/Baptist Hospital, Winston-Salem, NC
Synthia L. Beeler	East Tennessee State University, Johnson City, TN
Timothy A. Belcher	University of South Alabama, Mobile, AL
Audra L. Busenlehner	Tuscaloosa Family Practice, Tuscaloosa, AL
Matthew T. Dorman	Halifax Medical Center, Daytona Beach, FL
Amy E. Foresee	University of Tennessee, Knoxville, TN
Dennis K. Harden	University of South Alabama, Mobile, AL
Woodrow W. Herring, III	Tuscaloosa Family Practice, Tuscaloosa, AL
Sean C. Kerby	University of South Alabama, Mobile, AL
Vincent Law	Tuscaloosa Family Practice, Tuscaloosa, AL
Benjamin A. Marble	University of South Alabama, Mobile, AL
Richard H. Maughon	University of Arkansas, Little Rock, AR
Amorette L. Miller	University of Alabama, Huntsville, AL
Nancy E. Moultrie	University of Tennessee, Memphis, TN
Michael A. Remillard	Medical Center East, Birmingham, AL
Laura A. Riley	Tuscaloosa Family Practice, Tuscaloosa, AL
Gregory P. Stidham	Tuscaloosa Family Practice, Tuscaloosa, AL
Stephen M. West	Selma Family Med. Residency, Selma, AL
Ann L. White	Naval Hospital, Pensacola, FL
Melvin J. Williams, Jr.	Tuscaloosa Family Practice, Tuscaloosa, AL
Wesley C. Williams, II	University of Texas Med. Branch, Galveston, TX
Darrell E. Willis, Sr.	University of South Alabama, Mobile, AL

Internal Medicine

Scott R. Boerth	University of Iowa Hospitals/Clinics, Iowa City, IS
Laura C. Bunch	Baptist Health System, Birmingham, AL
John K. Hill, II	Vanderbilt University, Nashville, TN
Frances K. T. Inge	University of South Alabama, Mobile, AL
Kalpana Jain	Med. College of Virginia, Richmond, VA
Mark S. Kreisberg	University of Washington, Spokane, WA
Paul D. McNeely	Alton Ochsner Foundation, New Orleans, LA
Phillip A. Pybass	University of South Alabama, Mobile, AL
Laura A. Shaver	University of Alabama, Birmingham, AL

Medicine/Pediatrics

Frankie W. Erdman, Jr.

University of South Alabama, Mobile, AL

Obstetrics/Gynecology

Christina Belle-Henry

Texas Tech University, Lubbock, TX

David P. Dulaney

New Hanover Regional, Wilmington, NC

Kenneth E. Farmer, Jr.

University of South Alabama, Mobile, AL

Praful G. Patel

University of South Alabama, Mobile, AL

Wendy M. Riggins

University of South Florida, Tampa, FL

Ophthalmology

Andrew W. Everett

University of Alabama, Birmingham, AL (1998)

Otolaryngology

Jason P. Lockette

University of Louisville, Louisville, KY

Pathology

Lisa L. Crisp

Emory University, Atlanta, GA

Meredith I. Gamblin

Vanderbilt University, Nashville, TN

Danielle C. Gibson

University of Arkansas, Little Rock, AR

Rex D. Roach, III

University of South Alabama, Mobile, AL

Pediatrics

Pamela M. Grier

Sacred Heart Hospital, Pensacola, FL

Carmen E. S. Johnson

Central Texas Medical Foundation, Austin, TX

Keith M. Krist

University of South Alabama, Mobile, AL

Amy T. Schepens

University of South Alabama, Mobile, AL

R. Neil Treece, III

East Tennessee State University, Johnson City, TN

Valerie N. Whatley

University of Louisville, Louisville, KY

Dwight A. Yoder

University of South Alabama, Mobile, AL

Preliminary Medicine

Holly A. Ward

Alton Ochsner Foundation, New Orleans, LA

Preliminary Surgery

Brian C. Lewis

Spartanburg Regional Med. Ctr., Spartanburg, SC

Radiology-Diagnostic

Rachadip S. Sachasinh

University of South Alabama, Mobile, AL (1998)

Surgery

Paul E. Enochs

University of South Alabama, Mobile, AL

Forrest G. Ringold

University of South Alabama, Mobile, AL

Jonathan K. Smith

William Beaumont Medical Center, El Paso, TX (1998)

Douglas R. Trzcinski

Conemaugh Memorial, Johnstown, PA

Urology

Kapil Pareek

University of Louisville, Louisville, KY (1999)

HONORS CONVOCATION AWARDS

Dean's Award Matthew T. Dorman
Award to the graduating senior who has accumulated the highest scholastic grade point average for the full four years of medical school.

Merck Award in Ophthalmology Ann L. White
Awarded to the graduating medical student, selected by the Ophthalmology faculty, who demonstrated both an interest in ophthalmology and best exemplified our ideal of competent and compassionate patient care.

Pharmacology Achievement Award Amy T. Schepens
The award is designed to recognize outstanding student performance in Pharmacology.

**American Medical Women's Association
Scholarship Achievement Citation** Lisa L. Crisp
Meredith I. Gamblin
Presented to those women students who graduate in the top ten percent of their class.

Honors Award in Biochemistry Lisa L. Crisp
Awarded to a student who excelled in all aspects of the Medical Biochemistry course.

John W. Donald Memorial Award in Surgery Kapil Pareek
Awarded to the senior student who best demonstrated clinical and academic excellence in the surgery clerkship.

Obstetrics/ Gynecology Award Praful G. Patel
Presented to the graduating medical student who, through scholarship, patient care, interaction with faculty and house staff, and motivation, has demonstrated excellence in Obstetrics and Gynecology.

**Hollis J. Wiseman Award for
Excellence in Pediatrics** Andrew W. Everett
Presented to the student who best exemplified Dr. Wiseman's outstanding scholarship, compassion for patients and families, involvement in the profession and community, enthusiasm for exploration and steadfast love of family, friends and colleagues.

**Outstanding Student in the
Anatomical Sciences** Matthew T. Dorman
Awarded by the faculty of the Department of Structural and Cellular Biology to the student with the best performance in the four anatomical science courses.

**Charles W. Urschel Achievement Award in
Physiology** Matthew T. Dorman
Awarded to a graduating senior for outstanding performance in the Physiology course and/or Physiology research.

**Family Practice and
Community Medicine Student Award** Darrell E. Willis
Awarded by the faculty of the Department of Family Practice and Community Medicine to the graduating senior student who shows the greatest potential as a future family physician. The selection is based on the student's

broad general medical knowledge and clinical skills; demonstration of concern for the physical, emotional and social well-being of the patients; and understanding of concepts central to family medicine.

Pathology Award Meredith I. Gamblin
Danielle C. Gibson
Given jointly by the Alabama Association of Pathologists and the University of South Alabama Department of Pathology faculty and residents for excellence in Pathology.

Merck Award Danielle C. Gibson
John K. Hill, II
Awarded by vote of the faculty to senior students with superior academic achievement.

Excellence in Emergency Medicine Parag A. Mahatekar
The excellence in Emergency Medicine award is given by the faculty of the Department of Emergency Medicine and the Society of Academic Emergency Medicine to the student demonstrating outstanding clinical skills and proficiency in Emergency Medicine.

Medical Alumni Leadership Award Jonathan K. Smith
Awarded to a senior student, by vote of classmates, in recognition of outstanding leadership of the graduating class.

Neurology Award Kalpana Jain
Awarded by the Department of Neurology to a senior student who has shown excellence in clinical neuroscience.

Samuel Eichold Award Phillip A. Pybass
Presented to the graduating medical student who through scholarship, patient care, interaction with faculty and housestaff, and motivation has demonstrated outstanding achievement in Internal Medicine.

SNMA Leadership Award P. Michelle Grier
Awarded by the Student National Medical Association to a graduating senior who has demonstrated outstanding community, school and organizational service and leadership qualities.

Community Service Award P. Michelle Grier
This award is presented by the Mobile County Medical Society to a senior whose classmates believe best fulfills the ideals of humanitarian public service as demonstrated by superior awareness of, and achievement in, civic and community programs.

Lange Award Daniel E. Banach
Awarded by vote of the faculty to a senior student with superior academic achievement.

Mutual Assurance Award Michael A. Remillard
This award is presented to a senior medical student who plans to remain in Alabama for residency and who excels in patient communication.

CONGRATULATIONS

Dr. Valentina I. Grishko, a postdoctoral fellow in the laboratory of Dr. Glenn L. Wilson, was selected to receive one of the Hoffmann-La Roche Inc. Young Investigator Awards for her poster presentation at a recent American Association for Cancer Research meeting in San Diego. Only 17 investigators were selected for this award which paid for her travel expenses to the meeting. Her poster was entitled "Detection of alkylation damage in mitochondrial DNA at the nucleotide level using ligation-mediated polymerase chain reaction."



Roopa Dhawan, a Murphy High School junior, won first place in the senior division biochemistry category at the Alabama Science and Engineering Fair and will be one of four state winners to advance to the International Science and Engineering Fair in Louisville, KY. Dhawan's project was conducted during the summer working with Drs. Robert C. Boerth and R. Blaine Moore in the Department of Pediatrics. Her project was entitled "Alpha-4 Beta-1 Intergrin in Sick Cell Subjects During Vaso-Occlusive Crises." First place winners in the senior division won a four-year scholarship to UAH. More than 200 students from across Alabama participated in the state science fair.



Phillip Fortenberry and Steven Werdehoff, participants of the 1996 Medical Student Summer Research Program, attended the 1997 National Student Research Forum at the University of Texas Medical Branch. Phillip and Steven were invited to present their data at the national forum as a result of their summer research achievements. The students' research was sponsored by the Department of Pediatrics.



Kristine J. Krueger, M.D. and John A. Vande Waa, Ph.D., M.D., Assistant Professors of Medicine, were elected to the Regional Council of the Southern Section, American Federation for Medical Research. They will serve three-year terms during the Southern Societies Regional Meeting in New Orleans. The Southern Section of AFMR represents nearly 1,000 biomedical researchers across the Southeastern United States.



Wladimir Wertelecki, M.D., Professor and Chair of the Department of Medical Genetics, has been named secretary-treasurer of the World Alliance for the Prevention of Birth Defects. The world Alliance was organized with the support of the March of Dimes Foundation to prevent birth defects, which are a leading cause of infant mortality, developmental disabilities and severe mental retardation. Wertelecki has been actively involved in tracking, monitoring and preventing birth defects through the Genetics/Birth Defects Center he developed at USA.

ANNOUNCEMENTS

J. Graham Smith Jr., M.D., Professor of Dermatology, presented the 18th Zakon Lecture at the History of Dermatology Society. The lecture was held during the annual meeting of the American Academy of Dermatology in San Francisco March 20-26. Smith also chaired a symposium on global dermatology and presented a paper titled "Darwinian (Evolutionary) Dermatology."

Frank V. deGruy III, M.D., Professor and Chair of the Department of Family Practice and Community Medicine, has been appointed to a development committee of the U.S. Medical Licensing Examination. The joint program of The National Board of Examiners and the Federation of State Medical Boards provides a common evaluation system for measuring applicants for medical licensure. deGruy will serve on the program's Step-3 Computer-based Case Simulation Test Material Development Committee.

Richard H. Esham, M.D., Professor of Medicine in the Division of Internal Medicine and Geriatrics, has been appointed to a development committee of the U.S. Medical Licensing Examination. The joint program of the National Board of Examiners and the Federation of State Medical Boards provides a common evaluation system for measuring applicants for medical licensure. Esham will serve on the program's Step-3 Item Writing Task Force on Chronic Illnesses and Ongoing Care.

Robert J. Cox, M.D. Assistant Professor of Emergency Medicine, was elected to the Board of Directors of the Alabama Chapter of the American College of Emergency Physicians at the Annual Meeting held June 2, 1997.

*If you would like to submit
an article for publication,
please forward it to:*

Karrye E. Jackson
University of South Alabama
College of Medicine
CSAB 170
or
FAX (334) 460-6073

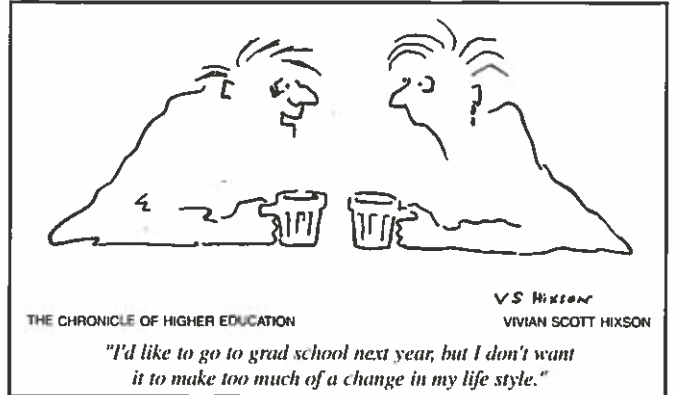
NEW Ph.D. GRADUATES IN BASIC MEDICAL SCIENCES

LETETIA C. JONES, sponsored by Dr. Jonathan G. Scammell in the Department of Pharmacology. Her dissertation was entitled "Regulation of Secretogranin II Expression in GH₄C₁ Rat Pituitary Cells."

SHAWN MICHELE DUNKIN BEARSON, sponsored by Dr. John W. Foster in the Department of Microbiology and Immunology. Her dissertation was entitled "Regulation of the Acidification Tolerance Response in *Salmonella typhimurium* by the Mouse Virulence Locus, *mviA* and the Alternate RNA Polymerase Sigma Factor σ^5 ."

BRADLEY L. BEARSON, sponsored by Dr. John W. Foster in the Department of Microbiology and Immunology. His dissertation was entitled "The Acid Tolerance Response of *Salmonella typhimurium*: Identification of Defenses Against Organic and Inorganic Acid Stress."

EDWARD SHAW, sponsored by Dr. David Wood in the Department of Microbiology and Immunology. His dissertation was entitled "Transcriptional Characterization of the *Rickettsia prowazekii rpoD* Gene Linkage Group."



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