

1999-2000
SUMMARY OF SCHOLARLY ACTIVITIES
DEPARTMENT OF CELL BIOLOGY AND NEUROSCIENCE

I. ARTICLES PUBLISHED IN BOOKS AND JOURNALS

A. Full-length published articles.

R. Balczon. Centrosome Replication in Somatic Cells: The Significance of G₁ Phase. *Curr. Top. Dev. Biol.* 49:251-266 (2000).

M. Birincioglu, X.M. Yang, S.D. Critz, M.V. Cohen, and J.M. Downey. S-T Segment Voltage During Sequential Coronary Occlusions Is an Unreliable Marker of Preconditioning. *Am. J. Physiol.* 277:H2435-H2441 (1999).

P.A. Fields, V.H. Lee, A. Jetter, S.-M.T. Chang, and M.J. Fields. B-Chain Sequence and In Situ Hybridization of the Rabbit Placental Relaxin-Like Gene Product. *Biol. Reprod.* 61:527-532 (1999).

S.R. Goodman. Discovery of Nonerythroid Spectrin to the Demonstration of Its Key Role in Synaptic Transmission. *Brain Res. Bull.* 50(5/6):345-346 (1999).

V.I. Grishko, N. Druzhyina, S.P. LeDoux, and G.L. Wilson. Nitric Oxide-Induced Damage to mtDNA and Its Subsequent Repair. *Nucleic Acids Res.* 27:4510-4515 (1999).

S.O. Kim, C.P. Baines, S.D. Critz, S.L. Pelech, S. Katz, J.M. Downey, and M.V. Cohen. Ischemia Induced Activation of Heat Shock Protein 27 Protein Kinases and Casein Kinase 2 in the Preconditioned Rabbit Heart. *Biochem. Cell Biol.* 77:559-567 (1999).

S.P. LeDoux, W.J. Driggers, B.S. Hollensworth, and G.L. Wilson. Repair of Alkylation and Oxidative Damage in Mitochondrial DNA. *Mutat. Res.* 434:149-159 (1999).

A. Nakano, C.P. Baines, S.O. Kim, S.L. Pelech, J.M. Downey, M.V. Cohen, and S.D. Critz. Ischemic Preconditioning Activates MAPKAPK2 in the Isolated Rabbit Heart: Evidence for Involvement of p38 MAPK. *Circ. Res.* 86:144-151 (2000).

B.S. Pace, Y.R. Chen, A. Thompson, and S.R. Goodman. Butyrate Inducible Elements in the Human α Globin Gene Promoter. *Exp. Hematol.* 28:283-293 (2000).

M.A. Pappolla, Y.-J. Chyan, B. Poeggeler, P. Bozner, J. Ghiso, S.P. LeDoux, and G.L. Wilson. Alzheimer β Protein Mediated Oxidative Damage of Mitochondrial DNA: Prevention by Melatonin. *J. Pineal Res.* 27:226-229 (1999).

J. Sangerman, A.L. Gard, A. Shah, and S.R. Goodman. Synthesis, Assembly, and Turnover of α and β -Erythroid and Nonerythroid Spectrins in Rat Hippocampal Neurons. *Brain Res.* 849:128-138 (1999).

B.J. Schnackenberg, R. Balczon, D.R. Hull, and R.E. Palazzo. Reconstitution of Microtubule Nucleation Potential in Salt-Extracted Centrosomes of *Spisula Solidissima* Oocytes. *J. Cell Sci.* 113:943-954 (2000).

H. Schatten, M. Ripple, R. Balczon, G. Wilding, G. Weindruch, and M. Taylor. Androgen and Taxol Cause Cell-Type Specific Alterations of Centrosomes and DNA Organization in Hormone-Responsive LNCaP Prostate Cancer Cells and Androgen-Independent DU145 Prostate Cancer Cells. *J. Cell. Biochem.* 76:463-477 (2000).

A. Shartava, A.K. Shah, and S.R. Goodman. N-acetylcysteine and Clotrimazole Inhibit Sickle Erythrocyte Dehydration Induced by 1-Chloro-2, 4-Dinitrobenzene. *Am. J. Hematol.* 62:19-24 (1999).

A. Shartava, J. McIntyre, A.K. Shah, and S.R. Goodman. The Gardos Channel Is Responsible for CDNB Induced Dense Sickle Cell Formation. *Am. J. Hematol.* 64(3):184-189 (2000).

A.F. Sikorski, J. Sangerman, S.R. Goodman, and S.D. Critz. Spectrin (β SpII Σ 1) Is an Essential Component of Synaptic Transmission. *Brain Res.* 852:161-166 (2000).

J. Vacik, B.S. Dean, W.E. Zimmer, and D.A. Dean. Cell-Specific Nuclear Import of Plasmid DNA. *Gene Ther.* 6:1006-1014 (1999).

L. Xu, A.E. Ferry, C. Monteiro, and B.S. Pace. Increased γ Globin Production by Antisense β Globin RNA Transcripts. *Gene Ther.* 7:438-44 (2000).

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B. Articles in press.

R. Balczon. Methods for the Study of Centrosome Reproduction in Mammalian Cells. *Meth. Cell Biol.* (2000).

B.S. Baliga, B.S. Pace, H. Chen, A.K. Shah, and Y. Yang. Mechanism for Induction of Fetal Hemoglobin Synthesis by Hydroxyurea in Sickle Cell Erythroid Progenitors. *Am. J. Hematol.* (2000).

J.C. Brandon, S.D. Izenberg, P.A. Fields, C. Evankovich, G. Wilson, and S.K. Teplick. Pancreatic Clefts Caused by Penetrating Vessels: A Potential Diagnostic Pitfall for Pancreatic Fracture on CT. *Emerg. Radiol.* (2000).

J.A. Carson, R.A. Fillmore, R.J. Schwartz, and W.E. Zimmer. The Smooth Muscle Gamma Actin Gene Is a Genetic Target for the Mammalian Homologue of Drosophila Bagpipe, mNkx 3.1 and Serum Response Factor. *J. Biol. Chem.* (2000).

N. Dryzhyna, M.E. Smulson, S.P. LeDoux, and G.L. Wilson. Poly (ADP-ribose) Polymerase Facilitates the Repair of N-Methylpurines in mtDNA. *Diabetes* (2000).

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R.A. Fillmore and W.E. Zimmer. Identification of mRNAs Encoding Hox b4 and Hox b5 in Developing Chicken Gizzard. *Cell. Mol. Biol. Lett.* (2000).

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S.R. Goodman. *Cell Biology. McGraw-Hill Encyclopedia of Science and Technology* (2000).

K.K. Hirschi, N.S. Belaguli, R.J. Schwartz, and W.E. Zimmer. Regulation of Smooth Muscle Gamma Actin Expression by Transforming Growth Factor β . *J. Biol. Chem.* (2000).

B.S. Hollensworth, C. Shen, J.E. Sim, D.R., Spitz, G.L. Wilson, and S.P. LeDoux. Glial Cell Type-Specific Responses to Menadione-Induced Oxidative Stress. *Free Radic. Biol. Med.* (2000).

D.W. Killilea, R. Hester, R. Balczon, P. Babal, and M.N. Gillespie. A Simple Apparatus for Hypoxic Perfusion and Fluorescence Microscopic Detection of Reactive Species Production in Cultured Pulmonary Artery Smooth Muscle Cells. *Am. J. Physiol.* (2000).

D.S. Longnecker and G.L. Wilson. Pancreas in Handbook of Toxicologic Pathology. *Acad. Press* (2000).

T.S. Pain, X. Yang, S.D. Critz, G. Heusch, M.V. Cohen, and J.M. Downey. Opening of Mitochondrial K_{ATP} Channels Triggers the Preconditioned State by Generation of Free Radicals. *Circ. Res.* (2000).

C.A. Peters, R.E. Cutler Jr, E.T. Maizels, M.C. Robertson, R. P. Shiu, P. Fields, and M. Hunzicker-Dunn. Regulation of PKC δ by Estrogen and Rat Placental Lactogen-1 in Luteinized Rat Ovarian Granulosa Cells. *Mol. Cell. Endo.* (2000).

Y. Yang, and B.S. Pace. Pharmacological Induction of Fetal Hemoglobin Synthesis: Cellular and Molecular Mechanisms. *Am. J. Pediat. Pathol. Mol. Med.* (2000).

W.E. Zimmer, Y. Zhao, S. Critz, J. Sangerman, L. Elferink, S. Xu, and S.R. Goodman. The Domain of Brain β -Spectrin Responsible for Synaptic Vesicle Association Is Essential for Synaptic Transmission. *Brain Res.* (2000).

II. PUBLISHED ABSTRACTS

A. Abraham, A. Bencsath, A. Shartava, D. Kakniashvili, and S.R. Goodman. Preparation of Irreversibly Sickled Cell β -Actin From Normal Red Blood Cell β -Actin Verified by Liquid Chromatography and Off-Line Mass Spectrometry. 48th ASMS Conf. Abstract #1088 (2000).

Y.M. Bhatnagar and G. Wang. Triplex DNA Formation Is Enhanced by Ethanol. 24th Annu. Mtg., Nat. Sickle Cell Prog. #92A (2000).

C. Browning, A. Sayed, and B.S. Pace. Fetal Hemoglobin Induction: Isolation and Characterization of DNA-Binding Proteins Altered by Butyrate. 24th Annu. Sickle Cell Prog., # 71A (2000).

J.A. Carson, J. Reecy, R.A. Fillmore, W.E. Zimmer, and R.J. Schwartz. Co-Expression of mNkx3.1 and SRF Activates the Smooth Muscle γ -Actin Promoter. Conf., Molecular, Cellular, and Integrated Physiological Approaches to the Failing Heart, p.113 (1999).

- T. Cooper, T. Russell, and B.S. Pace. Fetal Hemoglobin Induction by ST 38, a Fatty Acid Derivative. *J. Invest. Med.* 48(1):146A (2000).
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- S. Eastman and S.G. Kayes. Seroprevalence of *Toxocara canis* in Asthmatic and Non-Asthmatic Subjects. 26th Annu. USA Medical Student Research Day (1999).
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- A.E. Ferry, D. Morgan, and B.S. Pace. Globin Gene Regulation During Erythroid Maturation: The Role of Novel cDNA Clones. *Blood* 94:3786 (1999).
- A.E. Ferry, D.A. Morgan, and B.S. Pace. γ -Globin Induction by a Novel Fetal Stage Specific Transcription Factor. 24th Annu. Sickle Cell Prog., # 70A (2000).
- M.J. Fields, A-R. Fuchs, M. Drost, R.C.M. Simmen, S.-M.T. Chang, A.A. Kowalski, S.A. Balaguer, H. Binta, C.J. Canino, M. Shemesh, and P.A. Fields. Luteal-Uterine Interaction During the Peri-implantation Period of Pregnancy: A Model for Embryo Loss in the Cow. *Proc., Havemeyer Foundation Workshop on Fetomaternal Control of Pregnancy.* p. 11 (1999).
- R.A. Fillmore, J.A. Carson, R.J. Schwartz, and W.E. Zimmer. Nkx3.1, a Prostate Regulatory Gene, Co-Activates the Smooth Muscle Gamma Actin Promoter. *Proc., Southeast. Dev. Biol. Soc., #A19* (2000).
- H.A. Foley, S. Critz, and B.S. Pace. The Effects of Thrombopoietin in Globin Gene Expression During Megakaryocytic Lineage Commitment. *Blood* 94:3827 (1999).
- H. Foley, S. Critz, and B.S. Pace. Mechanisms for γ Gene Silencing During Megakaryocytic Lineage Commitment. *Mol. Ther.* 1:190 (2000).
- A.L. Gard, E. Gavin, V. Solodushko, and D. Pennica. Gliotrophic Role and Expression of Cardiotrophin-1 in Postnatal Rat CNS. *Soc. Neurosci. Abstr.* 25:2027 (1999).
- V. Grishko, M. Solomon, S.P. LeDoux, G.L. Wilson, and M.N. Gillespie. Xanthine Oxidase (XO)-Induced Mitochondrial(mt) DNA Damage in Pulmonary Vascular Endothelial Cells (Ecs) Mapped at Nucleotide Resolution. *Free Radic. Biol. Med.* 27 Suppl. S105 (1999).

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S.G. Kayes and J. C. Parker. *Toxocara canis* Induces Airway Hyper-responsiveness and Remodeling in Acutely Infected Rats. *Am. Soc. Parasitol.* 74:45a (1999).

F. Little-Wilson, L. Sindel, and S. G. Kayes. Is There a Relationship Between *Toxocara canis* Infection, Inflammation, and Asthma in Sickle Cell Disease. 24th Nat. Sickle Cell Prog. 24:201a (2000).

A. Nakano, C.P. Baines, S.O. Kim, S.L. Pelech, T.S. Pain, J.M. Downey, M.V. Cohen, and S.D. Critz. MAPKAP2, but not JNK, Is Activated During Ischemia in Preconditioned Hearts. *Am. Heart Assn. 72nd Sci. Sessions*, p.180, No. P390 (1999).

B.S. Pace, A.E. Ferry, and D.A. Morgan. γ Globin Induction by a Fetal Stage Specific DNA Binding Protein. 12th Conf., Hemoglobin Switching, p. 240 (2000).

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A. Shartava, X. Gibson, J. McIntyre, A. Shah, and S.R. Goodman. NAC Blocks Dense Cell and ISC Formation *In Vitro* by Protecting the Gardos Channel and β -Actin From Oxidative Damage. 24th Annu. Mtg., Nat. Sickle Cell Prog., #118a (2000).

G. Wang. Detection and Determination of Oligonucleotide Triplex Formation-Mediated Transcription-Coupled DNA Repair in HeLa Nuclear Extracts. *Am. Soc., Microbiol. Conf., DNA Repair and Mutagenesis: Mechanism, Control, and Biological Consequences*, p. 82 (1999).

G. Wang. Molecular Mechanism of Peptide Nucleic Acids (PNA) Binding-Induced Gene Expression. 24th Annu. Mtg. Nat. Sickle Cell Prog., p120a (2000).

G. Wang. Detection and Determination of Oligonucleotide Triplex Formation-Mediated Transcription Coupled DNA Repair in HeLa Nuclear Extracts. 65th Cold Spring Harbor Symp., Quantitative Biology: Biological Response to DNA Damage, p. 259 (2000).

S. Wu, G. Brough, J. Creighton, M. El-Menshawi, S. Goodman, and T. Stevens. Disruption of F-Actin Binding to Non-Erythroid Spectrin Induces Focal Inter-Endothelial Cell Gaps. *FASEB J.* 14(4):A694 (2000).

S. Wu, S. Goodman, and T. Stevens. Non-Erythroid Spectrin Physically Links Calcium Store Depletion to Activation of Calcium Entry in Endothelial Cells. *FASEB J.* 14(4):A411 (2000).

III. BOOKS PUBLISHED

None.

IV. PRESENTATIONS

R. Balczon. Analysis of Centrosome Function. University of Southern Mississippi, Hattiesburg, MS (2000).

R. Balczon. Reconstitution of Microtubule Nucleation Potential in Centrosomes Isolated From *Spisula Solidissima* Oocytes. 39th Am. Soc. Cell Biol. Annu. Mtg., Washington, DC (1999).

Y.M. Bhatnagar. Nuclear Architecture. Grambling State University, Grambling, LA (2000).

Y.M. Bhatnagar and G. Wang. Poster Presentation. Triplex DNA Formation is Enhanced by Ethanol. 24th Annu. Mtg., Nat. Sickle Cell Prog., Philadelphia, PA (2000).

S.D. Critz. K_{ATP} Channels and Ischemic Preconditioning in the Rabbit Heart. Auburn University at Montgomery, Auburn, AL (1999).

A.L. Gard. Gliotrophic Role and Expression of Cardiotrophin-1 in Postnatal Rat CNS. Soc. Neurosci. Mtg., Miami, FL (1999).

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S.R. Goodman. A Role for Spectrin in Synaptic Transmission. UAB Department of Biochemistry and Molecular Genetics, Birmingham, AL (2000).

S.R. Goodman. Finding a Cure for Sickle Cell Disease. Bishop State Community College, Mobile, AL (2000).

S.G. Kayes. *Toxocara canis* and Asthma: Time for Another Study? Mobile County Public Health Staff, Mobile, AL (1999).

S.G. Kayes. *Toxocara canis* Induces Airway Hyperresponsiveness and Remodeling in Acutely Infected Rats. 74th Annu. Mtg., Am. Soc. Parasitol., Monterey, CA (1999).

S.G. Kayes. Seroprevalence of *Toxocara canis* in Asthmatic and Non-Asthmatic Subjects. 41st Annu. Mtg., Southeast. Soc. Parasitol., Chattanooga, TN (2000).

S.G. Kayes. Is There a Relationship Between *Toxocara canis* Infection, Inflammation, and Asthma in Sickle Cell Disease. 24th Annu. Mtg., Nat. Sickle Cell Program, Philadelphia, PA (2000).

S.P. LeDoux. CNS Cell-Specific Responses to Oxidative Insults: Role of Mitochondria. Center for Research on Environmental Toxicology, Oregon Health Sciences University, Portland, OR (2000).

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S.P. LeDoux. Panel Discussion Participant DNA Repair in the Nervous System. Winter Conf., Brain Res., Breckenridge, CO (2000).

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B.S. Pace. Mechanisms for Fetal Hemoglobin Induction. Boston Children's Hospital, Hematology/Oncology Division, Boston, MA (1999).

B.S. Pace. To Transfuse or Not To Transfuse. State Med. Soc. Annu. Mtg., Mobile, AL (1999).

B.S. Pace. Update on USA Comprehensive Sickle Cell Center. Children Youth Sickle Network Mtg., Montgomery AL (1999).

B.S. Pace. Transfusion Therapy, Pain Management in Pediatric Sickle Cell Patients. Sickle Cell Disease Association of America, (1) Huntsville, AL; and (2) Montgomery, AL (2000).

B.S. Pace. Sickle Cell Disease in Adolescence. Auburn University at Montgomery, Grand Rounds, Internal Medicine Residency Rounds, Montgomery, AL (2000).

B.S. Pace. New Treatment Updates in Sickle Cell Disease. Ala. State Sickle Cell Assn. Annu. Mtg., Mobile, AL (2000).

B.S. Pace. Fetal Hemoglobin Induction by ST38, a Fatty Acid Derivative. South. Soc. Pediatr. Res., New Orleans, LA (2000).

B.S. Pace. (1) γ Globin Induction by a Novel Fetal Stage Specific Transcription Factor; and (2) Fetal Hemoglobin Induction: Isolation and Characterization of DNA-Binding Proteins Altered by Butyrate. 24th Annu. Mtg., Nat. Sickle Cell Prog., Philadelphia, PA (2000).

A. Shartava. NAC Blocks Dense Cell and ISC Formation In Vitro by Protecting the Gardos Channel and β -Actin From Oxidative Damage. 24th Annu. Mtg., Nat. Sickle Cell Prog., Philadelphia, PA (2000).

G. Wang. Molecular Mechanism of Peptide Nucleic Acids (PNA) Binding-Induced Gene Expression. 24th Annu. Mtg., Nat. Sickle Cell Prog., Philadelphia, PA (2000).

G.L. Wilson. Factor Influencing Mitochondrial DNA Repair. Cancer Center, Ohio State University, Columbus, OH (2000).

W.E. Zimmer. Regulation of the Smooth Muscle γ -Actin Gene. Baylor College of Medicine, Houston, TX (1999).

W.E. Zimmer. Co-expression of mNkx 3.1 and SRF Activates the Smooth Muscle Gamma Actin Promoter. Conf., Molecular, Cellular, and Integrated Approaches to the Failing Heart, Salt Lake City, UT (1999).

V. NATIONAL PROFESSIONAL RECOGNITION

Dr. Ron Balczon is a Study Section Member for the American Cancer Society and is on the Editorial Board of *Frontiers in Bioscience*. Dr. Mohan Bhatnagar is on the Editorial Board of *Biology of Reproduction*. Dr. Phillip Fields is on the Editorial Board of *Trends in Reproductive Biology*. Dr. Tony Gard is on the NIH-CSR Study Section: Molecular, Cellular and Developmental Neuroscience 6 (MCDN-6). Dr. Steven Goodman is on the Editorial Boards of *Brain Research Bulletin* and *Cellular & Molecular Biology Letters*. Dr. Goodman is also a Member of the State of Alabama Sickle Cell Oversight and Regulatory Agency. In addition, he has been elected as Councillor for the Association of Anatomy, Cell Biology, and Neuroscience Chairs. Dr. Steve Kayes is on the Editorial Board of the *Journal of Parasitologists* and is Section Editor of the *Journal of Parasitology*. Dr. Susan LeDoux is a Member of the State Legislative Committee for the American Association for Cancer Research. Dr. Betty Pace served on a Study Section involved in Minority Research Training Review, Special Emphasis Panel, for NHLBI. Dr. Glenn Wilson is an Associate Editor for *Clinical Science*. Dr. Warren Zimmer is on the American Heart Association Peer Review Committee. He also Co-organized an AHA Conference on Molecular, Cellular and Integrated Physiological Approach to the Failing Heart, Snowbird, Utah.

VI. BRIEF SUMMARY OF DEPARTMENT ACTIVITIES AND PROGRESS

The department underwent a name change to the Department of Cell Biology and Neuroscience. Two students received their Ph.D.'s from our department this year. Dr. Scott Hollensworth completed a thesis entitled "CNS Cell-Specific Responses to Oxidative mtDNA Damage," under the sponsorship of Dr. Susan LeDoux. Dr. Amy Ferry completed her thesis entitled "Identification of Stage Specific Transcription Factors That Regulate the γ to β Globin Gene Switch During Erythroid Maturation," under the sponsorship of Dr. Betty Pace.

The department has also recently exchanged laboratory and office space in the CSAB for equivalent space on the MSB second floor. As a result, the Department is, for the first time, primarily in contiguous space on the second floor of the MSB. In the process, we have consolidated the CBN and Sickle Cell Offices, both of which Dr. Goodman directs, into a single space in MSB 2015.