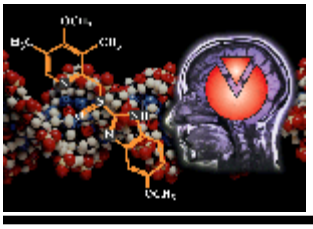

The Pharmacologist

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2010
September

Save the Date: ASPET's Annual Meeting at Experimental Biology April 9-13, 2011, Washington, DC

ASPET Program Information Inside

Important Dates:

September 9, 2010
Registration, Housing, and Abstract Submissions Open

November 8, 2010
Abstract Submission Deadline

February 9, 2011
Early Registration Deadline

March 4, 2011
Housing Reservation Deadline

April 9-13, 2011
Attend Experimental Biology 2011 in Washington!

ALSO IN THIS ISSUE:

The PHARMACOLOGIST

News

Features

Announcements

2011Dues Notices Will Be Sent Shortly

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No Later than January 1, 2011

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MESSAGE FROM THE PRESIDENT

Dear ASPET Members,

It is a great honor to have been elected President of ASPET. The Society and its Council exist to serve the needs of the members, to advance the discipline of pharmacology, and to advocate for the pivotal role of biomedical science in health care and in society in general. A strong ASPET is especially important at a time when senior as well as entering pharmacologists in academia, industry, and government are facing tremendous challenges and heightened expectations from the public. In this climate, forging new partnerships and alliances among pharmacologists working in the various sectors is crucial. Training the next generations of pharmacologists and ensuring that they have multiple career opportunities is also a major responsibility of ASPET and its members.

Specifically, what can ASPET, Council, and the President do at this time to strengthen the discipline of pharmacology? Clearly we must maintain our core mission of publishing leading journals in the field, holding high quality meetings, and providing value to our members. Under the oversight of the Board of Publications Trustees Chaired by Jim Barrett, the dedicated work and rigorous standards of ASPET's editors and editorial boards, and the management of Journals Director Rich Dodenhoff, the five ASPET journals continue to thrive. They represent a major means by which new scientific breakthroughs and timely reviews in our field are disseminated, as well as the major source of revenue to ASPET. I especially welcome our two new editors David R. Sibley of *Pharmacological Reviews* and Michael F. Jarvis of the *Journal of Pharmacology and Experimental Therapeutics*. They join Eric Johnson of *Drug Metabolism and Disposition*, Jeff Conn of *Molecular Pharmacology*, and Harry Smith of *Molecular Interventions*.

Jack Bergman will continue to chair the Program Committee. Its success is due in large measure to the creative and enthusiastic input from ASPET's nine Divisions, which ensures an annual meeting that reflects existing strengths as well as new directions in pharmacology. The annual meeting is also a major forum for new scientists to become familiar with and participate in the discipline. In that regard, I laud the recent creation of a new category of Postdoctoral Member, which will provide an attractive and affordable transition from Graduate Student Member to Regular Member. Reaching out to undergraduate and graduate students as well as postdoctoral fellows and providing them with networking and career development opportunities must be one of the highest priorities of ASPET.

Under the leadership of our Executive Officer, Christie Carrico, Past-Presidents Joe Beavo and Brian Cox, and Web Editor Jon Maybaum, ASPET has made a major investment in re-designing and expanding our web site. The new site offers streamlined access to vital information on the discipline of pharmacology, ASPET, training programs, career opportunities, and research highlights. The site also offers opportunities for interactive columns that are designed to facilitate communication among members. Comments from members are welcomed, and we hope you will share your ideas as to how to make the web site more valuable to you and your colleagues. The web site should also enhance our public advocacy efforts driven by the Public Affairs Committee and the Public Affairs Office under Jim Bernstein. Clearly, together with other societies we must intensify our efforts to educate the public and political leaders about the benefits and future promise of biomedical research. This will become increasingly important as healthcare costs continue to skyrocket and federal budgets remain under intense pressure.

Fortunately, thanks to prudent financial management, careful oversight by the Investment Subcommittee chaired by Chip Rutledge, and a major new donation, ASPET's reserves have bounced back and now exceed the levels in August 2008. Council and the Finance Committee chaired by Bryan Cox will continue to monitor the finances carefully to make sure that funds from members in the form of dues, journal page charges, and other contributions are used wisely. Through ongoing and new initiatives ASPET will ensure a strong scientific foundation for future drug discovery and drug therapy, help train new pharmacologists, and educate the public and our political representatives.

Sincerely yours,

James R. Halpert

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2011 ASPET Annual Meeting at Experimental Biology 2011

April 9-13, Washington, DC

PRELIMINARY PROGRAM

SATURDAY, APRIL 9 SESSIONS

2011 Teaching Institute: Creating Educational Partnerships from High School to Graduate School
Washington Convention Center, 2:00 pm – 4:30 pm

Chairs: J.V. Barnett, Vanderbilt Univ. and G.A. Dunaway, Southern Illinois Univ. Sch. of Med.

Graduate Student/Postdoc and Diversity Committee Colloquium: Science, Scientist, Advocate: Making the Case for Increased Funding for Biomedical Research
Washington Convention Center, 1:30 pm – 4:30 pm

Chair: J.V. Barnett, Vanderbilt Univ.

ASPET Business Meeting
6:00 pm – 7:30 pm

ASPET Opening and Awards Reception
7:30 pm – 9:30 pm

SUNDAY, APRIL 10 MORNING SESSIONS

WIP Into Shape Networking Walk
Meet at the Grand Hyatt Concierge Desk; 7:00 am – 8:30 am

Diversity Mentoring Breakfast
Grand Hyatt, 7:30 am – 9:30 am

Julius Axelrod Lecture: Brian Kobilka, Stanford Univ.
Washington Convention Center, Room 143A/B, 8:30 am – 9:20 am

Drug Metabolism and Action in Pathophysiological Conditions
Washington Convention Center, Room 143C, 9:30 am – 12:00 noon
Sponsored by the Divisions for Drug Metabolism; Integrative Systems, Translational & Clinical Pharmacology; and Toxicology

Chairs: R. Ghose, Univ. of Houston and E.T. Morgan, Emory Univ.

Overview and Opening Remarks — **Edward T. Morgan,** Emory Univ
Altered Expression of Drug Metabolizing Enzymes and Transporters in NAFLD — **Nathan Cherrington,** Univ. of Arizona Col. of Pharmacy
Effects of Inflammation and Its Treatment on Drug Action and Disposition — **Jamali Fakhreddin,** Univ. of Alberta
Toll-like Receptors: Novel Regulators of Hepatic Drug Metabolizing Enzymes — **Romi Ghose,** Univ. of Houston
Regulation of Drug Metabolism in Viral Infections — **Maria Croyl,** Univ. of Texas at Austin Col. of Pharmacy

Julius Axelrod Symposium
Washington Convention Center, Room 143A/B, 9:30 am – 12:00 noon

Chair: Brian Kobilka, Stanford Univ.

Pharmacology for Healthcare Professionals: A Thirst for Knowledge
Grand Hyatt Hotel, 9:30 am – 12:00 noon
Sponsored by the Divisions for Pharmacology Education; Cardiovascular Pharmacology; and Integrative Systems, Translational & Clinical Pharmacology

Chair: L. Wecker, Univ. of South Florida

Designing a Pharmacology Course for a Doctor of Physical Therapy Program — **Lynn Wecker,** Univ. of South Florida
A Pharmacology Course for Physicians Assistants — **Martha I. Davila-Garcia,** Howard Univ.
Pharmacology for Undergraduate Nursing Programs — **Marshal Shlafer,** Univ. of Michigan
Pharmacology for the Doctor of Pharmacy Curriculum — **Dan Kiel,** Massachusetts Col. of Pharmacy and Health Sciences
A Revised Pharmacology Curriculum for Dental Students — **Dennis Paul,** Louisiana State Univ. HSC, New Orleans

The Neurobiology of Post Traumatic Stress Disorder (PTSD) and Implications for Treatment
Washington Convention Center, Room 140 A, 9:30 am – 12:00 noon
Sponsored by the Divisions for Behavioral Pharmacology and Integrative Systems, Translational & Clinical Pharmacology

Chairs: M. Davis, Emory Univ. and L.L. Howell, Emory Univ.

Overview of the Clinical Problem of PTSD in the Military — **Robert Ursano,** Uniformed Services Univ. for the Health Sciences
Prolonged Stress and Neurochemical Dysfunction in Rodent Models of PTSD — **Shane Perrine,** Wayne State Univ.
Functional Anatomy and Neuropharmacology of Fear Learning and Memory — **Michael Fanselow,** UCLA
Extinction of Fear-potentiated Startle as a Model of PTSD: A Role of NMDA Receptors — **Michael Davis,** Emory Univ.
D-cycloserine Enhancement of Exposure Therapy in Social Anxiety — **Stefan Hofman,** Boston Univ.

Therapeutic Peptides: Novel Approaches in Drug Development
Washington Convention Center, Room 140B, 9:30 am – 12:00 noon
Sponsored by the Divisions for Integrative Systems, Translational & Clinical Pharmacology; Cardiovascular Pharmacology; Drug Metabolism; and Toxicology

Chairs: S. Alagarsamy, Ferring Res. Inst. and M.A. Holinstat, Thomas Jefferson Univ.

SUNDAY, APRIL 10 AFTERNOON SESSIONS

The Biological "Specifics" of the "Non-Specific" Placebo Response
Washington Convention Center, Room 140A, 3:00 pm – 5:30 pm
Sponsored by the Divisions for Behavioral Pharmacology; Drug Discovery, Development & Regulatory Affairs; and Integrative Systems,Translational & Clinical Pharmacology

Chair: J.D. Roache, Univ. of Texas HSC at San Antonio

Creating Effective Questions for Assessment and As Aids in Learning in Today's Pharmacology Programs
Grand Hyatt Hotel, 3:00 pm – 5:30 pm
Sponsored by the Divisions for Pharmacology Education and Cardiovascular Pharmacology

Chair: J.L. Szarek, The Commonwealth Med. Col.

Question Writing for Any Occasion: Use of Questions in Assessment and Learning — **John L. Szarek,** The Commonwealth Med. Col.
So You Think You Write Good Questions? Constructing Flawless Multiple Choice Questions for Assessment and Learning — **Jack Strandhoy,** Wake Forest Univ.
Dispelling Negative Notions About Essay Questions: Use Essay Questions in Any Class Size — **Amy Wilson-Delfosse,** Case Western Reserve Univ.
After the Assessment, What Do You Do? Evaluation of Test Results — **George Dunaway,** Southern Illinois Univ.

G-Protein Coupled Receptor Signaling in Stem Cell Biology
Washington Convention Center, Room 143A/B, 3:00 pm – 5:30 pm
Sponsored by the Divisions for Molecular pharmacology; Cardiovascular Pharmacology; Drug Discovery, Development & Regulatory Affairs; and Pharmacology Education

Chair: A. Pébay, Univ. of Melbourne, Australia

S1P and LPA Signaling in Stem Cell Maintenance — **Alice Pébay,** Univ. of Melbourne
GPCR and G Protein Signaling in Embryonic Stem Cells — **Bruce Conklin,** Gladstone Inst. of Cardiovascular Disease
LPA Signaling in Neural Stem Cells — **Jerold Chun,** Scripps Res. Inst.
Endothelin Signaling in Oligodendrocyte Progenitors (OPCs) — **Vittoria Gallo,** Children's National Med. Ctr.

Micro-RNA Controlled Regulation of Drug Metabolism and Disposition
Washington Convention Center, Room 143C, 3:00 pm – 5:30 pm
Sponsored by the Divisions for Drug Metabolism; Molecular Pharmacology; and Toxicology

Chairs: T. Yokoi, Kanazawa Univ., Japan and A. Yu, SUNY at Buffalo

Introduction to the Regulation of Drug Metabolism and Disposition by MicroRNAs — **Todd C. Skaar,** Indiana Univ.
MicroRNA Regulation of Cytochrome P450 Drug-metabolizing Enzymes — **Tsuyoshi Yokoi,** Kanazawa Univ
MicroRNA Regulation of ABC Drug Transporters — **Kenneth K-w. To,** The Chinese Univ. of Hong Kong Schl. of Pharmacy
Effects of MicroRNAs on UGT1A6 Protein Expression — **Michael H. Court,** Tufts Univ.

Systems Biology of Oxidative Stress and Therapeutic Implications
Washington Convention Center, Room 140B, 3:00 pm – 5:30 pm
Sponsored by the Divisions for Integrative Systems, Translational & Clinical Pharmacology; Cardiovascular Pharmacology; Drug Discovery, Development & Regulatory Affairs; Pharmacology Education; and Toxicology

Chair: I. Laher, Univ. of British Columbia, Canada

MONDAY, APRIL 11 MORNING SESSIONS

Advances in Estrogen Receptor Signaling: Potential Implications for Women's Health
Washington Convention Center, Room 140B, 9:30 am – 12:00 noon
Sponsored by the Divisions for Cardiovascular Pharmacology; Integrative Systems, Translational & Clinical Pharmacology; and the Committee on Women in Pharmacology

Chairs: A. Cignarella, Univ. of Padua, Italy, R.D. Feldman, Univ. of Western Ontario, Canada, and V.M. Miller, Mayo Clinic Coll. of Med.

Role of Neuroinflammation in Psychiatric Disease
Washington Convention Center, Room 140A, 9:30 am – 12:00 noon
Sponsored by the Divisions for Neuropharmacology; Behavioral Pharmacology; Drug Discovery, Development & Regulatory Affairs; Drug Metabolism; and Integrative Systems, Translational & Clinical Pharmacology

Chair: J.E. Clark, Drexel Univ.

Molecular Mechanisms Underlying the Effects of Chronic Inflammation on Depressive-like Behaviors — **Robert Dantzer,** Univ. of Illinois at Urbana-Champaign
Cytokines Sing the Blues: The Role of Cytokines in the Pathophysiology of Depression — **Andrew Miller,** Emory Univ.
Psychoneuroimmunology: Inter-relationships between Behavior and Immunity — **Michael Irwin,** UCLA
Schizophrenia and Major Depression as Inflammatory Disorders — **Markus J. Schwarz,** Ludwig-Maximilians-Univ.

Too Much or Too Little: Behavioral Models and Pharmacotherapies for Eating Disorders
Washington Convention Center, Room 143A/B, 9:30 am – 12:00 noon
Sponsored by the Divisions for Behavioral Pharmacology; Integrative Systems, Translational & Clinical Pharmacology; and Neuropharmacology

Chair: M.L. Banks, Virginia Commwealth Univ.

Molecular Pharmacology Division Postdoctoral Award Finalists
Washington Convention Center, Room 143C, 9:30 am – 12:00 noon

MONDAY, APRIL 11 AFTERNOON SESSIONS

Public Affairs Workshop: Promise and Partnership: FDA's Critical Path Initiative and its Intersection with Pharmacology
Washington Convention Center, Room 141, 9:30 am – 12:00 noon

Chair: M.F. Jarvis, Abbott Laboratories

Behavioral Pharmacology Division Symposium: Pharmacokinetic Approaches to the Treatment of Drug Abuse
Washington Convention Center, Room 140A, 3:00 pm – 5:30 pm

Chairs: G.T. Collins, Univ. of Michigan and C.R. Schuster, CRS Associates, LLC

Introduction to the Protein-based Approach for Treating Drug Addiction — **James H. Woods,** Univ. of Michigan; Discussant: **Charles R. Schuster,** CRS Assoc. LLC
Rationally Designed Mutant Cocaine Esterases: Dramatic Improvements in the Thermostability and Duration of Action — **Diwahar Narasimhan,** Univ. of Michigan
Preclinical Evaluation of Cocaine Esteraes for the Treatment of Cocaine Overdose and Addiction — **Gregory T. Collins,** Univ. of Michigan
Effectiveness of Cocaine-specific Vaccines in Humans — **Margaret Haney,** Columbia Univ. Col. of Physicians and Surgeons
Nicotine Immunotherapies: Pharmacokinetics, Behavior and Clinical Trials — **Paul R. Pentel,** Univ. of Minnesota
Development of Immunotherapies and Nanoparticle Conjugates for the Treatment of Methamphetamine Abuse — **Eric C. Peterson,** Univ. of Arkansas for Med. Sciences

Cardiovascular Pharmacology Division Trainee Showcase
Washington Convention Center, Room 140B, 2:30 pm – 5:30 pm

Drug Discovery, Development & Regulatory Affairs Division Symposium: High Impact Pharmacological Screening in Academia
Washington Convention Center, 143 A/B, 3:00 pm – 5:30 pm
Co-sponsored by the Division for Molecular Pharmacology

Chair: J.S. Lazo, Univ. of Pittsburgh

Pharmacology Education Division Course: What Happens to Drugs in the Body? A Pharmacokinetics Refresher Course
Grand Hyatt Hotel, 3:00 pm – 5:30 pm

Chairs: J.S. Fedan, NIOSH and J.S. Leeder, Children's Mercy Hospital and Clinics

Toxicology Division Symposium: Hypoxia, Hypoxia-Inducible Factor-1α and Toxic Responses
Washington Convention Center, Room 143C, 3:00 pm – 5:30 pm

Chair: P.E. Ganey. Michigan State Univ.

TUESDAY, APRIL 12 MORNING SESSIONS

Benedict R. Lucchesi Distinguished Lecture in Cardiac Pharmacology
Washington Convention Center, Room 140B, 4:30 pm – 5:30 pm

Torald Sollmann Lecture
Washington Convention Center, Room 143A/B, 8:30 am – 9:20 am

Autism and PDD: Neuropathology, Pharmacotherapies, and New Directions
Washington Convention Center, Room 140B, 3:00 pm – 5:30 pm
Sponsored by the Divisions for Behavioral Pharmacology; Integrative Systems, Translational & Clinical Pharmacology; & Neuropharmacology

Chair: E.A. Walker, Temple Univ. Sch. of Pharmacy

The Brain in Autism: Perspectives from Neuropsychology and Neuroimaging — **Robert Schultz,** Children's Hospital of Philadelphia
Neurochemistry in the Pathophysiology of Autism — **Michael G. Aman,** Ohio State Univ.
Serotonin Dysregulation in Autism Spectrum Disorders — **Diane C. Chugani,** Wayne State Univ.
Dysregulation of Dopamine and Glutamate Neurotransmission in Animal Models of Self-injurious Behavior — **Darragh P. Devine,** Univ. of Florida
Genetic Animal Models of Autism: Molecules to Potential Therapeutics — **Craig M. Powell,** Univ. of Texas Southwestern Med. Ctr.

Idiosyncratic Drug Reactions
Washington Convention Center, Room 141, 9:30 am – 12:00 noon
Sponsored by the Divisions for Toxicology and Drug Metabolism

Chair: C. Ju, Univ. of Colorado at Denver

Novel Regulation, Physiological Roles, and Pharmacological Intervention of GPCR-Adenylyl Cyclase Signaling Systems
Washington Convention Center, Room 143A/B, 9:30 am – 12:00 noon
Sponsored by the Divisions for Molecular Pharmacology; Cardiovascular Pharmacology; and Neuropharmacology

Chairs: C.W. Dessauer, University of Texas HSC at Houston and V.J. Watts, Purdue Univ.

Selective Regulation of Adenylyl Cylcase Isoforms by Cellular Microdomains — **Dermot M. Cooper,** Univ. of Cambridge
GPCR Specificity in Activation of cAMP Signaling Pathways — **Rennolds S. Ostrom,** Univ. of Tennessee
Olfaction in the Kidney: Role of the Olfactory Adenylyl Cyclase System — **Jennifer Pluznick,** Johns Hopkins Univ.
Use of Type 6 Adenylyl Cyclase as Drug: cAMP Dependent and Independent Effects in the Heart — **H. Kirk Hammond,** VA San Diego Health Care System
Therapeutic Research for AC5: New Pharmacological Insights — **Sandra Siehler,** Novartis Institues for Biomedical Res.

Regenerative Pharmacology and Translational Therapies for Repair of Nerve and Muscle Diseases/Disorders
Washington Convention Center, Room 140B, 9:30 am – 12:00 noon
Sponsored by the Divisions for Integrative Systems, Translational & Clinical Pharmacology and Cardiovascular Pharmacology

Chairs: F.C. Barone, SUNY Downstate Med. Ctr. and G.J. Christ, Wake Forest Univ.

Regenerative Pharmacology and Bioengineering for and Repair and Replacement of Skeletal Muscle — **George J. Christ,** Wake Forest Univ. Baptist Med. Ctr.
Translational Studies and Gene Therapy for Regeneration and Repair of Myotubular Myopathy — **Martin Childers,** Wake Forest Univ. Health Science Ctr.
Biomaterials as Pharmacological Tools for Peripheral Nerve Regeneration and Repair — **Christine Schmidt,** Univ. of Texas at Austin

Umbilical Cord Cells for Intervention in Human Disease of the Nervous System — **Paul R. Sanberg,** Univ. of South Florida Col. of Med.
Cellular and Pharmacological Interventions for Brain Injury: Amplifying the Endogenous Recovery Process — **Michael Chopp,** Henry Ford Health System

TUESDAY, APRIL 12 AFTERNOON SESSIONS

Therapeutic Targeting of Epoxyeicosanoids
Washington Convention Center, Room 143C, 9:30 am – 12:00 noon
Sponsored by the Divisions for Cardiovascular Pharmacology and Molecular Pharmacology

Chair: J.D. Imig, Med. Col. of Wisconsin

Drug Metabolism Early Career Achievement Award Lecture
Washington Convention Center, Room 140B, 2:00 pm – 2:50 pm

Drug Metabolism Division and James Gillette Award Platform Sessions
Washington Convention Center, Room 140B, 3:00 pm – 5:30 pm

Integrative Systems, Translational and Clinical Pharmacology Division Young Investigator Awards Platform Session
Washington Convention Center, Room 141, 3:00 pm – 5:30 pm

Neuropharmacology Division Postdoctoral Scientist Award Finalists
Washington Convention Center, Room 140A, 3:00 pm – 5:30 pm

Organ-Specific Toxicities Caused by Novel Metabolic Pathways
Washington Convention Center, Room 143C, 9:30 am – 12:00 noon
Sponsored by the Divisions for Toxicology; Drug Metabolism; and Integrative Systems, Translational & Clinical Pharmacology

Chair: K. Skordos, GlaxoSmithKline and D. Zhang, Bristol-Myers Squibb

Selective Expression and Biotransformation Mechanisms of Lung P450 Enzymes — **Garold Yost,** University of Utah
Adrenal Steroidogenic Enzymes-mediated Metabolism of Xenobiotics Leading to Toxicities — **Donglu Zhang,** Bristol-Myers Squibb
CYP Enzymes in the Brain: Organ Specific Regulation and Impact on Pharmacology — **Rachel Tyndale,** Univ. of Toronto
The Role of Ovarian Metabolism in Chemical-induced Ovotoxicity — **Patricia Hoyer,** Univ. of Arizona Health Science Ctr.
Intestine-specific P450 Reductase Gene Knockout-related Functions and Toxicity Potential — **Qiing-Yu Zhang,** New York Department of Health, Wadsworth Ctr.

Gα Subtype-Selective Signaling by GPCRs as a Substrate for Functional Selectivity
Washington Convention Center, Room 143A/B, 3:00 pm – 5:30 pm
Sponsored by the Divisions for Drug Discovery, Development & Regulatory Affairs and Molecular Pharmacology

Chair: R. Neubig, Univ. of Michigan

Introduction/Using RGS-insensitive Mutants of Gi and Go Dissect Specific Receptor Pathways In Vivo — **Rick Neubig,** Univ. of Michigan
Unique Contributions of 5HT1A/Gαi2 Signaling to Antidepressant Mechanisms — **John Traynor,** Univ. of Michigan
Dopamine Agonists Selectively Activate Different Gαi/o — **Graeme Milligan,** Univ. of Glasgow, UK
Antiepileptogenic Actions of α2A Adrenergic Receptors Acting via Gα-o in the Hippocampus — **Van Doze,** Univ. of North Dakota
Physiological Functions of G12 and G13 — **Stefan Offermanns,** Univ. of Heidelberg

WEDNESDAY, APRIL 13, MORNING SESSIONS

NEW FOR 2011
There will be programming on Wednesday afternoon for the first time.
See page 84.

Norman Weiner Lecture: Robert J. Lefkowitz, Duke Univ. and HHMI
Washington Convention Center, Room 143 A/B, 8:30 am – 9:20 am

New Roles for Arrestins in Signaling, Trafficking and Disease
Washington Convention Center, Room 140A, 9:30 am – 12:00 noon
Sponsored by the Divisions for Molecular Pharmacology and Integrative Systems, Translational & Clinical Pharmacology

Chair: J.L. Benovic, Thomas Jefferson Univ.

Mechanistic Insight into Arrestin-mediated Trafficking — **Jeffrey L. Benovic,** Thomas Jefferson Univ.
The Role of Arrestins in Signaling — **Marc G. Caron,** Duke Univ. Med. Ctr.
Arrestins and Disease — **Gang Pei,** Shanghai Institutes for Biological Sciences
The Functions of Alpha-arrestins — **Scott Emr,** Cornell Univer. Weill Inst. for Cell and Molecular Biology

Cardiovascular KCN1 (Kv7) Potassium Channels: Physiological Regulators and Targets for Therapeutic Intervention
Washington Convention Center, Room 140B, 9:30 am – 12:00 noon
Sponsored by the Divisions for Cardiovascular Pharmacology; Drug Discovery, Development & Regulatory Affairs; Integrative Systems & Translational & Clinical Pharmacology; and Molecular Pharmacology
Chairs: K.L. Byron, Loyola Univ. Strich Sch. of Med. and D.L. Kunze, MetroHealth Med. Ctr

Expression and Function of KCNQ Genes in the Vasculature — **Iain Greenwood,** St. George's Univ., London
Vascular KCNQ Channels as Physiological Signal Transducers and Novel Targets for Treatment of Cardiovascular Diseases — **Kenneth L. Byron,** Loyola Univ. of Chicago, Stritch Schl. of Med.
KCNQ Channels as a Therapeutic Target in Pulmonary Hypertension — **Alison Gurney,** Univ. of Manchester, UK
KCNQ Channels in the Reflex Regulation of Arterial Pressure — **Diana L. Kunze,** MetroHealth Med. Ctr.
The cardiac IKs Complex and Molecular Determinants of Its Localization — **Nicole Schmitt,** Univ. of Copenhagen

Chronobiology in the Modern Curricula - Addressing Disease Linkage and Pharmacological Approaches
Washington Convention Center, Room 143C, 9:30 am – 12:00 noon
Sponsored by the Divisions for Neuropharmacology and Pharmacology Education; Behavioral Pharmacology and Integrative Systems,Translational & Clinical Pharmacology
Chair: M.W. Wood, AstraZeneca Pharmaceuticals and S. Tischkau, Southern Illinois Univ.

An Overview of Circadian Clock Dysfunction and Disease — **Shelley A. Tischkau,** Southern Illinois Univ.
Pharmacological Approaches to the Treatment of Sleep and Wake Disorders — **John Renger,** Northwestern Univ.
Cancer and the Circadian Clock — **William J. Hrushesky,** Univ. of South Carolina
Chronopharmacology and Chronotherapeutics in Cardiovascular Disease — **Michael J. Smolensky,** Univ. of Texas-Houston

Pharmacogenomics and Personalized Medicine
Washington Convention Center, 143A/B, 9:30 am – 12:00 noon
Sponsored by the Divisions for Integrative Systems, Translational & Clinical Pharmacology; Drug Discovery, Development & Regulatory Affairs; Drug Metabolism; and Toxicology
Chair: A. Gaedigk, Children's Mercy Hospitals and Clinics

Role of Genetic Variation in Drug Metabolism and Response — **Richard Weinshilboum,** Mayo Clinic Col. of Med.
Pharmacogenetics and Personalized Medicine: Facing the Challenges of Bridging the Gap between Science and Utility — **Darrell Abernethy,** FDA
From Clinical Utility to Clinical Effectiveness: A Real World Perspective on Pharmacogenetics in Clinical Practice — **Felix W. Freuh,** Medco Health Solutions, Inc.
Incorporating Pharmacogenetics into Drug Development — **William Macias,** Eli Lilly and Co.

WEDNESDAY, APRIL 13 AFTERNOON SESSIONS

Pharmacogenomics to Address Adverse Drug Events
Washington Convention Center, Room 143A/B, 3:00 pm – 5:30 pm
Sponsored by the Divisions for Toxicology; Drug Discovery, Development & Regulatory Affairs; and Integrative Systems, Translational & Clinical Pharmacology

Chairs: D.L. Mendrick, NCTR/FDA and P.B. Watkins, Hamner Inst. for Health Sci.

Complexity in the Analysis of Pharmacogenomic Data — **Donna L. Mendrick,** National Ctr. for Toxicology Res./FDA
The Application of Pharmacogenomics into Genetic Toxicity and Carcinogenicity Testing — **Jiri Aubrecht,** Pfizer Global Res. and Develop.
Exploring the Impact of SNPs of Idiosyncratic Hepatotoxicity — **Paul B. Watkins,** The Hamner Inst. for Health Safety Sciences
The Submission and Review of Pharmacogenomic Data by Regulatory Agencies — **Issam Zineh,** Ctr. for Drug Evaluation and Res./FDA

Physiology and Pharmacology of Trace Amine Associated Receptors
Washington Convention Center, Room 143C, 3:00 pm – 5:30 pm
Sponsored by the Divisions for Neuropharmacology and Molecular Pharmacology; Behavioral Pharmacology; and Integrative Systems, Translational & Clinical Pharmacology

Chair: R.R. Gainetdinov, Italian Inst. of Technology, Italy and K.A. Neve, VA Med Ctr., Oregon Hlth. Sci. Univ.

Trace Amine-associated Receptor 1 (TAAR1) Pharmacology and Modulation of Brain Dopaminergic Activity — **Marius C. Hoener,** F. Hoffman-La Roche, Ltd.
Trace Amine-associated Receptors are Olfactory Receptors in Vertebrates — **Stephen D. Liberles,** Harvard Med. Schl.
Structure-activity Relationships and Species Selectivity of TAAR1 Ligands — **Anita H. Lewin,** RTI International
Trace Amine-associated Receptor 1 (TAAR1) as an Emerging Therapeutic Target — **Raul R. Gainetdinov,** Italian Inst. of Technology

Recent Developments in the Understanding of the Biology and Physiology of the JAK Family of Tyrosine Kinases
Washington Convention Center, Room 140A, 3:00 pm – 5:30 pm
Sponsored by the Divisions for Drug Discovery, Development & Regulatory Affairs; Drug Metabolism; Integrative Systems, Translational & Clinical Pharmacology; and Molecular Pharmacology

Chair: M.A. Sills, AD4 Pharma

Pathophysiology of JAK Therapeutic Intervention — **Mireia Gomez-Angelats,** Johnson & Johnson, La Jolla
Physiology and Pharmacology of JAK1 and JAK2 Kinases — **Michael Zinda,** AstraZeneca
Development of JAK1/JAK2 Kinase Inhibitors for the Treatment of Immunological Diseases and Multiple Myeloma — **Jordan Fridman,** Incyte Corp.

Therapeutic Angiogenesis
Washington Convention Center, Room 140B, 3:00 pm – 5:30 pm
Sponsored by the Divisions for Cardiovascular Pharmacology; Drug Discovery, Development & Regulatory Affairs; and Integrative Systems, Translational & Clinical Pharmacology

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Lecture given at Experimental Biology 2008 by the P. B. Dews Lifetime Achievement Award Recipient

Contributions of Behavioral Pharmacology to Our Understanding of the Etiology, Prevention, and Treatment of Substance Abuse

Charles R. Schuster

I was privileged to meet Dr. Peter B. Dews in the 1950's when I was working for Smith Kline and French. Dr. Leonard Cook, a previous Peter B. Dews Awardee, and I went up to see Dr. Dews at Harvard to get some advice about behavioral procedures that we could use for screening new pharmacological agents for potential use in the treatment of psychiatric disorders. Dr. Dews was very gracious, very helpful, and recommended that I get Dr. Charles B. Ferster as a consultant. Ferster had recently published with B. F. Skinner, a comprehensive collection of behavioral studies in which the scheduling of behavioral consequences was the major factor that influenced behavior (Ferster and Skinner, 1957). Dr. Ferster assisted us for a couple of years during the three years that I worked at Smith Kline and French, and during that time I learned a lot from Dr. Ferster about what became known as the Experimental Analysis of Behavior, or more colloquially, Skinnerian behaviorism. During that time I also learned a lot about pharmacology from my colleagues at SK&F, and through an extension class from the University of Chicago taught by Dr. Francis Oldham Kelsey, a professor there. Of course this was more than a few years ago, and there was no internet. I took the course through what is now called "snail mail," but it seemed to me to be fast paced, at least by the standards of the day. Dr. Kelsey, by the way, while working at the Food and Drug Administration was the one that blew the whistle on the teratogenic effects of thalidomide.

Because I had learned a bit of behavioral psychology and pharmacology, I was happy to be able to attend the Sigma Xi lectures given that year by Dr. Joe Brady, another P. B. Dews Awardee. Dr. Brady's lectures reviewed his experiments on "executive monkeys," and the behavioral conditions inducing ulcers in primates. The lectures were exciting, as they pointed out that the interactions between environment and physiologic response could be quite profound, and substantiated the importance of environmental control that was also pointed out by Ferster with regard to behavior. In talking with Dr. Brady after the lecture, he found out that I knew a little bit about pharmacology and a little bit about behavior, which was a rare combination in those days. Dr. Brady said, "Hey you've got to get your doctorate. Why don't you come down to the University of Maryland. I just got a grant with Sherm Ross, and we're setting up a behavioral pharmacology lab and could sure use you to help us." Such was the formality of graduate school application in those days. So I went back to school to get my doctorate at the University of Maryland.

Well as many are aware, Dr. Brady was not only on the faculty at the University of Maryland as an adjunct professor, but he was a lieutenant colonel in the Army, stationed at Walter Reed Army Institute of Research. In those days, WRAIR was a hot bed of behavioral, pharmacological, physiological, and endocrinological research. Among the people there were a number of behavioral psychologists that were very influential in terms of my career: In addition to Brady, Drs. Murray Sidman, Richard Herrnstein, and Jack Findley were there, and along the way influenced the course of behavioral and behavioral pharmacology research. WRAIR in the late 1950's and early 1960's was indeed quite literally a rare place, and provided me with an incredible intellectual environment.

Among the influential experiences that I had at WRAIR was an opportunity to observe Dr. John Mason, a neuroendocrinologist, surgically implant jugular catheters in rhesus monkeys. Dr. Mason was conducting studies on hormonal responses to stress, necessitating the collection of blood samples. As Heisenberg could tell us, to conduct these studies the sampling of blood itself could not influence Mason's measures – physical restraint for venipuncture just would not do. In order to proceed with these studies, Mason developed a surgical procedure for the placement of chronic indwelling jugular catheters which ran subcutaneously up to a plug mounted on the top of the skull. During studies the monkeys were restrained in chairs which did not allow them to reach the head mounts, and samples could be collected without undue stress.

In observing Mason's experiments, it was obvious that the catheters could transmit material (i.e., drugs) into the vein, maybe even easier than it could transmit material out. Being an operant conditioner, the obvious next step was to do that contingent on a response from the monkey. Before working at SK&F I had aspired to be a jazz musician and had several older musician friends who were shooting up heroin and tragically became hopelessly addicted. I wondered whether the rhesus monkeys would find heroin reinforcing. Times being what they were, I did not think that I could make a normal healthy rhesus monkey self inject drugs – that was psychopathology. At the time psychoanalysis was substantially influential and offered the most prevalent theory of the time about heroin addiction. According to the theory, opiate addiction was a product of latent homosexuality. Homosexual ideation generated by the Id disturbed the conscience, or the Superego, producing a neurotic conflict. That conflict could be alleviated by a drug that decreased sex drive, which was a purported effect of the opiates. In walking around the animal quarters, I didn't see any indication that any of our monkeys would be good candidates to test this theory, so I decided that we were going to have to go in a different direction.

After some explorations, we started in earnest when Travis Thompson joined the lab as a post-doctoral fellow. Both Shirley Spragg and John Nichols previously had success with chimpanzees and rats, respectively, by making their subjects physiologically dependent on morphine before giving them an opportunity to self inject the drug when they were in withdrawal. So we started that way.

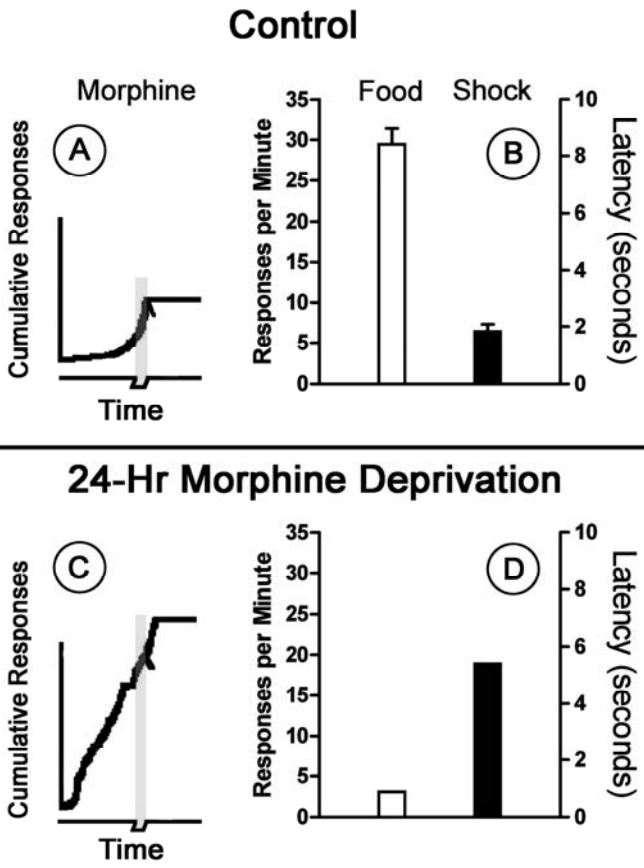

Fig. 1. Effects of morphine deprivation on responding maintained under a complex schedule of morphine injection, food presentation and shock avoidance. Morphine maintained responding under a chained FI, FR schedule, whereas a signaled FR schedule of food presentation and a signaled discrete-trial shock avoidance schedule maintained responding in alternate components. A representative cumulative record of control performance maintained under the chained schedule by morphine is shown in panel A, whereas the representative control performance parameters of food-maintained responding are shown as average response rates, and the latencies maintained by shock avoidance are shown in panel B. For the cumulative records, the x-axis represents time and the y-axis shows cumulative responses. The record starts with the onset of the two-min FI and the deflection of the lower "event" line and corresponding gray portion indicate the FR-link of the chained schedule. The slash mark on the cumulative curve indicates the completion of the FR link with the infusion of morphine. The lower row of graphs (panels C and D) show performances after 24 hours of morphine deprivation. Adapted from Thompson and Schuster, 1964.

We were helped in a substantial way by Jack Findley, who was one of the principal researchers in the laboratory, and in my opinion one of the most brilliant scientists in the history of behavior analysis. His work on multi-operant repertoires was just phenomenal, and we incorporated some of Findley's complex multi-operant procedures into our studies of morphine self administration. In these studies, we surgically implanted venous jugular catheters; made the rhesus monkeys dependent by injecting them with 2 mg/kg of morphine four times a day; and then trained them on a multiple schedule. The multiple schedule was comprised of a fixed-ratio schedule of food reinforcement for 8 min, a 5-min period of shock avoidance, followed by a chained FI, FR schedule in which a response was reinforced with morphine infusion (2 mg/kg). After the injection, the food and shock-avoidance components were repeated, and the complete cycle was repeated four times a day at 6-hr intervals. After some exposure to this schedule, performances were stable and characterized by a progressively increasing rate of response during the FI link of the chain followed by a high sustained response rate up to morphine injection within the FR link of the chain (Fig. 1A). In addition, response rates under the fixed-ratio schedule of food reinforcement averaged close to 30 responses per min, and responses occurred with an average latency of less than 2 sec during the shock avoidance component (Fig. 1B).

After these stable performances were obtained, the effects of a number of different variables were assessed. First, treating subjects with morphine before the food and shock-avoidance components, had no effect on these performances, however, responding maintained by morphine injection under the chained FI, FR component was markedly suppressed. It would be presumptuous to take credit for agonist-maintenance therapy from this study, but it certainly demonstrated its feasibility. The decreases in responding under the chained schedule by the monkeys, and the agonist control of morphine seeking in addicted patients likely are a product of similar mechanisms.

Omitting the chained FI, FR morphine-injection component induced withdrawal in the monkeys, decreased response rates maintained by food, and increased latencies to avoid shock 24 hrs after the last morphine injection (Fig. 1D). When the chained FI, FR schedule of morphine injection was re-introduced, the number of responses in the fixed interval was greatly increased (Fig. 1C). The increase in responding during the FI link of the chain was also obtained with nalorphine injection (the only opioid antagonist available at the time). Nalorphine also markedly disrupted performances during the food and shock-avoidance components similarly to 24 hours of morphine deprivation. The increases in the number of responses in the fixed-interval component, whether with nalorphine injection or morphine deprivation along with the disruptions in responses maintained by food presentation or shock avoidance suggested that withdrawal specifically enhanced the reinforcing efficacy of morphine.

Interestingly, this experience with morphine injections rendered saline transiently effective in restoring to normal patterns the withdrawal-disrupted food-maintained and shock-avoidance behavior. The stimuli associated with both the morphine component, and those associated with morphine infusion had the capacity to temporarily reverse some of the signs of withdrawal. These results were so exciting, and the potential of this line of research so promising, that I spent the next 50 years doing studies on drug self administration in animals and humans.

Getting back to the studies of Spragg and Nichols, it concerned me that we initially made the subjects dependent on opioids to obtain reinforcing effects of morphine. My jazz musician friends were not physically dependent when they first tried heroin, and they used it intermittently and gradually before it became a regular habit. Certainly they were not physically dependent when they first found the drug reinforcing, and if self administration in animals was to be a more complete approach to drug abuse, the issue of whether dependence was a necessary condition for animal studies needed to be addressed.

After moving from the University of Maryland to the University of Michigan I was joined by Dr. James H. Woods, and we initiated a study to address whether dependence was necessary for morphine reinforcement. In that study monkeys were allowed to self inject extremely low doses of morphine – in the range of 10 to 25 µg/kg per infusion – only three times a week. Under these conditions, morphine was an effective reinforcer, even though the morphine exposure was too low to produce physical dependence as indicated by the absence of withdrawal signs. Thus, morphine served as a positive reinforcer even without physical dependence. However, our earlier study showed that when opioid dependence developed, morphine could function as a negative reinforcer, with subjects escaping from the aversive state of withdrawal. Morphine's reinforcing effects were complex indeed.

Dr. Woods and I also showed that stimuli associated with the infusion of morphine could maintain extremely long chains of behavior even during extinction. And it reminded me of the fact that human drug addicts will spend all day long hustling, and going through long chains of behavior, ultimately being able to obtain the money to be able to buy drugs. And there is no doubt that this behavior is sustained by conditioned reinforcers along the way, which have been associated ultimately with the drug as a reinforcer.

By this time more people were studying drugs as reinforcers, and many of us were marching through the pharmacopeia, determining which drugs would, and which would not, serve as reinforcers in laboratory animals. Two of my colleagues, Drs. Robert Balster and Chris-Ellyn Johanson in the 1970s comprehensively reviewed the accumulated literature and found that by and large the drugs that animals self administered were the drugs that humans abuse. Additionally, drugs that humans find aversive would actually serve as negative reinforcers in animals – responses of animals were reinforced by avoidance of, or escape from these injections. Further, drugs that are neutral in humans were also neutral in animals, they would neither avoid them nor work for them. Finally, the patterns of drug self administration were similar among animals and humans. With opiates animals gradually increased their intake as tolerance developed, and finally stabilized at some high dose, which is essentially what humans do when access to drug is relatively unrestricted. On the other

hand, psychomotor stimulant drugs were taken in binges both in animals and humans. These similarities across animals and humans render this an animal model with both face validity, predictive validity, and substantial potential for translational research. I can't imagine another model that is more impressive in that regard than is drug self administration.

With that in mind, it is worthwhile to explore some of the ways that self-administration procedures have been used. Clearly one practical application is in assessing new drugs with an eye towards preventing those with abuse liability from ever entering the market, or in doing so only with adequate warning. We are currently in a period of time when prescription drug abuse is rampant. Drug self administration in animals during the process of drug development helps a pharmaceutical company determine whether or not their compound has the potential to be abused – a very practical application. We can also examine new formulations of older drugs, or novel ways of delaying the onset of effects of the drug to decrease its abuse liability.

We are also in the present time looking very intensively for compounds that may be useful medications to treat drug abuse. The drug self-administration procedure typically factors heavily in these attempts, as it should. Given its validity as detailed above, it is natural to assess efficacy by examining whether a compound might in some way alter the propensity to self administer a drug. When coupled with an examination of the effects of the compound on behavior maintained by other reinforcers we can go further to assess the specificity by which the compound may alter drug self administration. And indeed a number of recent papers show selective effects of compounds on behaviors maintained by drugs of abuse compared to behaviors reinforced with food presentation. In our studies with morphine pretreatments described above, we also showed selective effects – food-maintained responding under the fixed-ratio schedule and responding maintained by shock avoidance were not affected, whereas self administration of morphine was virtually eliminated. Certainly many of the more recent attempts to assess efficacy of potential drug abuse treatments are elegant demonstrations of either the success or failure of medicinal chemistry to provide new compounds that might serve as leads. However, I wish that other studies would compare self administration to responding maintained by several other reinforcers, lest we confuse a selective effect on responding maintained by the drug of abuse with a selective lack of effect on responding maintained by the single comparison non-drug reinforcer.

Drugs can serve as important tools for understanding the brain mechanisms that mediate the reinforcing effects of all positive and negative reinforcers, not simply drug reinforcers. The advance of our science into more molecular aspects of reinforcement mechanisms in the brain is exciting, and clearly has great potential for new and important basic information that may also have eventual applications to further the public health. As a former NIH Institute Director I want to caution that we need to keep in mind that the public funds these studies, and we are obligated to give them something for their money, whether it be basic knowledge or new advances in medicine. To do this most effectively our studies will have to be able to predict the behavior of the intact organism in an ever-changing environment. Any scientific approach, whether reductionistic or one dealing with whole animals, needs to be ever mindful of the public trust.

In the process of studying drug self administration, it is important to emphasize that the finding that drugs can serve as reinforcers has allowed us to use all of the principals of the experimental analysis of behavior to better understand the etiology of drug addiction. We have explored and found that most of the same variables that influence behavior maintained by more traditional reinforcers affect drugs as reinforcers in the very same way, indicating a functional equivalence of reinforcing effects. These findings allow us to examine the special circumstances of drug abuse from a more informed perspective.

One important aspect of drug abuse in human beings is that it is very frequently a social enterprise. Because drugs are often self administered in a social context along with the delivery of social reinforcers, the drugs can acquire conditioned reinforcing effects that may augment any primary reinforcing effects. My colleague, Dr. Chris-Ellyn Johanson and her students have demonstrated in studies with human subjects that drugs, originally devoid of reinforcing effects, can be self administered after specific circumstances. Normal human subjects who volunteered for the study were given differently colored capsules on different days; one color was associated with diazepam and the other with placebo. When normal subjects were subsequently given a choice between the two colors of capsules they almost invariably chose the capsule color that was associated with placebo. Under other conditions the subjects were told that they would be participating in a study of the effects of drugs on performance, and were put on a very ambiguous performance task in which it was impossible for them to assess how well they performed. On the days in which they were given diazepam in a colored capsule, the computer program signaled a superior performance and they earned a substantial amount of money. On the

days in which they were given placebo in a differently colored capsule, the computer program signaled that they did poorly on the task and the subjects earned little money. After four occasions, the subjects were given a choice between the two capsules with no work requirements and no money involved. The experiences resulted in a switch in their preference to the diazepam capsule that had been associated with the monetary reinforcement. So it appears that the previously ineffective diazepam became a conditioned reinforcer due to its association with the reinforcing effects of money. And this change in the effectiveness of a drug as a reinforcer could very well be an important mechanistic factor in the etiology of drug abuse.

Reflecting on this mechanism may provide insight into the reinforcing effects of psychomotor stimulant drugs. These like many other drugs of abuse are very often taken in a social context and have perhaps the capacity to become conditioned reinforcers, as well as having their own intrinsic positive reinforcing effects. In addition, the studies by Ron Hill and several subsequent preclinical studies demonstrate that psychomotor stimulant drugs can enhance the effectiveness of conditioned reinforcers. So it is possible that the psychomotor stimulant drugs may enhance their own conditioned reinforcing effects. Some may label this effect “incentive salience” or formulate some other novel hypothetical construct rendering the phenomenon more enigmatic. With the phenomenon cast in terms of known stimulus functions it may lose some of the enigma, but doing so renders it more amenable to empirical study, which of course is what the scientific enterprise is all about. Moreover, this interpretation helps us understand why psychomotor stimulant drugs are so effective as reinforcers. They have primary reinforcing potential, conditioned reinforcing potential, and the potential to increase their own conditioned reinforcing effects. Together these effects can render them especially effective reinforcing stimuli which combined render them especially addicting.

Some have characterized the especially addicting effects of some drugs as inducing individuals to totally lose control over their behavior. This characterization puts the emphasis in the wrong place. As George Bigelow has noted, circumstances often characterized as a complete loss of control by the individual are better characterized as excessive control over behavior by the drug. Instead of focusing on a failing of the individual, possibly a failing of moral consistency, we focus on aspects of the environment of which the behavior is a function. Experiments in monkeys by Robert Balster and Tom Aigner speak to the issue. In those experiments, rhesus monkeys were given a choice between cocaine and food reinforcement. After a few days under these choice contingencies, Balster and Aigner had to stop the experiment because had they continued, the monkeys would have starved; they just were not choosing food often enough. The National Institute on Drug Abuse, the press coverage, and other groups in the United States responded to this study with sensational claims that “cocaine is so addictive that animals will die in order to get it.” Of course any student of the experimental analysis of choice behavior suspected that those claims were exaggerated. Another one of my students, Bill Woolverton, then having moved to the University of Mississippi, replicated Balster and Aigner’s study, but did so covering more parameters of the reinforcing stimuli. In addition to a choice between simply an injection of cocaine, at its maximally effective dose, and a single pellet of food, Woolverton varied the magnitude of food reinforcement and convincingly demonstrated that it is simply an issue of the relative sizes of the reinforcing stimuli, as my old friend and colleague Dick Herrnstein would have predicted. At sufficiently large magnitudes of food reinforcement the subject switched from predominately choosing cocaine injections to choosing food more often. Not only does Woolverton’s study apply the brakes to inappropriate hyperbole about cocaine abuse, it importantly points to the importance of concurrent contingencies that can be applied to address the problem of drug dependence in people with contingency management. These techniques were successfully applied to alcohol abuse by Nate Azrin, significantly advanced in application with cocaine abusers by Steve Higgins, and brilliantly incorporated into the workplace by Ken Silverman. Powerful concurrent contingencies of non-drug reinforcement can compete with drugs as reinforcers and completely capture the individual’s repertoire of behavior so that s/he just says no to drugs!

Alternative reinforcement can be even more powerful from the standpoint of prevention. Many of the risk factors that exist for the development of a drug addiction can be looked at as a paucity of alternative reinforcers in the individual’s environment, especially those that are incompatible with drug use. That paucity, combined with readily available drugs and peer group contingencies, can render the environment one that makes drug abuse highly likely. A paucity of non-drug reinforcement could be due to their complete absence due to a poverty-stricken environment, or it could be due to an absence of a behavioral repertoire necessary to acquire available reinforcers. Drug abuse starts out easy. You don't have to be smart; you don't have to be good-looking; you don't have to be anything other than willing to take drugs. Absent alternative competing reinforcers, drug addiction is a highly likely outcome.

This conceptualization speaks directly to how we can best bring about the necessary change to prevent drug abuse. Dr.

Shepherd Kellam at Johns Hopkins University actually started research on prevention at the University of Chicago. Kellam and his colleagues went into a number of different schools in the Woodlawn area of Chicago and intensively studied children throughout their entire first year of school. Kellam found that young males who were disruptive in their first-grade class, aggressive, and shy, had an odds ratio of about 2.5 for using alcohol and cigarettes at age of 13 to14, and at age 21 had the approximately the same 2.5 odds ratio for using hard drugs. Thirty years later these same individuals had an odds ratio of about two for having used cocaine in the past three months. This astounding predictive power had not been obtained previously in any research along the same lines.

In addition, the finding pointed Kellam to preventative research. After relocating to Johns Hopkins University he bumped into my old mentor, Joe Brady, who pointed him to the "good-behavior game." The "good-behavior game" had been developed at the University of Kansas by Montrose Wolf (Barrish et al., 1969). The game dictates that a classroom be divided into groups of four individuals with the aggressive boys randomly distributed across the groups. The game arranges reinforcers to be distributed based on the behavior of the group. The behavior reinforced is refraining from speaking out of turn, staying seated, and basically conduct essential for learning to take place in the classroom. Reinforcers are only provided if the entire group follows the rules, which puts peer pressure from classmates on the identified at-risk children. As the game progresses, the length of time during which the reinforcement contingencies are in place increases, so that over the first year of school good classroom behavior is "shaped," allowing the at-risk children to become better students.

The results of this implementation of the "good behavior game" (Kellam et al., 2008) were astounding. First, there was a decrease in the probability of drug use. Second, there was a decrease in the likelihood of involvement with the criminal justice system. Third, there was a decrease in cigarette smoking. There also was an increased probability of graduating from high school, and a decrease in the utilization of mental health services. In addition, all of these outcomes were obtained in the children who were at the higher end on ratings of aggressiveness and disruptiveness at the beginning of the first grade. This finding also points to an important implication for intervention and prevention: start early. If we wait until adolescence to intervene it will be more difficult, less likely to achieve positive outcome, and more costly to individuals and society. Kellam has identified early behaviors that distinguish children at risk. We need to use that information.

In summing up, it has been about 50 years since I was first introduced to the concepts of behavioral pharmacology, and behavior analysis. I have spent those 50 years putting those principles to test, and to work in understanding drug abuse, drug dependence and drug addiction. It has been extremely exciting and rewarding to have participated in the development of the field of behavioral pharmacology, and to see it contribute mightily to our understanding of the etiology, prevention, and treatment of drug abuse and drug addiction. While we may not completely eradicate the problem of drug addiction, I have no doubt that in the future we can tremendously curtail the multiplicity of problems associated with drug addiction.

Acknowledgments

I want to express my thanks to ASPET for giving me the Peter B. Dews Award and to Jonathan Katz who helped put my Dews Award presentation into written words. Most importantly, my colleagues and students made contributions to my career that cannot be overstated. Finally, I specifically want to express my enduring gratitude and indebtedness to my mentor, Joseph V. Brady, and to my colleague and wife, Dr. Chris-Ellyn Johanson.

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Experimental Biology 2010, Anaheim, CA

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Susan Wood, *Children's Hospital of Philadelphia*

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Delores Shockley Award

Debra Cooper, Emory University, was the first winner of this award which was presented to her at the ASPET Best Abstract Competition on Sunday evening in Anaheim at EB2010. Dr. Shockley was the first African American woman in the US to earn a PhD in pharmacology, and the first black woman appointed to chair a pharmacology department in the US.

Mid-Atlantic Pharmacology Society (MAPS)

Annual Meeting - December 10, 2010

Hosted by Fox Chase Cancer Center

"Cancer Pharmacogenomics: From Bench to Bedside"

Program Host – Margie L. Clapper, PhD, Fox Chase Cancer Center

PROGRAM

Morning Session

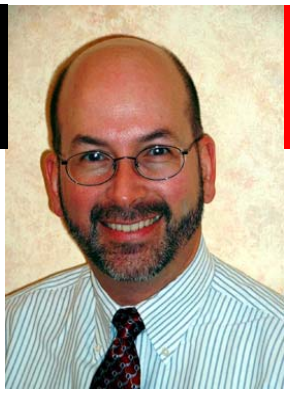
7:45-8:30	Registration & Continental Breakfast (Center Building); Poster setup (Robert C. Young Pavilion Atrium)
8:30-8:40	Fox Chase Cancer Center Welcome: J. Robert Beck., MD, Senior Vice President and Chief Academic Officer, Fox Chase Cancer Center
8:40-8:50	MAPS Welcome: Vincent J. Aloyo, PhD; President, MAPS
8:50-9:00	Introduction to Program – Margie L. Clapper, PhD, Professor, Co-Leader, Cancer Prevention and Control Program and Keystone Program in Personalized Risk and Prevention, Fox Chase Cancer Center
9:00-10:10	**Keynote Speaker** – **David Flockhart, MD, PhD,** Chief, Division of Clinical Pharmacology, Indiana Univ. School of Medicine, Indianapolis, IN: "*Pharmacogenetic approaches to the treatment of breast cancer"*
10:10-11:00	**Rebecca Suk Heist, PhD,** Massachusetts General Hospital, Assistant Professor of Medicine, Harvard Medical School, Boston, MA: "*Targeting somatic mutations in lung cancer: EGFR and ALK"*
11:00-11:30	Refreshment Break
11:30-12:20	**Evgeny Krynetskiy, PhD, DSc,** Associate Professor, Pharmaceutical Sciences, Temple Univ. School of Pharmacy, Philadelphia, PA: "*Beyond Thiopurine S-methyltransferase (TPMT): A view from the bench*"
12:20-12:30	Koelle Award Presentation
12:35-2:30	Lunch & Poster Viewing and Judging (Robert C. Young Pavilion Atrium)

Afternoon Session

2:30-3:20	**Paul Billings, MD, PhD**, Chief Medical Officer, Life Technologies, Inc., Carlsbad, CA: "*Genomic Medicine: the New Oncology Subspecialty?*"
3:20-4:10	**Howard McLeod, PharmD**, Fred Eshelman Distinguished Professor, Director, Institute of Pharmaco-genomics and Individualized Therapy, Univ. of North Carolina, Chapel Hill, NC: *"Using the genome to guide cancer therapy"*
4:10-4:30	Poster Awards Presentations – Presented by Sri Ghatta, MAPS Councilor
4:30-4:40	Concluding Remarks – Margie L. Clapper, PhD
4:40-4:50	Induction of new MAPS officers
5:00-5:45	Post meeting reception – Robert C. Young Pavilion Atrium

Note: All speaker times include presentation and discussion.

Journals



New Authorship Responsibility Reporting

The ASPET Board of Publications Trustees has added new requirements related to authorship responsibility for manuscripts submitted to the Society's journals. Effective with the January issues (December for *Molecular Interventions*), all articles published by the Society will include an "Authorship Contributions" section. Authors are now required to complete the new "Authorship Responsibility, Financial Disclosure, and Chemical Structure Statement Form". The form asks each author to specify his or her contributions to the manuscript using a five category checklist:

- *Participated in research design*
- *Conducted experiments*
- *Contributed new reagents or analytic tools*
- *Performed data analysis*
- *Wrote or contributed to the writing of the manuscript*

The form also offers an "other" option for contributions outside the five categories, but an explanation of the "other" contributions is required. Each author listed on a manuscript will check all of the applicable areas in which she or he contributed and sign individually. A separate copyright transfer form must also be submitted.

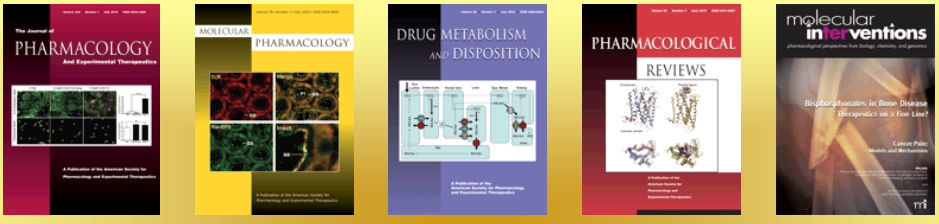
This new procedure is intended to prevent false authorship issues such as "honorary" authors, inclusion of authors without their knowledge, and otherwise listing individuals who do not qualify for authorship. The form also seeks to prevent exclusion of individuals who should be included as authors.

The form went into use on September 15, and all manuscripts submitted to an ASPET journal must be accompanied by the completed form. ASPET staff will request forms from authors whose work is already under peer review and is accepted for publication in a January or later issue.

The Authorship Responsibility, Financial Disclosure, and Chemical Structure Statement form and the Copyright Transfer form are available from the Instructions to Authors on each journal's web site as a single fill-in-the-blank PDF file.

New Editorial Board Members

Dr. Laura M. Bohn is the new Minireview Editor for *Molecular Pharmacology.* Dr. S. Jamal Mustafa of West Virginia University has joined the *JPET* Editorial Advisory Board. Both were approved by the Board of Publications Trustees in August.



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Public Affairs/ Government Relations

Legislative Update

Congress returned to Washington the week of September 13. With Republican Congressional candidates surging in polls and the increasing likelihood that the GOP will retake the House and possibly the Senate, the one sure thing we will see is gridlock in the Capitol. Supporters for stem cell funding will hope to pass legislation to allow federal funding of human embryonic stem cell research (see below). But Congress has limited time until the November 2 mid-term elections and will have to enact stopgap spending bills to keep the government up and running. And there will be ongoing debate about extending tax cuts due to expire at the end of the year. But everything will really have to wait until after November 2.

Vice President's Report on Stimulus Funding

Late August, Vice President Biden released a report titled "The Recovery Act: Transforming the American Economy through Innovation." The report says that $100 billion in federal stimulus funds are helping to accelerate significant advances in science and technology and will help the U.S. to achieve innovative breakthrough in science. The report notes that of the $10 billion stimulus funds NIH received, 82% went directly toward biomedical research. The full report is available at http://www.whitehouse.gov/sites/default/files/uploads/Recovery_Act_Innovation.pdf.

Expanded Pharmacogenomics Research Network

The NIGMS-led network of scientists focused on understanding how genes affect responses to medicines now includes 14 scientific research projects and seven network resources. A news release on the new group of awards, expected to total $161.3 million over the next 5 years and funded by nine NIH components, is at http://www.nigms.nih.gov/News/Results/pgrnIII_20100709. A news release on an associated resource, the Pharmacogenomics Knowledge Base (PharmGKB), is at http://www.nigms.nih.gov/News/Results/PharmKGB_20100709.

ASPET Advocacy Outreach Program

ASPET's grassroots congressional education effort informs ASPET members how to become effective public advocates for biomedical research. As a scientist, you are the most effective advocate for the biomedical science research enterprise - and the most credible too. Legislators, media and the public need to hear from you that the investment in biomedical research should be a national priority.

To create scientist-advocates of the future, ASPET in 2009 developed the **Advocacy Outreach Program** to help develop informed and effective public advocates for biomedical research. The purpose of this outreach effort is to educate and train graduate students, post-docs and faculty in pharmacology departments on the importance of grassroots advocacy in support of increased funding for the NIH. The ultimate goal of the outreach program is to 1) develop a cadre of interested individuals who will more effectively advocate on critical issues of science funding and science policy and 2) provide individuals the skills needed to become informed and proactive participants in these issues at whatever institution they may find themselves in the near future. To date, ASPET visited UT Southwestern, Emory University, Wayne State University for Michigan's Annual Research Colloquium, and Vanderbilt University Medical Center. These presentations are especially informative for graduate and post-doctoral students. If there is an opportunity for ASPET to make a presentation at your institution this year or in 2011, or for information on how to arrange a successful meeting with your Members of Congress, contact Jim Bernstein, ASPET's Director of Government and Public Affairs at 301-634-7062; jbernstein@aspet.org.

ASPET Advocacy for FDA

A letter from ASPET to Health & Human Services Secretary Kathleen Sebelius requests that the Secretary provide FDA a 20% increase in its FY 2012 budget and make FDA among the highest funding priorities as the Department begins formulating its fiscal year 2012 budget. ASPET cites the chronic underfunding of the FDA as endangering our public health, economy, and national security.

Also supporting increases in FDA's FY 2012 budget, a Congressional letter urges Secretary Sebelius to make FDA funding a priority as she negotiates FY 2012 funding levels with the Obama Administration. The letter was cosigned by Rep. Henry Waxman i(D-CA), Sen. Tom Harkin (D-IA), Rep. John Dingell (D-MI), Rep. Frank Pallone (D-NJ), and Bart Stupak

(D-MI). Rep. Waxman is Chairman of the House Committee on Energy and Commerce and Senator Harkin is Chairman of the Senate Committee on Health, Education, Labor and Pensions. These are the primary committees for FDA authorizing legislation and oversight of FDA. Reps. Dingell, Pallone and Stupak are all senior leaders on Chairman Waxman's committee. You can read both letters at: http://www.aspet.org/Page.aspx?id=1859.

Appeals Court Overturns Stem Cell Funding Ban

On September 9 The U.S. Court of Appeals for the D.C. Circuit issued a stay on a preliminary injunction issued by U.S. District Judge Royce Lamberth on Aug. 23 that had barred NIH funding of human embryonic stem cell (hESC) research. The U.S. Court of Appeals action was in response to an emergency motion to stay the preliminary injunction filed by the Department of Justice on Sept. 8. During the brief stay period, NIH can resume its intramural hESC research and the agency's normal extramural application and grant processes. The Coalition for the Advancement of Medical Research, a leading stem cell advocacy organization, has been running full page ads with the signatures of over 75 medical school deans. And NIH Director Francis Collins and several stem cell researchers and patients were expected to testify at a Congressional hearing on September 16. To help Congress pass legislation that allows federal funding for human embryonic stem cell research, please visit the FASEB alert at: http://capwiz.com/faseb/issues/alert/?alertid=16653501.

At this writing, Sen Arlen Specter (D-PA) has introduced the *Stem Cell Research Advancement Act of 2010.* Specter's bill would make into law President Obama's 2009 Executive Order allowing federal funding for embryonic stem cell research. It is not clear if the Senate will actually consider the legislation.

STAFF NEWS

Dan Collinge, Senior Editorial Coordinator for *Molecular Pharmacology*, left ASPET on August 3 to pursue a second master's degree at the University of Maryland. Dan had been with ASPET since January 2004. We wish Dan all the best in his studies and future career.

Erin Salb (top) assumed Dan's responsibilities for *Molecular Pharmacology*. Erin joined ASPET in November 2009 and had been the Editorial Coordinator for *Drug Metabolism and Disposition*.

Courtney Beardsworth (middle), who joined ASPET this past June and was the Editorial Assistant for *JPET*, was promoted to Editorial Coordinator for *Drug Metabolism and Disposition*. She will also help with *JPET* as needed.

As Editorial Coordinators, Erin and Courtney manage the peer review process for their respective journals. The ASPET peer review team also includes **Cassie Wood**, Senior Editorial Coordinator for *JPET*, and Managing Editor **Jill Filler**, who handles *Pharmacological Reviews*. All four work with ASPET's authors, editors, editorial board members, and reviewers to keep the manuscript submission and peer review process for the Society's journals moving smoothly and in a timely manner. They also make sure that text and graphics files are posted online as "Fast Forward" publish-ahead-of-print articles and are delivered to our compositor for copyediting and formatting.

Suzie Thompson (bottom), Director of Membership and Marketing and currently on maternity leave, visited the ASPET office in early September with her twins Joshua (on left) and Taryn, who were born on June 15. Exhausted but happy, Suzie reports that everyone is doing fine. Suzie will return to work this fall.

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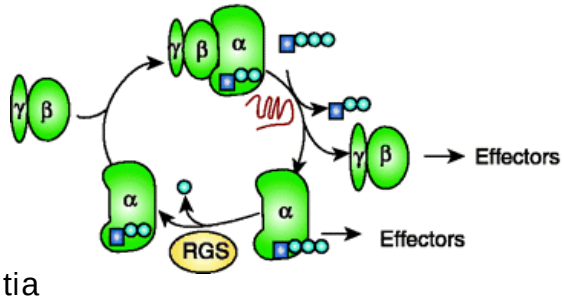
Mitchell A. Nothem, Univ. of the Sciences in Philadelphia
James K. Nunez, Univ. of Colorado Denver
Scott T. O'Hern, Texas A&M Univ.
Sarah Obaidat, Univ. of Missouri
Summit S. Pandat, Case Western Reserve Univ.
Jillian L. Pattison, Kenyon Col.
Chelsea R. Peters, Ohio Northern Univ.
Kevin E. Pflaum, Grinnell Col.
Flaka Radoniqi, Whittier Col.
Kaitlyn A. Reilley, Lafayette Col.
Eric J. Reimer, Baker Univ.
Peter A. Reisz, Vanderbilt Univ.
Andrea Rose, Lipscomb Univ. Col. of Pharmacy
Amir-Arsalan Safaai-Jazi, Univ. of Vermont
Richard N. Sanders, Univ. of Denver
Caroline M. Sawicki, Case Western Reserve Univ.
Nicholas A. Shah, Univ. of Cincinnati
Max M. Shannon, Earlham Col.
Darien Shapiro, Univ. of Utah
Monet Stanford, Univ. of Maryland - Baltimore Cnty.
Joshua J. Startup, North Park Univ.
Rachel D. Stephens, Lipscomb Univ. Col. of Pharmacy
Rheana A. Techapinyawat, Univ. of Arizona Col. of Med. - Phoenix
Regina Ulis, Univ. of Maryland - Baltimore Cnty.
Nathan J. Verlinden, Drake Univ.
Derek T. Walker, Univ. of Arkansas
Brandon Way, Univ. of Colorado
Aubrey S. White, Univ. of New England
Jennifer A. Wittwer, Ohio State Univ.
Xiao Zhu, Duke Univ.

Plan to attend the ASPET Colloquium:

RGS and AGS Proteins in Physiology and Disease



Sponsored by the Division for Molecular Pharmacology

Organized by John R. Hepler, Emory University, and Venetia Zachariou, University of Crete

This day-and-a-half colloquium will held in conjunction with **Experimental Biology 2011** and will begin on Wednesday afternoon, April 13 and continue through Thursday, April 14. Registration is separate from the EB meeting. Watch the ASPET web site for more information.

ASPET Notes with Sympathy the Passing of the Following Members:

Norman Kirshner, PhD

Winifred Jean Angenent Koelle, MD

Steven E. Mayer, PhD

New Memorial Travel Awards

The **Jerry J. Buccafusco Travel Award** has been jointly endowed by the Division for Integrative Systems, Translational and Clinical Pharmacology and the Division for Drug Discovery, Development and Regulatory Affairs. It will be given to a student working in the area of integrative systems.

The **Steven E. Mayer Travel Award** was established in memory of Dr. Mayer, a past President of ASPET, by his wife, Dr. Elaine Sanders-Bush, and will be awarded to one of the top travel award recipients.

Members may contribute to either award on their annual dues notice.

Steven Edward Mayer, PhD

Dr. Steven Edward Mayer died on June 29, 2010 after a long illness. Born in Frankfurt, Germany, on February 11, 1929, Steven was the only child of Ernst and Irmgard Kaufmann Mayer. In 1938, he and his mother narrowly escaped the Holocaust by immigrating to Holland and then to the United States, where they joined his father in Chicago, IL, and subsequently became US citizens. At 16, he enrolled at the University of Chicago, graduating with Bachelor of Arts and Bachelor of Science degrees, both with honors. After two years in medical school at the University of Chicago, he took a leave of absence to do research in pharmacology at the University of Illinois, Chicago, earning a PhD degree in 1954. He then served in the Public Health Service at the National Institutes of Health in Washington, DC, and worked at Washington University in St. Louis. In 1957, he joined the faculty of the Department of Pharmacology at Emory University in Atlanta, GA, and remained there until 1969, when he moved to the University of California at San Diego as Professor of Medicine and Director of the Division of Pharmacology. In 1985, he relocated to Nashville as Visiting Professor in Pharmacology at Vanderbilt University School of Medicine until he retired in 1995, as Professor Emeritus at the University of California at San Diego.

During his long and distinguished academic career, Dr. Mayer received many honors, including the John Jacob Abel Award, President of the American Society of Pharmacology and Experimental Therapeutics, Associate Editor of the revered pharmacology textbook *Goodman and Gilman's Pharmacological Basis of Therapeutics*, and Editor of the major scientific journal *Molecular Pharmacology*. His laboratory research on fat and cardiac muscle metabolism was recognized internationally for its innovation and rigor. He will also be remembered for his love of chamber music and his vast collection of CDs. Throughout the years as an academic scientist and in retirement, he continued to experiment with and to enjoy photographing the wonders of nature.

Dr. Mayer is survived by his wife of twenty-two years, Elaine Sanders Bush; a daughter Stephanie (Todd Marshall) in Boulder, CO; a son Alex (Suzanne Van Dam) in Hancock, MI; former wife, Jean Mayer, of San Diego, CA; a stepdaughter, Kate Bush Loyco (Michael) in Nashville, TN; and his grandchildren, Peter and Arthur Mayer, Rachel Marshall, and Lucy Loyco. There will be a celebration of Dr. Mayer's life later this summer in Nashville. In lieu of flowers, donations in his memory may be made to the American Society for Pharmacology and Experimental Therapeutics (ASPET) for the Steven E. Mayer Travel Fund or to the Department of Pharmacology, University of California, San Diego (9500 Gilman Drive, Dept. 0636, La Jolla, CA 92093).

Submitted by Dr. Elaine Sanders Bush.

James Whyte Black, PhD

Dr. Black was born on June 14, 1924 and died on March 22, 2010. The following tribute was by Alan McGregor, Professor of Medicine, King's College London, London, UK, was given at the funeral service for Dr. Black on March 29, 2010, and was published as an editorial in the British Journal of Pharmacology *(2010)* ***160*** *(Suppl. 1) S3-S4. It is reprinted here with permission of the British Pharmacological Society.*

Greatness is earned not just through what we achieve, but by how we handle the recognition of our achievements and how we behave thereafter. James Black was a truly great man.

In the modern era of communication the world has mourned his passing and marvelled in his achievements with the sheer density of coverage rightly reflecting the significance of his life and contribution. The headlines are well known.

Born into a mining family in Lanarkshire in 1924, schooled in Fife, prior to University at St Andrews, Jim was a proud Scotsman and, with Alexander Fleming, one of only two Scottish Nobel Laureates – a source of huge pride to his native land.

Trained as a physician at St Andrew's and qualifying as such in 1946; he turned his back on medicine because of its perceived "lack of humanity" and in his own words "pursued his love affair with knowledge" first as a cardiovascular physiologist and thence, with the help of medicinal chemists, as an analytical pharmacologist. Never having done a PhD he described himself as "one untrained in experimental science who picked it up along the way".

His career spanned academe and industry – the universities of Singapore, Glasgow, University College London and King's College London, interspersed with the pharmaceutical companies ICI, Smith Kline French and the Wellcome Foundation. His relationships with these organisations were driven by the desire to pursue his personal scientific ideas and goals. Universities offered independence and freedom but inadequate resource and expertise for his science – industry offered huge resource but often scepticism and impatience at his approach and corporate commercial expectations which were of less interest to him.

The story of the science that emerged is legendary but worth telling.

Working in Glasgow in the early 1950s on mechanisms to increase oxygen supply to the ischemic heart he proposed, based on Raymond Ahlquist's adrenergic receptor hypothesis of 1948, that an alternative approach would be to reduce the heart's need for oxygen by reducing its rate and force of contraction. His hypothesis, that a compound that blocked the cardiac beta-adrenergic receptor could achieve this, was imminently testable. A move to ICI followed in 1958 and in 1964 propranolol was launched and the hypothesis confirmed.

He defined his drug discovery pathway as such

1. Identify the clinical problem.
2. Characterise the underlying biological processes.
3. Establishing the regulatory molecules and receptors involved.
4. Design compounds which antagonise this process by acting through the same receptor pathway.

Keen to test this pathway in a different system and unkeen to get involved in the subsequent commercial development and delivery of propranolol into the marketplace; he moved in 1964 from ICI to Smith Kline French. Focussing now on the ability of histamine to stimulate gastric acid secretion and contribute to peptic ulcer disease – the result, in 1975, was the launch of cimetidine, the first selective histamine H2 antagonist. The rest, as they say, is history!

Both propranolol and cimetidine were unique and "first-in-class"– i.e. first approved drugs acting through novel mechanisms of action – no "me too's" for Jim Black! Both became the biggest selling compounds of their generation. Both contributed massively to improving human health. The compounds themselves and the thinking and processes needed to develop them changed the face of medicine and perhaps as an afterthought – but certainly as a result; "no single man on earth has ever earned more income for the international pharmaceutical industry"!

Recognition and honours have followed;

- Elected an FRS in 1976,
- Knighted in 1981,
- Awarded the Nobel Prize with Gertrude Elion and George Hitchings in 1988,
- He was Chancellor of Dundee University from 1992 until 2006,
- Appointed to the Order of Merit by HM the Queen in 2000 and
- Talked of now in the same league as William Harvey who discovered the circulation of the blood.
- With none of it ever changing the man who often wondered "what all the fuss was about?"

I had the honour of knowing Jim for 24 years – first as a colleague, then as a friend and finally as a physician. Humble, charming, kind and generous, passionate to the end about life, music and science – that of both the young in encouraging and securing their futures and of course his own – right to the end he remained active and he was still publishing in 2010 on gastrin antagonists in gastric and pancreatic cancer. A great scientist and a very great man. Claude Bernard characterised the likes of Jim beautifully –"innovators see what everyone else has seen BUT think what nobody else has thought".

And what of his personal life? Devastated by the death of his first wife Hilary in 1986, and sustained by their loving daughter Stephanie; he found real happiness again with Rona, whose loving care and attention revitalised his life and ensured continuing independence and quality of life right to the very end.

James Black's achievements are the stuff of legends. In closing I am reminded of his fellow Nobel Laureate and my other hero Nelson Mandela's comments on death; "In eulogies to the departed the words of the living sometimes bear little relation to reality and in reality the names of only very few people are remembered beyond their lives". James Black will never be forgotten.

Winifred Jean Angenent Koelle, MD

Winifred Jean Angenent Koelle MD died peacefully on August 6, 2010, in her home at the Quadrangle, Haverford, Pennsylvania, at 84. “Winnie” was born in Batavia on the island of Java in the Dutch East Indies, enjoying life as the only child of a Colonial Official until the Japanese invasion. Both she and her American mother, Tilse Daniels Angenent (Wellesley 1924) were separated from her father Dr. Pieter Hendrick Angenent and interred in Japanese Concentration Camps. Despite exhausting forced labor, Winnie continued studying science.

Following the end of the war, she entered Wellesley, majoring in chemistry and graduating in 1948. Winning a scholarship to Physicians and Surgeons at Columbia University, she earned an MD degree in 1952, Internal Medicine.

She married Dr. George Brampton Koelle, University of Pennsylvania Emeritus Professor and member of the National Academy of Sciences, and then resided in Swarthmore, PA, for half a century. Winnie took a hiatus to deliver and raise three sons who survive her: William Angenent Koelle and wife Paula Millirons Koelle of Huntsville, Dr. Jonathan Stuart Koelle of San Diego, and Dr. Peter Brampton Koelle of Swarthmore.

She resumed her practice serving as Chief of Intensive Care, Taylor Hospital, Ridley Park, PA. The family spent nearly a year in Shiraz, Iran, in 1969-1970 with George and Winnie on the Pahlavi University faculty. She then served as chief of Outpatient Medicine at Philadelphia General and on the Penn faculty.

Preceded in death by George, Winnie spent her final decade at the Quadrangle, enjoying friends, her beloved Siamese cats, the Philadelphia Symphony Orchestra, ornithology, and visits by her sons and two granddaughters Heidi Tilse and Emily Suzanne Koelle, including one delightful meeting in Burgundy.

Following a wake on August 7 at the Townhouse Restaurant in Media, PA, her funeral was held on August 9, officiated by Bishop David Moyer, Church of the Good Shepherd, Rosemont, PA. Mother was personable, generous, a gifted physician, a loving wife, mother, and friend. While we sadly bid her farewell, deposing her ashes in Crum Creek, a tributary of the Delaware; as with Father, she lives within us forever.

Submitted by William Koelle.

Definitions of Categories of ASPET Membership

Regular Members: Any doctoral level investigator who has conducted and is the primary author on at least one publication of an original study in the area of pharmacology published in a peer-reviewed journal is eligible for membership in ASPET. Exceptions may be made for someone who does not meet the degree requirement but who has made major research contributions to pharmacology. Dues for regular members are $140/year. Regular members must be nominated by one (1) Regular or Retired ASPET member.

Postdoctoral Members: Any qualified person who has received their Ph.D. or equivalent degree in pharmacology or a related field within the past five years is eligible for Postdoctoral membership. Individuals may remain in the Postdoctoral Membership category for a maximum of five (5) years from the date of receipt of their PhD (or equivalent) degree after which time they must upgrade to Regular Membership. Applicants for Postdoctoral membership must be sponsored by one (1) Regular or Retired ASPET member.

Affiliate Members: An investigator who does not meet the requirements for Regular membership because of the lack of a degree or lack of publication is eligible to apply for Affiliate membership. Affiliate members receive all the same member benefits as Regular members except that they may not vote in ASPET elections. Dues for Affiliate members are $105/year. Affiliate members must be nominated by one (1) Regular or Retired ASPET member.

Student Members: Individuals who are enrolled in undergraduate, graduate, or professional degree programs are eligible for Student membership in ASPET. Student members receive all the same benefits as Regular Members except that they may not vote in ASPET elections. Individuals may remain in the Student Member category for up to two (2) years following completion of their research doctoral degree. Undergraduate students pay no dues. Dues for second year and above Student members are $30. Student members must be nominated by one (1) Regular or Affiliate ASPET member.

Sponsors should send an email or letter addressing the applicant's qualifications for ASPET membership directly to the ASPET office (rphipps@aspet.org).

Regular Member Benefits (Dues $140):

- Reduced page charges for corresponding authors to publish in ASPET journals – pay $40/page instead of $80/page and save enough with one four-page article to pay your annual ASPET dues!
- Half-price color fees to publish color figures in ASPET journals.
- Free full-text access to all five online ASPET journals, including all back issues.
- Free subscription to *Molecular Interventions* (print) and *The Pharmacologist (*online).
- Reduced subscription rates for ASPET print journals.
- Reduced registration fees for ASPET meetings.
- Sponsorship of papers at the ASPET meeting.
- Best abstract awards for young scientists at the ASPET meeting.
- Free listing in the FASEB Directory.
- Membership in multiple ASPET Divisions for no additional dues.

Postdoctoral Members (Dues $70) have all the benefits of Regular Members.

Affiliate Members (Dues $105) have all the benefits of Regular Members except they may:

- Sponsor candidates for Student membership only.
- Not sponsor a paper for a non-member at a Society meeting.
- Not vote in Society elections.
- Not hold an elected office in the Society.

Student Members (Dues $30) have all the benefits of Regular Members except that they:

- Pay no dues their first year.
- Pay only $30 annual dues thereafter. Undergraduate student members pay no dues and get their first graduate year free.
- Must have their papers at Society meetings sponsored by a member.
- May not vote in Society elections nor hold an elected office in the Society.

2010 Member Publication Subscription Rates

- *Journal of Pharmacology and Experimental Therapeutics* (Monthly) - $220/year
- *Pharmacological Reviews* (Quarterly) - $89/year
- *Drug Metabolism and Disposition* (Monthly) - $137/year
- *Molecular Pharmacology* (Monthly) - $180/year
- *Molecular Interventions* (Bimonthly) – included with dues

APPLICATION INSTRUCTIONS

Submit the completed Application for Membership form or use the online application form on the ASPET web site at **http://www.aspet.org/membership/apply**. Submit a current *curriculum vitae* including bibliography for Regular and Affiliate Membership. You may e-mail the CV to the ASPET Membership Coordinator, Robert Phipps, **rphipps@aspet.org**.

Sponsor Statements: Submit a statement of qualifications of the applicant from one Regular/Retired Member of ASPET for Regular Membership, Affiliate Membership and Student Membership (Affiliate Members may also sponsor student applicants). In addition to the statement certifying that the applicant is qualified for ASPET membership, sponsors should provide their own current address, phone, fax, and email. It is the responsibility of the applicant to insure that these documents are submitted to the ASPET office.

American Society for Pharmacology and Experimental Therapeutics
9650 Rockville Pike, Bethesda, MD 20814-3995 USA
Phone: 301-634-7060 ♦ Fax: 301-634-7061 ♦ www.aspet.org

Membership Application – TP0910

Please Complete All Sections:

Section 1: Application Details

Application for:

❑ **Regular Membership** ❑ **Affiliate Membership**

❑ **Postdoctoral Membership – Date PhD received:** _____

❑ **Graduate Student – Expected Date of Graduation:** _____

❑ **Undergraduate Student - Year:** ❑ **Fr** ❑**Soph** ❑**Jr** ❑**Sr**

Section 2: Source

How did you hear about ASPET:

❑ **Meeting** _____

❑ **ASPET Journal** _____

❑ **Mentor** _____

❑ **Other** _____

Section 3: Personal Information

Name:

Institution:

Address:

Telephone:

Fax:

Email:

Section 4: Optional Demographics (Not Required)

Date of Birth: _____

Sex: ❑ Female ❑ Male

Ethnicity:

❑ Asian

❑ Black or African American

❑ American Indian or Alaskan Native

❑ Hispanic or Latino

❑ Native Hawaiian or Pacific Islander

❑ White

❑ Other: _____

The information in this section will be used by ASPET to collate statistics and will be kept private. Completion of this section is voluntary.

Section 5: Sponsor (Must be an ASPET Member)

Name and email of your sponsor:

Please have your sponsor send us a brief letter or e-mail outlining your qualifications for membership in ASPET to the Membership Coordinator , Robert Phipps, (rphipps@aspet.org).

Section 6: Division Selection

Divisions: *Division membership is a benefit of ASPET membership and there is no additional charge to belong to a division. It is highly recommended that you join a division so that you may take full advantage of Society participation. Joining a division allows you to participate in creating the scientific program for the annual meeting, network with people in your field at mixers and divisional programs, and receive special notices and newsletters about items and activities of interest in your field. Be sure to pick a division!*

Indicate primary (1) and as many secondary (X) divisions to which you wish to belong:

___ Division for Behavioral Pharmacology
___ Division for Cardiovascular Pharmacology
___ Division for Drug Discovery, Development & Regulatory Affairs
___ Division for Drug Metabolism
___ Division for Integrative Systems, Translational, & Clinical Pharmacology
___ Division for Molecular Pharmacology
___ Division for Neuropharmacology
___ Division for Pharmacology Education
___ Division for Toxicology

Section 7: Curriculum Vitae

Regular, Affiliate, Postdoctoral, and Graduate Student applicants: Please send your *Curriculum Vitae* (including bibliography) by email to the Membership Coordinator, Robert Phipps (rphipps@aspet.org).

Undergraduate Student Applicants Only:

Current Education :

Expected Degree & Date: School: City/State/Country: Major Field:

Applications are reviewed on a rolling basis. Please DO NOT send payment with your application.
Upon membership approval, you will be sent a dues statement and welcome package.
Student Membership is FREE for the first year, Regular members pay $140, Affiliate Members pay $105, Postdoctoral Members pay $70.

Call or e-mail the ASPET Membership Department for additional information: 301-634-7135 / rphipps@aspet.org.

Future Meetings

Mid-Atlantic Pharmacology Society
Annual Meeting
December 10, 2010
Fox Chase Cancer Center
(Philadelphia)

Experimental Biology '11
Washington, DC
April 9-12
(APS, ASBMB, ASPET, ASIP, ASN, AAA)

Have You Joined a Division?

Take full advantage of your ASPET Membership
Join one or more of ASPET's 9 Divisions

- Help create the annual meeting's scientific program through divisional programming
- Network with people in your research field
- Receive special notices about divisional activities
- Participate in running the division and help plan its activities

For more information about ASPET's Divisions, visit aspet.org.