ASPET Preliminary Program for Experimental Biology 2004 in Washington, DC

SYMPOSIA

Sunday, April 18

New insights on calcium signaling and vascular function
Chair: Joseph E. Brayden

The role for calcium in coordination of oscillating vascular smooth muscle cells. Christian Aalkjaer, Univ. of Aarhus, Aarhus, Denmark.
Regulation of vascular tone by transient receptor potential channels. Joseph E. Brayden, Univ. of Vermont Col. of Med.

Pharmacology of ADHD in 2004
Chairs: Monique Ernst and Jonathan L. Katz

The future of genetics in the pharmacology of ADHD. James Kennedy, Ctr. for Addiction and Mental Hlth., Toronto.
New therapeutic targets and animal models of ADHD. Jerry J. Buccafusco, Med. Col. of Georgia.
Novel treatment of ADHD. Lawrence Greenhill, Columbia Univ.
Functional neuroimaging in ADHD. Monique Ernst, NIH NIMH/MAP.

Phospholipase C-epsilon: A multifunctional signaling protein regulated by both heterotrimeric and Ras superfamily G proteins
Chair: Ken Harden

Regulation of PLC-epsilon by G alpha subunits. Jon W. Lomasney, Northwestern Univ.
Rho-mediated activation of PLC-epsilon. Michele R. Wing, Univ. of North Carolina, Chapel Hill.
Function of PLC-epsilon in cardiac function and carcinogenesis. Tohru Kataoka, Kobe Univ., Japan

Mechanisms of adverse drug reactions
Chair: Ron N. Hines

Reactive intermediates as underlying causes of adverse drug reactions. B. Kevin Park, Univ. of Liverpool Med. Sch., U.K.
Felbamate as a model for understanding idiosyncratic drug reactions. Christine M. Dieckhaus, Merck Res. Labs.
Potential role of cytochrome b5 and cytochrome b5 reductase in drug hypersensitivity. Sunil Bajad, Univ. of Wisconsin at Madison.
Pharmacogenomics as a tool to better understand adverse drug reactions. Dan M. Roden, Vanderbilt Univ. Sch. of Med.
Genetic CYP2C9 variants as risk factors for coumadin-induced adverse drug reactions. Allan E. Rettie, Univ. of Washington Sch. of Pharmacy.

Toxicological and health implications of glutathione transport and metabolism
Chair: Larry H. Lash

Hepatic transport of glutathione: Mechanisms and relationship to liver function and pathology. Ned Ballatori, Univ. of Rochester.
Mitochondrial glutathione transport: role in susceptibility to chemically induced apoptosis. Larry H. Lash, Wayne State Univ.
Regulation of glutathione synthesis: Disease models and health implications. Terrance J. Kavanagh, Univ. of Washington.
The pharmacology of eating and energy utilization: Neurocircuitry and effectors

*Chairs: Timothy H. Moran and Kenny J. Simansky*


Emerging concepts and compounds in obesity therapeutics

*Chairs: Terry J. Opgenorth and Lou A. Tartaglia*

The FDA obesity guidance. Patricia Beaston, FDA.


Hypothalamic regulation of insulin action. Luciano Rossetti, Albert Einstein Col. of Med.


Endocannabinoids and energy balance: CB-1 receptor antagonists for the treatment of obesity. Andy G. Swick, Pfizer, Inc.

trans-3,4-dimethyl-4-arylpiperidine opioid receptor antagonists as a novel treatment for obesity. M.A. Statnick, Eli Lilly and Co.

MC4 receptor as a potential target for the treatment of obesity. Tung M. Fong, Merck and Co.


Future directions in pharmacology graduate training

*Chair: Peter C. Preusch*

Introduction: Training programs in pharmacology from the NIH perspective. Peter C. Preusch, NIH, NIGMS.

What constitutes a good training program in pharmacology from the reviewer’s perspective. James C. Garrison, Univ. of Virginia Sch. of Med.

What the pharmaceutical industry of the 21st century is looking for in a pharmacologist. Robert R. Ruffolo, Wyeth Res.


Electronic resources for pharmacology education

*Chairs: Gary C. Rosenfeld and Jack W. Strandhoy*

Introduction and the use of web based Knowledge Objectives to enhance teaching and learning in pharmacology. Gary C. Rosenfeld, Univ. of Texas Hlth. Sci. Ctr., Houston.

Web Based database reference works in teaching graduate pharmacology. David B. Bylund, Univ. of Nebraska Med. Ctr.

HEAL and BEN as multimedia database resources for medical education. Robert G. Carroll, East Carolina Univ.

Using computer and PDA resources to enhance pharmacology education. Jack W. Strandhoy, Wake Forest Univ. Sch. of Med.

Neuroimaging: Strategies for application to preclinical neurotoxicology and neuropharmacology

*Chair: Bill Slikker*


Small animal imaging using positron emission tomography. Arion Chatziioannou, UCLA Sch. of Med.

Investigating brain damage and repair with PET in rodents. Harley Kornblum., UCLA.

Brain T1 magnetic resonance imaging (MRI) is a semi-quantitative estimator of brain manganese concentrations in nonhuman primates (abstract 7436). David C. Dorman, CIIT Ctrs. For Hlth. Res., Research Triangle Park, NC

MRS to assess developmental neurotoxicity. Christine C. Cloak, Brookhaven Natl. Lab.
Monday, April 19

**Knockout mouse models for studying in vivo function of cytochrome P450 and other drug metabolizing enzymes**

*Chair: Xinxin Ding*

Using knockout and humanized mice to understand mechanisms of polycyclic hydrocarbon toxicity. Tim Dalton, Univ. of Cincinnati.
The role of CYP1B1 in the disruption of bone marrow hematopoiesis by polycyclic hydrocarbons. Colin R. Jefcoate, Univ. of Wisconsin at Madison.
Functional consequences of microsomal NADPH-cytochrome P450 oxidoreductase deficiency. Anna Shen, Univ. of Wisconsin at Madison.
A conditional P450 reductase knockout mouse model for investigating tissue-selective, P450-mediated drug metabolism and xenobiotic toxicity. Xinxin Ding, State Univ. New York State Dept. of Hlth.


**Therapeutic opportunities for histamine H3 receptor ligands**

*Chair: Arthur A. Hancock*

Molecular pharmacology of the histamine H3 receptor. Rob Leurs, Vrije Univ., Amsterdam, the Netherlands
Effects of H3 antagonists in a variety of animal models of learning, memory and attention, and the side-effect liabilities of such compounds. Gerard B. Fox, Abbott Labs.
Effects of novel histamine H3 receptor antagonists on food intake and body weight in rodents and in larger species. Karin Rimvall, Novo-Nordisc A/S
Role of presynaptic H3 receptors in myocardial ischemic states. Roberto Levi, Cornell Univ.
Novel compounds interacting with the histaminergic system have antinociceptive effects in animal models. Lindsay B. Hough, Albany Med. Col.

**Targeting chemokine receptors in the central nervous system**

*Chair: Jeffrey K. Harrison*

Diverse functions of chemokines in the CNS. Jeffrey K. Harrison, Univ. of Florida.
Modified virally encoded chemokines to probe structure-function of chemokine receptors. Christopher N. Davis, Univ. of Florida Hlth. Sci. Ctr.
Chemokine regulation of lymphocyte and dendritic cell trafficking in experimental autoimmune encephalomyelitis. William J. Karpus, Northwestern Univ.
A genetic approach to understanding roles of chemokines and their receptors in animal models. Richard M. Ransohoff, Cleveland Clinic Fndn.
Development and evaluation of small molecule chemokine receptor antagonists. Richard Horuk, Berlex Biosciences.

**Advances in fluorescence methods for receptor studies: 3rd International Symposium**

*Chair: Ian McGrath*

Fluorescence in pharmacology. Ian McGrath, Univ. of Glasgow.
The use of fluorescent ligands in the study of vascular function. Craig Daly, Univ. of Glasgow.
Imaging neurotransmission at the nerve muscle junction. Tom Cunnane, Univ. of Oxford.
Kinetics of uptake and localization of fluorescent phorbol ester and protein kinase C or RasGRP3 as a function of time after phorbol ester addition. (abstract 3939). Derek C. Braun, NCI, NIH.
Control of Ca++ in the vascular wall. Christian Aalkjaer, Univ. of Aarhus, Aarhus, Denmark.
Use of fluorescent probes to study ligand-induced conformational changes in receptors. Brian Kobilka, Stanford Univ.

Tuesday, April 20

**Early ADME support and the drug discovery process**

*Chair: Adedayo Adedoyin*

Impact of high throughput assays on drug discovery. Adedayo Adedoyin, Aventis Pharmaceut.
Permeability assays on drug discovery. Tycho Heimbach, Pfizer Global R&D.
High throughput CYP inhibition assays. Larry Wienkers, Pharmacia.
Frontiers in anticoagulant pharmacology: New insights on mechanism of action and emerging novel therapeutics

Chairs: Madhu S. Chintala and Giora Z. Feuerstein

New insights into mechanisms of initiation and propagation of the coagulation cascade. Douglas Monroe, Univ. of North Carolina at Chapel Hill.

Thrombin receptors antagonists (PAR-1) as a novel approach in antiplatelet therapeutics. Madhu S. Chintala, Schering-Plough Res. Inst.

Future anti-coagulants: Is 9 the winning number? Giora Z. Feuerstein, Merck Res. Labs.


Gender and the pharmacology of eating disorders: Linking molecules and signals to behavior

Chair: Joan M. Lakoski

Estrogen regulation of pituitary leptin. Gwen V. Childs, Univ. of Arkansas for Med. Sci.


Sex hormones, body weight regulation and food intake. Deborah J. Clegg, Univ. of Cincinnati Sch. of Med.

Gender and dietary nutrient regulation of insulin action. Renee Commerford, Novartis Inst. for Biomedical Res.

A rat model of binge-type eating: What we have learned so far. Rebecca L. Corwin, Penn State Univ.

siRNAs: Research tools/therapeutic molecules?

Chair: Michael T. McManus

Mechanisms of action of siRNAs. Gyorgy Hutvagner, Univ. of Massachusetts Med. Sch.

Mechanistics aspects of rational siRNA design. Anastasia Khvorova, Dharmacon.

Hairpin-delivered siRNAs in cell culture. Dave Turner, Univ. of Mich.

Lentiviral RNAi vectors for the identification and validation of novel therapeutic targets. Peter Sandy, MIT.

SiRNAs – transition to therapeutic molecules in humans. Jolanta Vidugiriene, Promega.

Polymorphisms in signaling cascades and effector molecules

Chair: J. David Port

Polymorphisms in a- and b-ARs; relationship to outcomes in cardiovascular disease. Stephen B. Liggett, Univ. of Cincinnati.

Genomic and posttranscriptional regulation of serotonin 5-HT2 receptor signaling. Elaine Sanders-Bush, Vanderbilt Univ.


Wednesday, April 21

Environmental agents and ion channel function

Chairs: William D. Atchison and Timothy Shafer

Disruption of cerebellar GABA_A receptor-mediated inhibition by environmental mercurials, a possible contributor to selective neuronal vulnerability. William D. Atchison, Michigan State Univ.

Disruption of function of high-voltage activated calcium channels by environmental agents – implications for developmental function. Timothy Shafer, EPA, Research Triangle Park, NC.

Site-specific actions of ethanol on NMDA receptors. John J. Woodward, Med. Univ. of South Carolina.

Impairment of LTP and spatial learning are associated with disruption in glutamatergic synaptic function produced by environmental type exposure to lead. Tomas R. Guirarte, Johns Hopkins Univ.

Modulation of ligand-gated chloride channels in insect and mammalian neurons. Xilong Zhao, Northwestern Univ.

Inhibition of neuronal nicotinic acetylcholine receptors by the abused solvent, toluene. Ambuja Bale, EPA, Research Triangle Park, NC.
**Dopamine receptor blockade in the development of ‘atypical’ antipsychotic agents**  
*Chairs: Jack Bergman and Joseph Wettstein*

The continued utility of dopamine receptor blockers in the treatment of psychosis. Philip G. Janicak, Univ. of Illinois at Chicago.
Dopamine partial agonists as dopamine receptor stabilizers: The next generation of dopamine-based antipsychotic drugs. Nicholas Waters, Carlsson Res. AB, Göteborg, Sweden.
Dissociation rate from D₂ receptors as a predictor of “atypicality” in antipsychotic action. Philip Seeman, Univ. of Toronto.
The role of 5HT₁A receptor activity in behavioral effects of some “atypical” antipsychotics. Wouter Koek, Univ of Texas Hlth. Sci. Ctr. at San Antonio.
Preclinical identification of serotonergic and glutamatergic targets for the development of novel antipsychotics. Mark A. Geyer, UCSD Sch. of Med.

**Neuroprotective effects of natural products**  
*Chairs: Nancy Pearson and Dale Birkle*

Mitochondrial dysfunction and therapies in Parkinson’s disease. Clifford W. Shults, UCSD
The multiplicity of actions of fruit polyphenolics in forestalling and reversing the deleterious effects of brain aging and behavior. James A. Joseph, Tufts Univ.

**Rescuing mutant receptors and proteins: A new drug development strategy**  
*Chair: P. Michael Conn*

Influence of molecular and chemical chaperones on protein folding. William J. Welch, UCSF.
Pharmacological chaperones acting on the V2 receptor; potential therapeutic applications. Michel Bouvier, Univ. of Montreal.

**Protein-protein interactions in cellular signaling cascades: A new frontier for drug discovery**  
*Chair: Haian Fu*

Dynamic visualization of biochemical networks in living cells. Stephen Michnick, Univ. of Montreal.
Targeting phosphorylation-dependent protein-protein interactions. Haian Fu, Emory Univ. Sch. of Med.

**Cancer chemotherapy and drug metabolism**  
*Chair: David S. Riddick*

Interactions of anthracyclines with drug-metabolizing enzymes. David S. Riddick, Univ. of Toronto.
Bioreductive pro-drugs: Routes of activation and potential application in gene therapy. Ian J. Stratford, Univ. of Manchester.
Role of glutathione conjugation and efflux in cellular resistance to alkylating agents and other reactive electrophiles. Charles S. Morrow, Wake Forest Univ.

**Nexuses between dopamine and serotonin systems: Implications for antipsychotic drug actions**  
*Chair: Frank I. Tarazi and John A. Schuetz*

Mechanism of actions of atypical antipsychotic drugs: Role of serotonin 5-HT₁A agonism. Junji Ichikawa, Vanderbilt Univ. Sch. of Med.
Molecular interaction sites for therapeutic agents targeting dopamine and serotonin receptors. John A. Schetz, Univ. of North Texas Hlth. Sci. Ctr.
Neurophysiological effects of antipsychotics on dopamine and serotonin systems. Kurt Rasmussen, Eli Lilly and Co.

**Phosphodiesterases – status as therapeutic targets**
*Chairs: Larry Burgess and Jim Winkler*

A series of sub-nanomolar PDE5 inhibitors leading to a clinical candidate more potent and selective than sildenafil. John E. Macor, Bristol Myers Squibb.
Discovery and development of PDE4 inhibitors. Tim Martins, ICOS Corp.
Discovery and development of cGMP PDE inhibitors. Joe Thompson, OSI Pharmaceut.
Phosphodiesterase 3 – status as a therapeutic target. Vincent C. Manganiello, NHLBI, NIH

**DIVISION SESSIONS**

**Division for Behavioral Pharmacology workshop: Quantitative methods in behavioral pharmacology**
*Moderator: Jonathan L. Katz*

Introduction. Jonathan L. Katz, NIDA, NIH, IRP
Self-administration of drug mixtures. W.L. Woolverton, Univ. of Mississippi Med. Ctr.

**Division for Cardiovascular Pharmacology Graduate Student and Postdoctoral Scientist Best Paper Competition**
*Chairs: Steven P. Jones and Richard H. Kennedy*

**Division for Clinical Pharmacology symposium: Mechanisms of gender effects on human drug response**
*Chair: David A. Flockhart*

Mechanisms of gender effects on pharmacodynamics: Ion channel activity. Steven N. Ebert, Georgetown Univ. Med. Ctr.
Mechanisms of gender effects on phamacokinetics. J. Christopher Gorski, Indiana Univ. Sch. of Med.
Mechanisms of gender effects on disease: Gender differences in ‘intermediate phenotypes’ for hypertension. Daniel T. O'Connor, UCSD

**Division for Drug Discovery, Development and Regulatory Affairs symposium: Drug discovery and development: From idea to approval**
*Chair: Ben Yerxa*

Drug discovery: Finding new targets and active compounds. H. Jefferson Leighton, BioDesign, Boston, MA
Drug development: Establishing clinical human safety and efficacy. Karla Jacobus, PPD Develop., Morrisville, NC
Drug approval: The FDA and the regulatory process. Pauliana Hall, PCH Integrated Regulatory Services, Laguna Niguel, CA

**Division for Molecular Pharmacology Postdoctoral Award Finalists**
*Chair: Palmer W. Taylor*

A new approach to structure-guided drug design: Fluctuations in the drug target and freeze frame inhibition. Palmer W. Taylor, UCSD.

**Division for Neuropharmacology symposium: Cell biology of the catecholamine neuron: A symposium in honor of Julius Axelrod celebrating a decade of molecular exploration of mammalian phenotypes of catecholamine biosynthetic enzyme, transporter and metabolizing enzyme deficiency, and their clinical relevance to neuronal excitability, food- and drug-related behaviors, and neuronal development and degeneration.**
*Chair: Lee Eiden*

Introduction. Solomon Snyder, Johns Hopkins.
Disruption of striatal dopamine signaling causes amphetamine-induced hypophagia. Richard Palmiter, Univ. of Washington.
The vesicular monoamine transporters and other regulated traits of monoamine-secreting cells. Lee E. Eiden, NIMH-IRP, NIH
Regulated trafficking of catecholamine transporters in presynaptic terminals. Randy D. Blakely, Vanderbilt Univ.
COMT: From gene to brain and behavior. Daniel Weinberger, NIMH-IRP, NIH

**Division for Pharmacology Education workshop: Team learning: Small-group activities in the large-group lecture hall**

Lectures remain the main instructional modality because they are efficient and summarize large bodies of material. However, learners are passive recipients of information. To increase active learning, small-groups have been adopted. This allows problem solving and application of knowledge in real-life situations but, demands faculty and facilities and can result in uneven inter-group instruction. Team Learning (TL) combines the strengths of lectures and small-groups. TL consists of three phases. In Phase 1 learners acquire required content through self-study, lectures or both. In Phase 2 learners demonstrate their readiness to apply information through tests taken individually and in small-groups followed immediately by faculty feedback. In Phase 3 students solve problems in small-groups in the lecture hall. Keys to this phase are that groups work on the same problem, select their solution from a list, and simultaneously declare their selection. Problems are designed to generate inter-group controversy which faculty exploit as groups orally defend their selections. The rich discussion enables faculty to correct student thinking and model critical thinking.

This two-hour workshop will expose participants to the principles of Team Learning through their participation in a mock course using Team Learning. At key intervals participants will reflect on specific Team Learning principles to learn more about the process and to appreciate how Team Learning may be applied to their specific circumstance. By the end of the workshop participants will be able to describe the three phases of Team Learning, define differences between Readiness Assurance Tests and Group Activity questions and describe the elements of a good Group Activity question.

**Division for Systems and Integrative Pharmacology symposium: Calcium mobilization to calcium sensitization: Identifying new pharmacologic targets in smooth muscle**
*Chairs: George Christ and Chris Wingard*

Regulation of Ca\(^{2+}\)-mobilization in detrusor muscle. Gerry Herra, Univ. of Vermont Col. of Med.
K\(^+\) channels, gap junctions and smooth muscle. George J. Christ, Albert Einstein Col. of Med.
Actin cytoskeletal remodeling in smooth muscle. William T. Gerthoffer, Univ. of Nevada Sch. of Med.
ROS and Ca\(^{2+}\)-sensitivity in smooth muscle. Keith A. Jones, Mayo Clinic.
EETs and ionic conductance systems in cerebral vascular muscle. David R. Harder, Med. Col. of Wisconsin.

**Division for Toxicology symposium: Hepatoxicity: Signaling mechanisms in cell death and survival**
*Chair: Harihara M. Mehendale*

Mechanisms of acetaminophen hepatotoxicity: Oxidant stress and regeneration. Hartmut Jaeschke, Univ. of Arizona
Inflammation: A susceptibility factor in drug-induced liver injury. Robert A. Roth, Michigan State Univ.
Survival mechanisms in fatty hepatocytes. Anna Mae Diehl, Johns Hopkins, Univ.
Mechanisms of progression and regression in liver injury. Harihara M. Mehendale, Univ. of Louisiana at Monroe

**Division for Drug Metabolism Platform Session: Biotransformation and drug transport**
*Chairs: Michael R. Franklin and Tim S. Tracy*

**LECTURES AND SPECIAL SESSIONS**

**Graduate Student Colloquium: Preserving and promoting our discipline: A workshop emphasizing pharmacology student participation**
*Chairs: Myron L. Toews, Stephanie W. Watts and Barbara S. Beckman*

Pharmacology is a basic science discipline that encompasses a wide range of scientific interests, yet possesses the unique focus of studying substances that interact with living systems through chemical processes. As a discipline, pharmacology does not have the profile possessed by others, including physiology, microbiology and immunology. The focus of this workshop will be to utilize the talent and thought of our graduate students, in combination with Graduate Directors from
across the nation, and address questions/issues critical to preserving and, importantly, promoting pharmacology. Small
groups will break out with a charged topic and, near the end of the meeting, present their ideas to the group. Where
appropriate, these items will be forward to Council of ASPET for discussion.

Possible topics:
1. Summer Undergraduate Programs - does your institution have one? Is it useful in recruiting students to pharmacology?
2. Undergraduate Pharmacology courses - does your institution have one? Is it useful in recruiting students to
pharmacology?
3. Incorporating pharmacology into other undergraduate courses (Physiology, micro)
4. Recruiting graduate students
   a. What works?
   b. What DOESN'T work?
5. Getting our message and identity out to the world (what is our message and how do we relay it?)

I CONSIDER ISSUE 5 EXTREMELY CRITICAL. We suffer from an amazing lack of PR or understanding, but yet every
individual in a developed country is living a life improved because of pharmacology. How do we make the public at large
understand how important this is to their lives, and how proper training of students is necessary to ensure continuing
development of drugs for future generations?
6. How is pharmacology "better" and/or "different" than other disciplines? How did you find out about pharmacology?
7. How can graduate students be proactive in their departments and schools?
8. How can graduate students be proactive at a higher level?
9. What are resources and affiliations available to pharmacology Graduate students
10. Would interaction with industry in a formal way be of use to your education as a pharmacologist? If so, how do you
    envision this?

2004 Teaching Institute: Strategies for collaborative/integrative teaching and research relationships between
pharmaceutical sciences and pharmacy practice faculties

Chairs: Ed Bilsky and Paula Witt-Enderby

Pharmacy education: Building a strong foundation for practice through science and research. Gayle A. Brazeau, SUNY at
Buffalo.
Impact of clinical research on patient care. Milap C. Nahata, Ohio State Univ. Col. of Pharmacy
Coordinated Pharm.D. and Ph.D. programs: Building bridges from the bench to the clinic. Kim L.R. Brouwer, Univ. of
North Carolina.

Minorities Committee Symposium: Careers in science: the specifics of how to get where you want to be

Chairs: Richard De La Garza and Margarita L. Dubocovich

The Minorities Committee: Current goals and future objectives. Margarita L. Dubocovich, Northwestern Univ.
A career in academia. Sunny Ohia, Univ. of Houston.
A career in industry. Marlene L. Cohen, Creative Pharmacology Solutions LLC.
A career in government science. Jean Lud Cadet, NIH, NIDA, IRP, Baltimore.
A career as a college professor. Shubhik K. DebBurman, Lake Forest Col.
A career in science editing. Barbara B. Van Renterghem, Eaton Publishing.

Public Affairs Workshop: Scientific and Regulatory Challenges Involving Dietary Supplements and Botanical
Products
Chair: Rudolph Juliano

Speakers:
Mark McClellan, Commissioner, Food and Drug Administration
Paul M. Coates, Director, Office of Dietary Supplements, NIH
Stephen E. Straus, Director, National Center for Complementary and Alternative Medicine, NIH

Topics to be addressed include: how to promote a stronger scientific foundation at the FDA and the need to
promote better health through better research; how new collaborations with NIH will help to improve our
understanding of the underlying mechanisms of action and help to improve safety and efficacy of these products;
research opportunities for the extramural community; and regulatory perspectives on the Dietary Supplement
Health & Education Act of 1994 (DSHEA).

Public Affairs Workshop: Systems and Integrative Biology
Chair: David Bylund
The advent of molecular biology has produced a vast wealth of information on human health and disease. However, there has been a diminishment in the number and ability of trained investigators – and students pursuing training and research – in the integrative and organ systems sciences. Science cannot effectively study disease or treatments for a disease simply by using isolated molecules, cells, or organs. Speakers will give their perspectives on the challenges and opportunities for enhancing the integrative & organ systems sciences by addressing its impact on both academic and industrial concerns.

**Short Course: A beginner’s guide to RNAi**

*Chair: Michael T. McManus*

- Biology of RNA interference in mammals. Michael T. McManus, MIT
- How to use siRNAs. Gyorgy Hutvagner, Univ. of Massachusetts Med. Sch.
- How to make and use pol III hairpins. Dave Turner, Univ. of Michigan.
- How to make and package lentiviral RNAi vectors. Peter Sandy, MIT.

**Bernard B. Brodie Award Lecture**

Structural and functional diversity in heme monoxygenases. Thomas L. Poulos, Univ. of California, Irvine.

**P.B. Dews Award Lecture**


**John V. Croker Lecture**


Speaker: Sir James Black

**SATELLITE MEETINGS (Separate Registration Required)**

**Friday, April 16**

**Pharmacotherapy of obesity: Targets and tools for the 21st century**

An ASPET-Ray Fuller Symposium

*Chairs: Kenny Simansky and Timothy Moran*

Framing the problems for research in obesity and the role of NIH in progress toward solutions. Philip F. Smith, NIDDK, NIH.


The new neuroendocrinology of energy homeostasis. Michael W. Schwartz, Univ. of Washington.


Melanocortins receptors as targets for the development of novel anti-obesity agents. Russell J. Sheldon, P&G Pharmaceut.


Fatty acid synthase inhibitors as therapeutic tools: Basic science and clinical outlook. Frank Kuhajda, Johns Hopkins Univ. Sch. of Med.


Serotonergic 5-HT<sub>2c</sub> receptor agonists as novel therapeutic agents for obesity. Keith Miller, Bristol Myers Squibb.

Peripheral peptidergic mechanisms regulating food intake. Timothy H. Moran, Johns Hopkins Univ. Sch. of Med.


**Saturday, April 17**
Second RGS Protein Colloquium

Chairs: Vadim Arshavsky and David P. Siderovski

RGS proteins: Past, present, future. David P. Siderovski, Univ. of North Carolina at Chapel Hill.
RGS insensitive G proteins as probes of physiological RGS function. Richard R. Neubig, Univ. of Michigan
Regulation of vascular smooth muscle relaxation and blood pressure by RGS2. Michael E. Mendelsohn, Tufts Univ.
Functional analysis of RGS proteins in intact cells: Lessons from photoreceptors. Marie Burns, UC-Davis.