



THE Pharmacologist

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The Crohn Legacy



Inside:

Message from
the President:
Annette Fleckenstein

2015 Annual
Meeting Highlights

WCP 2014 Meeting
in Review

SURF Spotlight



Contents...

- 123** Message from the President
- 124** ASPET Annual Meeting at EB 2015
- 130** WCP 2014 Meeting in Review
- 132** Feature Story: *The Crohn Legacy: From Halitosis to Colitis and Beyond*
- 141** Science Policy News
- 149** Education News
- 155** Journal News
- 156** Members in the News
- 162** New ASPET Members
- 167** Chapter News
- 170** Division News
- 172** Upcoming Meetings & Congresses

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Message from The President

My Fellow *Pharmacologists*,

The title *Pharmacologist* is one that I use with great pride, as ours is a discipline that spans the gamut embracing in vitro molecular biology, chemical biology, whole animal research, and human/clinical research— plus “all things in between.” If you don’t consider yourself a “pharmacologist,” I urge you to reconsider—if you are investigating, discovering, or developing therapeutics to treat disease, then **you are a pharmacologist** and are most certainly welcome as a member of the American Society for Pharmacology and Experimental Therapeutics (ASPET)! The discipline of pharmacology encompasses important aspects of basic, cellular, behavioral, and translational research. Indeed, and as described in our new tagline, we strive to **transform discoveries into therapeutics**. Pharmacology serves as a nexus of disciplines, and it is critical that we use our multidisciplinary utility to foster what the general public wants and needs: that is, advancements in therapeutics.

Please take a look at the [previous](#) edition of *The Pharmacologist*, if you haven’t already done so. Encourage your colleagues, including those who do not necessarily envision themselves as pharmacologists and/or are not members of “traditional” pharmacology departments, to become ASPET members. The “I AM a (physiologist, neuroscientist, chemical biologist, etc.) AND an ASPET member!” campaign exemplifies the direction that I urge us to be thinking about as a discipline. Scientists who share our vision are found throughout industry, government, and academia, as well as many other settings. Encourage them to call ASPET their “home!” ASPET is an organization that articulates to legislators, funding agencies, foundations, the general public, and others that research on the next generation of drugs and therapeutics is important for everyone. Encourage your non-member colleagues to engage with us in these efforts!

I am truly honored to serve as the 83rd president of ASPET. I congratulate and thank Past-President Richard Neubig, Executive Officer Judith Siuciak, and the entire ASPET staff for an outstanding effort to launch numerous important initiatives successfully this past year. These include the implementation of a new communications strategy that includes our new logo and tagline as well as a bold, “fresh” new look for both *The Pharmacologist* and the ASPET website. Under their leadership, the Goodman and Gilman Award was fully endowed and will thus ensure future acknowledgment of outstanding research in pharmacology of biological receptors, which is of course the basis for discovery of many drugs for the treatment of human disease.

This promises to be an exciting year for ASPET. The David Lehr Award, intended to extend funding for research directed toward human health and made possible by a generous endowment from Mrs. Lisa Lehr in memory of her husband, will be awarded for the first time. In addition, we are excited that the Reynold Spector Award in Clinical Pharmacology, recognizing excellence in research and/or teaching in clinical pharmacology and made possible by the generosity of Dr. Reynold and Mrs. Michiko Spector, will likewise be inaugurated. These new awards, in addition to those already sustained by the society, have and will continue to highlight the accomplishments of those who have served our discipline with great distinction, including several Nobel laureates whom we are honored to recognize as distinguished members of our society.

ASPET is committed to serving the educational outreach needs of our membership. Accordingly, we are excited to announce the hiring of a new education manager, Catherine Fry, who will spearhead new and innovative educational and outreach efforts. We are also keenly committed to serving via our “Big Ideas” initiative, which will fund efforts requested directly by our members. I have been impressed by the thoughtful and exciting proposals provided by so many and look forward to the implementation of as many of these as possible in the year to come.

This is a critical time with regard to multiple issues involving National Institutes of Health (NIH) funding, workforce challenges for young scientists, and “reproducibility” of scientific data. Over the past several months, ASPET leadership has met with directors at the NIH and the Center for Scientific Review. A symposium is scheduled for EB 2015 with planned presentations from leaders of these important groups, and we look forward to continued and productive dialog. I encourage all members of ASPET to communicate with their governmental representatives, as this can make an important difference!

I have a particular concern for the next generation of scientists: that is, our current graduate students, postdoctoral fellows, new assistant professors, and other young professionals. I urge those of you at this stage of your career to become involved with ASPET and know that your participation in the society is greatly welcomed. If you would like to become more involved, please contact the ASPET office or individual division chairs directly. We need you, and I can assure you that participation in ASPET can provide important opportunities that will serve both you and the Society for many years to come.

The ASPET door is always open for feedback and suggestions. Please do not hesitate to contact us. I look forward to serving as ASPET President in the year to come, and thank you for this opportunity.

Annette E. Fleckenstein

ASPET Annual Meeting at EB 2015

Meeting Highlights

The 2015 annual meeting of the American Society of Pharmacology and Experimental Therapeutics will be held in conjunction with the Experimental Biology 2015 meeting in Boston next year. The meeting will be held at the Boston Convention and Exhibition Center from March 28 to April 1, 2015. This year's ASPET program will include a wide variety of scientific symposia from invited speakers in addition to award lectures, division sessions, education and career development sessions, a student and postdoctoral best abstract competition, and numerous mixers and networking events.

ASPET is pleased to announce two new society awards for 2015, the **David Lehr Research Award** and the **Reynold Spector Award in Clinical Pharmacology**. The inaugural presentations of both these awards will be held at the annual meeting.

The annual meeting can help you learn about the latest developments in your field to push your

research forward. Not only will your participation help you gain scientific information but also bring you in contact with others from your scientific community who can advise you on any research issues and career concerns. Save the dates to attend the ASPET Annual Meeting at EB 2015. We look forward to your participation and abstract submissions.

Important Dates

November 6, 2014

Abstract Submission
Deadline

February 2, 2015

Deadline for Discounted
Registration

February 23, 2015

Discounted Housing
Deadline

March 28–April 1, 2015

EB 2015 in Boston

2015 Lecture Highlights



Jeffrey L. Benovic

Jeffrey Benovic, professor and chair of the Department of Biochemistry and Molecular Biology, Thomas Jefferson University, will present the Julius Axelrod Award in Pharmacology Lecture: Arresting Developments in Receptor Signaling.



Andre Terzic

Andre Terzic, professor of medicine at the Mayo Clinic will present the Benedict R. Lucchesi Distinguished Lectureship in Cardiac Pharmacology Lecture: Regenerative Therapy for the Failing Heart.



William Catterall

William Catterall, professor and chair of the Department of Pharmacology, University of Washington will present the Norman Weiner Lecture: Structural Basis for Function and Pharmacology of Voltage-Gated Sodium and Calcium Channels.

The ASPET 2015 Annual Meeting Microsite

We are extremely excited to showcase our new microsite for the 2015 ASPET Annual Meeting. The microsite has a simple user-friendly interface and easy navigation customized for a rich, informative user experience. Visit the microsite at www.aspet.org/EB2015 to access information on the meeting program, abstracts, speakers, special events, sponsorship opportunities, and more!



ASPET Travel Awards to Experimental Biology

Application Deadline:
December 12, 2014

Students and postdoctoral fellows are invited to apply for a Travel Award to help defray the costs of travel and housing to attend the ASPET Annual Meeting at EB 2015. ASPET Travel Awards consist of a fixed sum of \$600, registration (at the early registration rate), plus up to \$400 in travel reimbursement provided upon submission of valid receipts after the meeting.

For more information and to apply for a travel award, please visit: www.aspet.org/awards/travel

ASPET Best Abstract Awards

Application Deadline:
November 24, 2014

Best Abstract Awards are presented by ASPET's Divisions for abstracts that have been submitted by postdoctoral fellows, graduate students, and undergraduates attending the ASPET Annual Meeting at Experimental Biology 2015. Selected individuals may be asked to present their research at the Best Abstract Competition on Sunday evening, March 29, 2015 or at a Division oral session.

For more information and to apply for a Best Abstract Award, please visit: www.aspet.org/awards/best-abstract



LECTURES

JOHN J. ABEL AWARD IN PHARMACOLOGY LECTURE

Speaker: TBD

JULIUS AXELROD AWARD IN PHARMACOLOGY LECTURE:

Arresting Developments in Receptor Signaling

Speaker: Jeffrey L. Benovic

BENEDICT R. LUCCHESI DISTINGUISHED LECTURESHIP IN CARDIAC PHARMACOLOGY:

Regenerative Therapy for the Failing Heart

Speaker: Andre Terzic

NORMAN WEINER LECTURE

Structural Basis for Function and Pharmacology of Voltage-Gated Sodium and Calcium Channels

Speaker: William A. Catterall

DRUG METABOLISM EARLY CAREER ACHIEVEMENT AWARD LECTURE

Speaker: TBD

REYNOLD SPECTOR AWARD IN CLINICAL PHARMACOLOGY LECTURE

Speaker: TBD

PRELIMINARY SYMPOSIA

2015 Teaching Institute: Training Students for Teaching Careers

Chairs: Kelly Karpa and Klarissa Hardy

ASPET Journal Symposium: Reproducibility in the Pharmacological Sciences: Moving the Discussion Forward

Chair: Darrell R. Abernethy

ASPET Presidential Symposium: Navigating the Future of Biomedical Research

Chair: Annette E. Fleckenstein

Biased GPCR Signaling in Drug Development: From Theory to Physiology

Chairs: Sudarshan Rajagopal and Arthur Christopoulos

Bile Acids and Liver Disease in Pregnant Women and Neonates

Chair: Lauren M. Aleksunes and Grace L. Guo

"Can We Talk?" Strategies for Collaborative Pharmacology Education

Chairs: A. Laurel Gorman, Jayne S. Reuben and John L. Szarek

Cardiac Fibroblasts: Fair-weather Friends in Myocardial Fibrosis and Repair

Chair: Paul A. Insel

Channelizing Ion Channel Drug Discovery-Advancements and Current Challenges

Chairs: Sujay V. Kharade and Michael F. Jarvis

Common Pathways and Mechanisms of Chronic Pain and Opioid Addiction

Chair: Susan L. Ingram

Crossing the Line: Exploring the Borders Between Physiological Redox Signaling and Oxidative Stress

Chairs: Thomas Michel and Marcia Haigis

Elucidating the Molecular Underpinnings of Behavior Using Pharmacological Knock-in Mouse Models

Chair: Randy D. Blakely

Emerging Regenerative Therapies in Pulmonary Disease

Chairs: Yuru Liu and Jalees Rehman

Emerging Roles of Trace Amine Associated Receptor 1 (TAAR1) in Drug Abuse and Mental Disorders

Chairs: Jun-Xu Li and Gregory M. Miller

Interindividual Variability in CYP-Mediated Drug Metabolism

Chairs: Hyunyoung Jeong and Timothy S. Tracy

Julius Axelrod Symposium: The Ins and Outs of G Protein-Coupled Receptor Signaling

Chair: Jeffrey L. Benovic

Membrane Transporters at the Interface of Drug Interactions, Biomarker Monitoring and Toxicity

Chairs: Lauren M. Aleksunes and Yurong Lai

Monoamines and Neurotrophins in Inflammatory Bowel Disease/Irritable Bowel Syndrome

Chairs: Hamid I. Akbarali and Sandor Szabo

Moving Beyond Traditional Stimulants: Emerging Characteristics and Therapeutic Applications of Atypical Reuptake Inhibitors

Chairs: Lawrence P. Carter and Bruce E. Blough

Nanotoxicology: Small particles, big concerns

Chairs: Jeffrey S. Fedan and Dale W. Porter

Natural Products: Bioactive Molecules from Nature

Chairs: Benedict T. Green and Bruce E. Blough

New Roles of Mitochondria in Vascular Function

Chairs: David W. Busija and Prasad Katakam

New Technologies to Measure Mitochondrial Changes

Chair: Craig C. Beeson and Brian S. Cummings

New Therapies for an Old Problem: The NINDS-Sponsored Anticonvulsant Screening Program

Chairs: John H. Kehne and Karen S. Wilcox

Novel Therapeutic Targets and Preclinical Models of Post-Traumatic Stress Disorder

Chairs: Carrie K. Jones and Michael Nedelcovych

Pharmacology of Neuronal Regeneration and Repair

Chair: Jonathan S. Marchant and Brock Grill

Presynaptic Autoreceptors and Improved Treatments of Major Psychiatric Disorders

Chair: Salomon Z. Langer

Protein Trafficking and Drug Development

Chair: P. Michael Conn

Psychomotor Stimulant Addiction: Lessons from Methamphetamine

Chairs: Rajeev I. Desai and Michael A. Nader

Speed Networking for Careers Beyond the Academic Bench

Chairs: Janet E. Clark and Paul McGonigle

Structural and Dynamic Basis of Receptor-Ligand Interactions

Chairs: Eric Ortlund and Stephen F. Traynelis

Structural Basis for Ion Channel Pharmacology

Chair: William A. Catterall

Systems Pharmacology: Enhancing Translational Research by Networking and Pharmacodynamic Modeling

Chairs: Donald E. Mager and Darrell R. Abernethy

The Human Microbiome: Systems Pharmacology Insights and the Potential for New Drug Discovery

Chairs: Ross Corriden and Christopher LaRock

The Role of Protein-protein and Protein-membrane Interactions on P450 Function

Chair: Wayne L. Backes

Transporter-Mediated Drug Interactions: Clinical Significance and Predictions

Chairs: Maciej J. Zamek-Gliszcznski and Caroline Lee

Vascular Stiffness, a Novel Therapeutic Approach for Hypertension

Chair: Stephen F. Vatner

DIVISION SESSIONS

Behavioral Pharmacology Division Symposium: Sigma Receptors in Health and Disease

Chair: Habibeh Khoshbouei

Cardiovascular Pharmacology Division Trainee Showcase

Drug Discovery and Development Division Symposium: Drug Development in Academic Centers

Chairs: Robert J. Leadley, Jr. and Robert W. Caldwell

Drug Metabolism Division James Gillette Best Paper Award and Platform Session

Integrative Systems, Translational and Clinical Pharmacology Young Investigator Awards Platform Session

Molecular Pharmacology Division Postdoctoral Award Finalists

Keynote Speaker: Jeffrey L. Benovic

Neuropharmacology Division Postdoctoral Scientist Award Finalists

Keynote Speaker: Brigitte Kieffer

Pharmacology Education Division Symposium: Active Learning: What's Up With That Flipping Classroom?

Chair: John L. Szarek

Toxicology Division Symposium: Pharmacogenetics and Drug Toxicity

Chair: Gary O. Rankin

CAREER DEVELOPMENT SESSIONS

Diversity Mentoring Breakfast

Graduate Student-Postdoctoral Colloquium
Chair: TBD

Pharmacology Education Division Symposium: Active Learning: What's Up With That Flipping Classroom?
Chair: John L. Szarek

Speed Networking for Careers Beyond the Academic Bench

Chairs: Janet E. Clark and Paul McGonigle

EDUCATION SESSIONS

2015 Teaching Institute: Training Students for Teaching Careers

Chairs: Kelly Karpa and Klarissa Hardy

“Can We Talk?” Strategies for Collaborative Pharmacology Education

Chairs: A. Laurel Gorman, Jayne S. Reuben and John L. Szarek

Pharmacology Education Division Symposium: Active Learning: What’s Up With That Flipping Classroom?

Chair: John L. Szarek

Speed Networking for Careers Beyond the Academic Bench

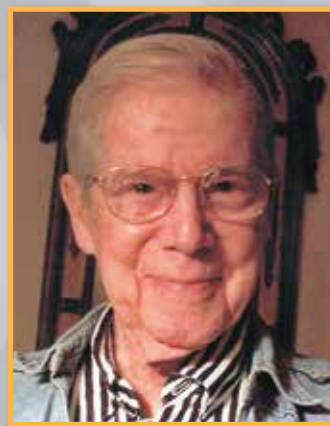
Chairs: Janet E. Clark and Paul McGonigle

New for 2015

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Raymond Spector Award in Clinical Pharmacology



David Lehr Research Award

Give a Day of Service to the Children of Boston at EB 2015



The Behavioral Pharmacology Division of ASPET will again sponsor a volunteer opportunity at EB 2015 in Boston on Friday, March 27, 2015 at Cradles to Crayons to help the children of Boston. If you would like to volunteer, please contact Charles P. France at france@uthscsa.edu.

Space is limited and further details will be provided to those who volunteer.



World Congress of Basic and Clinical Pharmacology

2014 Meeting in Review

Ken Thummel
President-Elect, ASPET

The 17th World Congress of Basic and Clinical Pharmacology was held at the Cape Town International Convention Centre, South Africa, over the week of July 13–18, 2014. It was the first World Congress meeting to be held on the African continent and was attended by up to 1500 scientists, representing 74 countries, including several members of ASPET's leadership and general membership. By all accounts, it was an extraordinarily successful event, for the high quality of the science presented, superb organization by the meeting organizers and WCP senior leadership (Drs. Douglas Oliver and Tiaan Brink), and the unforgettable venue at the foot of South Africa's fabled Table Mountain and the nearby Cape of Good Hope with the confluence of the Indian and Atlantic Oceans.

A strong cultural overtone for the meeting was set during an opening ceremony that featured a powerful presentation of traditional African dances and an inspiring charge to meeting attendees from the Deputy Minister of Health, Honorable Mathume Joseph Phaahla, that emphasized the need for new therapeutic agents and treatment modalities for combatting the spectrum of infectious diseases prevalent on the African continent, including malaria, Ebola, HIV, and tuberculosis. He noted the tremendous growth recently in the African pharmacological societies, many of whom were in attendance, and welcomed the opportunity that this meeting could provide for new partnerships between African and world brethren to address this and other daunting health challenges facing the African people. The opening ceremony ended with an outstanding presentation from Dr. Robert Lefkowitz, who took the audience on his remarkable journey

of pharmacological discovery of G protein-coupled receptor function and structure that culminated in him receiving, along with long-time collaborator Brian Kobilka, the Nobel Prize in Chemistry in 2012. As someone not steeped in the intricacies of cellular GPCR action, I found it incredibly educational and moving—something commented on by others attending the reception that followed.

The scientific meeting itself was populated with an incredible diversity of topics that cannot be fully captured in this brief communication; my interests, of course, gravitated toward drug metabolism and clinical pharmacology. One of note was a plenary session on epigenetics featuring a talk from Magnus Ingelman-Sundberg (Karolinska Institute) on preferential cytosine methylation in transcriptionally active genes of the liver and tissue specific-effects of SNPs on epigenetic control of gene expression, contributing to inter-individual differences in enzyme function.



A scenic view of Cape Town

There was also a provocative presentation from Dr. Ingolf Cascorbi (Christian Albrechts University Kiel) on the role of miRNA in the regulation of drug metabolizing enzymes and transporters that included evidence of coding and 5'-flanking sequence variation affecting miRNA control of protein synthesis. In a plenary session on drug hypersensitivity reactions, Simon Mallal (Vanderbilt University) reviewed the immune aspects of these adverse reactions with a focus on abacavir hypersensitivity. In the last part of his presentation he discussed the co-evolution of herpes viruses (CMV the most ancestral form, and HSV1 and HSV2 showing the most recent divergence) and HLA-A and HLA-B genes. As a consequence, target organ-specific reactions may be a function of drug-related alterations in epitope binding to viral-specific T cells present due to chronic infection. In his presentation "Pharmacogenomics: Improving the Safety of Drugs," Munir Pirmohamed (University of Liverpool) addressed differences in study design that may have contributed to the discordant conclusions from two large studies investigating the impact of pharmacogenomics on warfarin treatment – the US-based COAG study and the European EU-PACT study. The COAG study found no significant benefit of pharmacogenomic testing whereas EU-PACT concluded that genotype-based dosing was associated with a higher percentage of time in the therapeutic INR range relative to standard dosing during the initiation of warfarin therapy; both studies were published in the same issue of the *New England Journal of Medicine* late last year. At the conclusion of his presentation, he suggested the need for continued investigation of this evolving therapeutic paradigm. Finally, in a related symposium on drug-induced liver injury, Dr. James Lewis (Georgetown University) provided a comprehensive overview of the clinical aspects of DILI, emphasizing the need for development of predictive biomarkers. Despite years of research, there have been no good models for studying immune-mediated DILI. With this in mind, Dr. Jack Uetrecht (University of Toronto) described how inhibition of immune tolerance in mice by injection of mice lacking PD-1 with antibodies to CTLA-4 (PD-1 and CTLA-4 are T-cell surface protein that dampen T-cell responses) allowed for immune-dependent liver injury caused by amodiaquine. Focusing on human studies, Dr. Ann Daly (Newcastle University) described the identification by genome-wide association of



Table Mountain National Park, Cape Town

the HLA*33-01 allele as a predisposition toward DILI caused by a number of drugs. She also reported the association of the T-cell protein tyrosine phosphatase PTPN22 in DILI arising from co-amoxiclav therapy.

There was a considerable amount of business conducted at the Cape Town meeting in addition to the scientific presentations. Something that should be of interest to many ASPET members was a meeting to discuss the IUPHAR-ASPET Pharmacology Education project. This multi-national collaboration, spearheaded by Dr. John Szarek and Dr. Simon Maxwell, among others, is intended to generate novel, web-based educational tools for the pharmacology community that hopefully will enhance the delivery and uptake of pharmacological knowledge by the next generation of healthcare educators and providers. ASPET has invested in the creation of the educational website and one of its early platforms, the Guide to Receptors and Channels. Continued support for this endeavor will most certainly be a topic of future council meetings. Of course, another essential element of the WCP meeting was the voting that took place during the general assembly of the Council of the International Union of Basic and Clinical Pharmacology. Despite stiff competition from Melbourne, Florence, and Toronto, it was Glasgow, Scotland, that was ultimately selected as the site for the 2022 WCP meeting. For those who cannot wait that long, you should mark your calendars now for the next WCP meeting in 2018 in lovely Kyoto, Japan.

The Crohn Legacy: From Halitosis to Colitis and Beyond

Rebecca J. Anderson

On a hot summer day in 1956, Burrill Crohn was planting sweet corn in the garden of his country home in New Milford, Connecticut, when he was called to the phone (1). The editor of the *Washington Post* informed him that President Eisenhower had been rushed to Walter Reed Army Medical Center and was about to undergo emergency surgery for an intestinal obstruction. The 72-year-old Crohn was not part of Eisenhower's medical team and knew nothing about the case, except what the newspaper editor told him. Soon, though, journalists representing other prominent newspapers, news agencies, radio, and television networks, and scientific organizations also called Crohn. He was one of the most prominent gastroenterologists in the country, and they all wanted to know what he thought about the President's condition and chances for recovery.

Credit: The Crohn Family



Dr. Burrill Crohn

Always Inquisitive

Burrill Crohn did not set out to be a gastroenterologist. During his medical school training at Columbia University, he was fascinated by biochemistry and carried out a research project that earned him a PhD in addition to his MD in 1907. He subsequently set up a small private medical practice in Manhattan, but in the mornings, he volunteered as a biochemistry laboratory assistant at Mount Sinai Hospital. Between routine laboratory tests, he had plenty of time for research, and the hospital offered a wide variety of intriguing clinical cases.

From 1913 to 1921 (before the discovery of insulin), Crohn spent much of his time studying the function and diseases of the pancreas. This work was largely driven by Crohn's desire to use a new toy that had been presented to him by a visiting physician. The device was a new type of rubber catheter for collecting upper intestinal bile. Crohn first used it to establish a "normal" baseline by collecting specimens

from himself. “Night after night at bedtime, I would swallow that 36-inch long rubber catheter, drink a glass of milk to stimulate pancreatic secretion, and go to sleep. In the morning I would aspirate the pancreatic secretions and the bile from my duodenum...every afternoon the secretions were tested and the normal pancreatic enzymes evaluated in the laboratory” (1). He then compared those results with secretions collected from a series of patients with pancreatitis. His published monograph (*Studies in Pancreatic Disease*, 1915) earned him recognition as an expert on the pancreas.

Crohn also used the catheter to study liver diseases and took advantage of a new test for quantifying sensitivity to physical pain (called the Libman Test) while examining patients who suffered from peptic ulcers. He found a correlation between pain sensitivity and patients’ awareness of their peptic ulcers. Patients who presented with gross hemorrhage were insensitive to pain. On the other hand, patients with a low pain threshold were more likely to seek medical treatment, and their peptic ulcers were managed more effectively. On the strength of his innovative findings regarding ulcer management, Crohn was inducted into the American Gastroenterological Association in 1917, and in 1922, he was appointed to head the new gastroenterology department at Mount Sinai Hospital.

“It has been my misfortune (or perhaps my fortune) to spend most of my professional life as a student of constipation and diarrhea. Sometimes I wished I had chosen ear, nose, and throat as a specialty rather than the tail end of the human anatomy”

A caring physician, Crohn treated celebrities and ordinary patients with the same attentive bedside manners and exceptional expertise. To his siblings, Burrill was the big brother, a tower of strength who listened sympathetically to their problems, provided helpful advice, and generously offered assistance (2). Despite his demanding professional duties, he devoted Sunday afternoons to his children. Together, they explored all of the historical and cultural sites that New York City offered, and Crohn turned each field trip into an adventure. Climbing rocks in Central Park,

they fought the British at the Battle of Quebec. When they made their way through hilly terrain, it became the Donner Pass.

The youngsters roamed freely in the hospital’s laboratories, watching the laboratory technicians and playing with the experimental animals. His daughter recalls, “Often he would be called out to see a sick patient. But somehow he made time for me” (1, 2). Sometimes, Crohn took her along on house calls.

Gut Instincts

When Crohn entered medical practice at the turn of the twentieth century, the small intestine was not a topic of much interest. His medical school professors advised the class to skip the textbook chapter on small bowel because “there are no recognizable diseases of the small intestine except, perhaps, tuberculosis” (1). During Crohn’s internship at Mount Sinai Hospital, his mentor always required that autopsies include a dissection of the small bowel because he insisted on being thorough, but “nothing of note was ever found” (1).

Despite the lack of known intestinal ailments, Crohn was always curious and developed a keen gut instinct. A popular catch-all abdominal diagnosis at the time was “chronic appendicitis.” It covered all sorts of vague, unexplained, and neurotic abdominal pains and discomfort, including an inflamed gut. Over and over, surgeons removed a healthy appendix (often missing by inches a mass in the adjacent small bowel). One day on hospital rounds during Crohn’s residency, his chief of service presented a case of “chronic appendicitis.” Crohn paid close attention as his chief described the patient’s symptoms to the residents, but something about this case aroused his doubts. After hospital rounds, Crohn went back to re-examine the patient’s belly and noted a faint line that looked like a surgical scar. When asked, the patient confirmed that years earlier his appendix had been removed. Any question in Crohn’s mind about “the fanciful diagnosis of chronic appendicitis was dispelled then and there. The disease never existed” (1).

That was the first of many cases Crohn investigated because he thought the standard diagnosis seemed illogical. Rather than accepting medical dogma, he followed the trail of evidence, and his inquisitive mind and methodical research served him well. Most of these enigmatic cases involved the digestive system. In addition to pancreatitis and hemorrhagic peptic ulcers, he studied bulimia, pica, dyspepsia, trauma-

induced intestinal ulcers, and gallstones. He published his findings, which made significant contributions to explain the etiology of those disorders and honed his expertise in gastroenterology. He once lamented, “It has been my misfortune (or perhaps my fortune) to spend most of my professional life as a student of constipation and diarrhea. Sometimes I wished I had chosen ear, nose, and throat as a specialty rather than the tail end of the human anatomy” (1)!

In 1930, Crohn examined a 17-year-old boy who exhibited a fever, diarrhea, and a tender, palpable mass in his abdomen. Tuberculosis was still a common disease, and harkening back to his medical school training, Crohn initially diagnosed intestinal tuberculosis, the only known explanation for an irritable bowel. Fortunately, new diagnostic tests had become available, and Crohn systematically conducted skin, eye, and sputum assays. All were negative for tubercle bacilli. The chest X-ray was also negative. Having exhausted all of his noninvasive options, Crohn wanted to conduct exploratory surgery to examine the boy’s intestines directly.

Crohn accumulated 1000 cases over the course of his medical practice, and regional ileitis emerged as a common type of inflammatory bowel disease, second only to ulcerative colitis. It affected people across all cultures and economic groups.

At that time, there was no treatment for intestinal tuberculosis, and A. A. Berg, his surgical colleague and friend, initially refused to operate. Earlier, at the Trudeau Sanitarium, Berg had been persuaded against his better judgment to operate and resect the bowel of five patients with intestinal tuberculosis. Two patients were made worse, 2 died, and he did not know the outcome of the last patient—and never wanted to know.

Crohn persisted. He showed Berg his patient’s test results, which had convincingly ruled out tuberculosis. Reluctantly, Berg agreed to operate. He found an inflammatory mass and removed the terminal 12–16 inches of the boy’s ileum. In the laboratory, Crohn subjected the excised specimen to every available assay, scrutinizing stained sections for hours, but

found no trace of tubercle bacilli. He concluded that the boy’s ailment represented a new and previously undocumented medical condition, which he initially assumed was probably extremely rare. However, within 2 years, Crohn and his colleagues accumulated 14 such cases, all with the same clinical characteristics.

These cases had baffled the hospital staff, who speculated that the cause might be intestinal tuberculosis or actinomycosis (a disease characterized by granulomatous lesions), but they could not establish a definitive diagnosis. Some of those patients had been lying in the wards with their condition growing progressively worse for lack of an effective treatment—in the process developing fistulas (openings) in the gut wall.

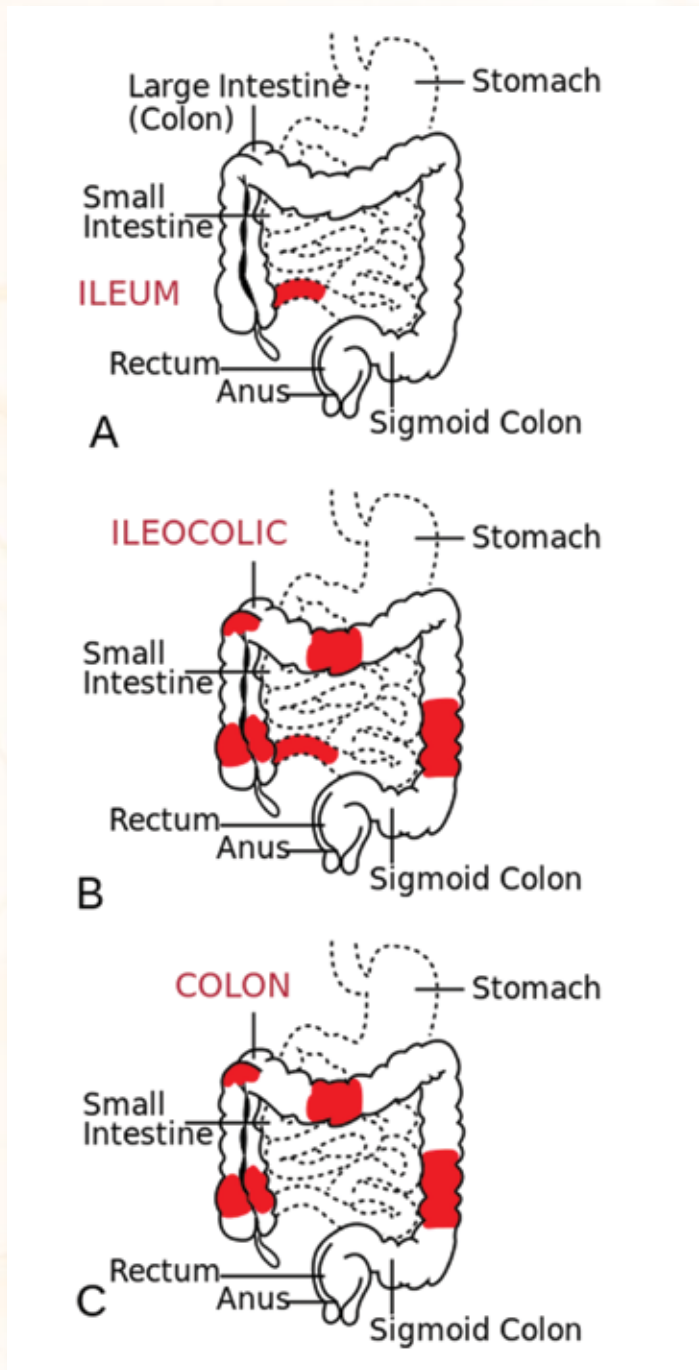
After the test results ruled out tuberculosis in these patients, Berg operated on them. In one patient, Berg removed eleven fistulas in the abdominal wall and cured the patient in a single operation. From the symptoms, surgical observations, pathologic analysis, and successful post-operative recoveries, Crohn and his pathology colleagues concluded that they were dealing with a previously undefined disease. They called it “regional ileitis” and Crohn proceeded to share their findings with the medical community.

In May 1932, he traveled to New Orleans and read his paper, “Regional Ileitis: A New Clinical Entity,” at the annual meeting of the American Medical Association. Crohn explained, “Regional ileitis is an inflammatory or granulomatous disease of the small bowel, characterized by fever, diarrhea, abdominal pain, and fistula formation. It is essentially a disease of youth, slowly progressive and disabling” (1). In October, Crohn, Leon Ginzburg, and Gordon Oppenheimer published their findings in *JAMA* (3). This seminal paper, which listed the authors in alphabetical order, would be widely referenced.

The Mayo Clinic immediately reviewed their files and found previously overlooked cases of ileitis. Within a year, regional ileitis was being discussed in Germany at an international meeting of surgeons. The introduction of endoscopes and higher resolution radiographic images facilitated the diagnosis. Radiologist John Kantor described the “string sign,” a narrowing of the intestinal lumen that appears as a thin string on barium radiographs, and which is now generally recognized as a characteristic sign of regional ileitis. Crohn accumulated 1000 cases over the course of his medical practice, and regional ileitis emerged as a common type of inflammatory bowel

disease, second only to ulcerative colitis. It affected people across all cultures and economic groups.

By the time President Eisenhower was rushed to Walter Reed Army Medical Center, the disorder had become well recognized by the medical profession, but Crohn was the only one who still called it regional ileitis. Everyone else called it Crohn's disease. No wonder every reporter in the country wanted Crohn to comment on the President's prognosis.



The three most common sites of intestinal involvement in Crohn's disease are ileal, ileocolic, and colonic.

By Samir, vectorized by Fvasconcellos (wImagePatterns of CD.jpg) [GFDL (www.gnu.org/copyleftfdl.html) or CC-BY-SA-3.0 (creativecommons.org/licenses)].

Based on the President's symptoms, Crohn surmised that the obstruction was a late manifestation of longstanding ileitis (1). Eisenhower had suffered from gastrointestinal distress for decades. While serving in the Panama Canal Zone as a newly commissioned officer in 1922, he experienced episodes of abdominal pain and weight loss (4). Convinced that the problem was appendicitis, he persuaded doctors in Denver to perform an appendectomy in 1923. Subsequently, he underwent a series of thorough diagnostic evaluations. While investigating his severe intestinal symptoms in 1949, doctors saw some "irregularity of caliber of the small bowel" in an X-ray (4). However, it was not until a month before his surgery in 1956 that an X-ray revealed a picture of his terminal ileum typical of Crohn's disease. His periodically inflamed ileum had healed, and scar tissue in the intestinal wall led to the obstruction (1, 4).

Eisenhower's medical team confirmed Crohn's disease as the diagnosis through direct observation during surgery and later microscopic examination of the diseased terminal ileum. They successfully bypassed the diseased segment by anastomosing the intestine above the obstruction with the transverse colon. The president made a rapid and full recovery.

Pharmacologic Intervention

In the days before regulatory oversight of pharmaceuticals, peddlers hawked patent medicines, reinforcing the public's widely held but misguided belief that a daily bowel movement was the key to a happy life. Elixirs and pills were promoted as a remedy for spring fever, tiredness, poor blood, and depression, but most of these concoctions were a mixture of vegetable compounds (including castor oil) that were predominantly laxatives. The main ingredient in Carter's Little Liver Pills was the cathartic, bisacodyl.

Constipation was not a serious medical concern. Diarrhea was. A primary symptom of ileitis and colitis, diarrhea caused dehydration, electrolyte imbalances, and abdominal pain. Crohn saw so many cases in his long career that he once exclaimed, "When I die, I hope to be sent to a Heaven where even the angels are constipated" (1).

In the decades before the introduction of anti-inflammatory drugs, surgery was a common treatment for Crohn's disease. Crohn's first ileitis patient (the 17-year-old boy) was well for 25 years

after Berg's operation, and then he developed only a mild recurrence. In many other cases of Crohn's disease, surgical intervention gave permanent relief from symptoms. But it was a radical treatment, and there was a limit to how much small bowel could be removed if symptoms recurred.

The results from all of these experiments supported his view that breath odor was not produced locally in the mouth or pharynx, but rather from metabolism and subsequent respiratory excretion.

Current pharmacological treatment of Crohn's disease is aimed at symptomatic relief. Treatments of choice to induce remission and manage acute recurrences of inflammation are systemic glucocorticoids such as budesonide or prednisone. Remission can be maintained with immunomodulatory drugs (such as mercaptopurine and azathioprine) and broad-spectrum antibiotics (such as metronidazole and ciprofloxacin), which manage inflammation and infection, respectively. For moderate to severe Crohn's disease, as well as in patients who become refractory to the first-line drugs, TNF inhibitors such as infliximab (Remicade®) or adalimumab (Humira®) have proven effective alone and in combination with azathioprine/mercaptopurine. Because the cause of Crohn's disease is unknown and there is no cure, it remains a fertile area for pharmacologic research. Crohn's disease now affects about 500,000 people in the United States, and two of the top three best-selling drugs in the world in 2013 were anti-inflammatory drugs (adalimumab and infliximab) used to treat Crohn's disease.

In Search of Bad Breath

The elucidation of Crohn's disease established Crohn as a premier gastroenterologist, and he was in great demand as a speaker. He was flattered when a dental association invited him to speak at a meeting in New York in 1941, but he struggled to find a topic in gastroenterology that would be of interest to dentists. Finally, he settled on the perfect subject: bad breath.

Until the late 1930s, halitosis was attributed primarily to decaying teeth, necrotic abscesses of the pharynx, infected tonsils, obstructed nasal passages, nasal deviations, and periodontal disease. "Even before serious consideration, these explanations did not make sense to me" (1). Improvements in oral hygiene, which minimized the role of teeth, gums, and the pharynx in persistent halitosis, reinforced his skepticism. He also noted a publication by Marion Blankenhorn who had studied a patient with a complete stenosis of the esophagus following laryngeal cancer surgery. Blankenhorn inserted garlic directly into the patient's stomach via a gastrostomy tube, and the patient developed a distinctive garlicky breath (5).

To prepare for his dental conference lecture, Crohn decided to conduct his own research and obtained a small grant from a toothpaste manufacturer to follow up on Blankenhorn's observations. With no previous experience, Crohn first had to master how to classify and quantify odors. He adapted a sniff test devised by scientists at the Massachusetts Institute of Technology for assessing industrial smells and classified breath according to type (sweet, acrid, pungent, and repulsive/nauseating) and intensity (from very faint to overpowering).

In his first experiments, Crohn asked test subjects to chew onions or garlic-loaded salami without swallowing. The odor remained on their breath for only a short time. Next, he intubated a willing subject and placed a solution of garlic or onions directly in the stomach. The subject passed the sniff test during and shortly after intubation, but a few hours later, his breath was overpowering. Like Blankenhorn, Crohn concluded that mouth exposure is not responsible for bad breath. Rather, food must pass through the intestinal tract, be absorbed into the bloodstream, and undergo metabolism in the liver. Those smelly metabolites eventually reach the lungs and are expired.

To further test this hypothesis, Crohn studied two subjects who were patients in his wards. One patient was recovering from a colostomy to treat ulcerative colitis. Crohn inserted a capsule of garlic into the patient's stoma and within hours his garlic breath was obvious to the nurses on the ward. The other patient had undergone gall bladder surgery, and a drainage tube had been inserted into his bile tract. When Crohn gave the patient garlic either orally or rectally, he could detect the distinct odor of garlic in the bile

drainage the next day. Later, the odor also appeared on the patient's breath.

Crohn repeated these experiments with whiskey—deciding it was time to jump in and serve as his own test subject. After rinsing his mouth or gargling with Scotch, Crohn noted the odor of whiskey faded within ten minutes. In his next test, he downed six shots of Scotch at bedtime. His friends did not need to be sniff test experts to whiff his whiskey breath the next morning.

The results from all of these experiments supported his view that breath odor was not produced locally in the mouth or pharynx, but rather from metabolism and subsequent respiratory excretion. He suspected that fats or fatty substances were the odiferous substances, but he was not equipped to isolate them. (Investigators subsequently identified the garlic metabolites as organosulfur compounds.) Nevertheless, when his findings were published, Crohn became an overnight expert on halitosis (6). Patients flooded to his office wanting relief from real or suspected bad breath.

Steve willingly returned to the clinic again and again to donate additional samples of his blood. Same result. He became known as “the man who can’t catch AIDS”

Because he knew the alimentary canal from top to bottom, Crohn was appointed to a panel of the American Medical Association to standardize the names of diseases of the gastrointestinal tract. In 1961, he chaired the committee of the American Gastroenterological Association that authorized and coded names of diseases of the abdominal digestive organs. Those panels established nomenclature that has now become standard at American institutions, but during the discussions, Crohn repeatedly stated his reluctance to incorporating his name into the lexicon. At an international conference in Prague, he rose to voice his objection to a resolution officially designating ileitis as Crohn's disease. He was ruled out of order, and the resolution was adopted unanimously.

The Other Crohn, the Other Disease

Sixty years after Burrill Crohn published his observations of the disease that bears his name,

another member of the Crohn family made medical history. Stephen Crohn, the grandson of Burrill's brother, was increasingly puzzled why he remained healthy, while many of those around him died. In 1982, his business partner and lover, Jerry Green, died from a syndrome that had just been formally described by physicians and would later be coined AIDS. Over the next decade, Steve saw dozens of his friends become infected with HIV, develop the same symptoms, and die. In a life measured by funerals and memorials, he naturally worried that he had also become infected and frequently sought HIV testing. The results always came back negative and he remained healthy, but he constantly worried that the tests might be wrong.

Credit: The Crohn Family



Stephen Crohn

Intelligent and well spoken, Steve was a social activist. He marched with Martin Luther King from Selma to Montgomery and protested the Vietnam War. He found solace in Buddhism (7). His pharmacology expertise—like many counterculture baby boomers—was limited to recreational drugs.

The focal point of his life had always been the fine arts. He trained at New York's Cooper Union, the

Biosketch:



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In the next issue of *The Pharmacologist*...

Dr. Anderson will be exploring a story on the "Great Dogsled Relay" that helped in treating a diphtheria epidemic in Alaska. Don't miss the exciting December 2014 issue.

Art Students League of New York, and City College of New York and became a talented painter and sculptor. He supported his passion for art through jobs in copyediting, magazine production, and interior design. His longest affiliation was as a proofreader for Fodor's travel guides (7, 8). In the early 1980s, he operated a restaurant with Green in Los Angeles, but for most of his adult life, he lived in Hell's Kitchen, a rough-and-tumble working-class neighborhood on Manhattan's West Side. Naturally gregarious and fun loving, Steve maintained close relationships with his family. He remembered their birthdays, cheered them when they were sick, and joined them at the beach on summer holidays. He was the favorite uncle to his sisters' children (2).

As more and more of his friends were struck down, though, Steve became increasingly conscious of every ache and pain. Could this be an early sign of AIDS? He walked faster than everyone else—so much to do, so little time (2). An advocate of self-help, he boldly faced his fears, first through support and grief groups, and then, after earning a master's degree in social work from New York University in 1992, as a counselor to caregivers and AIDS patients. Still, against all odds, he remained healthy. He wanted to know why.

The Magic Missing Molecule

The Crohn family gathered every five years on Burrill's birthday (2). Burrill's parents had instilled the importance of education and civic duty into their 12 children. A sizeable number of their descendants pursued careers in law or, like Burrill, in medicine. Steve consulted his medically oriented relatives, and they confirmed that he embodied an interesting case. Encouraged by them, Steve persisted—for years—telling anyone who would listen that he must have some sort of natural immunity to HIV. "Why won't anybody study me?" he complained in frustration to his sister (2).

Meanwhile, Bill Paxton, a British virologist, had arrived in New York to conduct postdoctoral research at the Aaron Diamond AIDS Research Center. Looking around the center for a research project, Paxton noticed that no one was studying people who were highly exposed to HIV but had not become infected. In 1994, he began contacting AIDS activists and asking for referrals of subjects who fit that profile. Within a week, a doctor associated with the AIDS community called and told him, "I have the perfect person" (9).

Steve was the first subject to walk through Paxton's door, and they clicked instantly. Like Burrill, Steve had no qualms about being an experimental subject. He desperately wanted to help others and relished the opportunity to become part of his family's medical legacy. Paxton was impressed that although Steve had no formal research training, "he just had this empathy for science. He understood it" (9).

The most satisfying thing to Paxton was that he could tell Steve, "You were right. You have this molecule missing. That is advancing science"

Paxton exposed samples of Steve's blood to HIV—thousands of times higher than the titer normally needed for infection—but Steve's lymphocytes remained virus-free. Suspecting a laboratory error, Paxton refined and repeated his tests. Steve willingly returned to the clinic again and again to donate additional samples of his blood. Same result. He became known as "the man who can't catch AIDS" (10).

Scientists knew that T-helper lymphocytes (CD4 cells) carried a surface chemokine receptor, CCR5, that mediates HIV binding and entry into the cell. Paxton discovered that the gene that codes for

Comparison of Crohn's Disease Versus Ulcerative Colitis

	Crohn's Disease	Ulcerative Colitis
terminal ileum involvement	common	seldom
colon involvement	usually	always
rectum involvement	seldom	common
fever	common	in severe disease
abdominal pain	always	occasional
abdominal tenderness	always	occasional
rectal bleeding	rare	always
abdominal mass	common	never
obstruction/stricture	common	rare
fistulas	common	rare
inflammation	patchy, discrete ulcerations separated by segments of normal mucosa	continuous and diffuse
granulomas	common	never

the CCR5 receptor protein on Steve's CD4 cells was missing 32 base pairs (now called $\Delta 32$ CCR5). The deletion did not affect his health, but the deformed receptor prevented the virus from binding (11).

Paxton soon found 12 additional people with the same defect, but Steve, with his outgoing personality, intellect, and keen sense of humor, was the most articulate and highly sought spokesperson. After the extreme sadness that he had experienced in losing so many loved ones, "he was proud of the miraculous gift of being able to provide the key to unlocking a mystery of AIDS" (2). He personified and affirmed the hope that AIDS could be conquered.

The most satisfying thing to Paxton was that he could tell Steve, "You were right. You have this molecule missing. That is advancing science" (9). The revelation about $\Delta 32$ CCR5 triggered a flood of clinical investigations worldwide (12). Approximately 1% of the population in North America and Europe, like Steve, have the homozygous $\Delta 32$ CCR5 mutation and are resistant to HIV infection.

In 2006, clinicians in Germany transplanted stem cells with the $\Delta 32$ CCR5 mutation into Timothy Brown, a patient who was suffering from acute myeloid leukemia and was HIV-positive. The transplant prevented his leukemia from recurring, and the $\Delta 32$ CCR5 mutated cells cured his HIV infection (13). The successful treatment of Brown (the "Berlin patient," the only documented case of an AIDS cure) opened new avenues for HIV/AIDS research and provided new evidence that AIDS could be cured. In 2007, the Food and Drug Administration approved maraviroc, the first CCR5 receptor antagonist, for the treatment of AIDS.

Watching these events unfold, Steve was thrilled: "Can you believe that this has happened (2)?" It was similar to the reaction of his great-uncle Burrill, who also watched in amazement as the intestinal disorder he first characterized became formally recognized and incorporated into the standard compendium of medical diseases. Each, in his own way, was extraordinary, a larger-than-life force of nature who contributed to breakthrough discoveries that have

significantly advanced medicine and improved the lives of millions of patients. But each was also a very ordinary man who enjoyed the simple pleasures in

life, performed simple acts of kindness as a matter of course, and above all else was devoted to his family, the Crohn family.

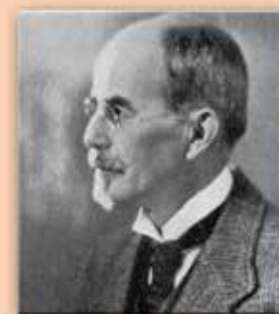
References

1. Crohn BB (2010) Notes on the evolution of a medical specialist 1907–1065. The Burrill B. Crohn Research Foundation, New York. Available from: issuu.com/taghkanic/docs/bbc-ch1
2. Personal communications with Abby Pratt, Amy Crohn Santagata, and Carla Crohn Friedman.
3. Crohn BB, Ginzburg L, and Oppenheimer GD (1932) Regional ileitis: A pathologic and clinical entity. *JAMA* **99(16)**:1323–1329.
4. Franklin JL (2009) Eisenhower and Crohn's Disease, *Hektoen Intl Archiv* **1(2)**. Available from: www.hektoeninternational.org/Journal_Eisenhower.html
5. Blankenhorn MA and Richards CE (1936) Garlic breath odor. *JAMA* **107(6)**:409–410.
6. Crohn BB and Drosd R (1941) Halitosis. *JAMA* **117(26)**: 2242–2245.
7. Green J (June 13, 2014) The man who was immune to AIDS. *New York Magazine*. Available from: nymag.com/health/bestdoctors/2014/steve-crohn-aids-2014-6
8. Woo E (September 21, 2013) Immune to HIV but not its tragedy. *Los Angeles Times*. Available from: articles.latimes.com/2013/sep/21/local/la-me-stephen-crohn-20130922
9. Singh M (September 21, 2013) In life, man immune to HIV helped scientists fight virus. *NPR Shots Health News*. Available from: www.npr.org/blogs/health/2013/09/21/224506556/in-life-man-immune-to-hiv-helped-scientists-fight-virus
10. Wilkie T (March 29, 1996) The man who can't catch AIDS. *The Independent*. Available from: www.independent.co.uk/news/the-man-who-cant-catch-aids-1344588.html
11. Paxton WA, Martin SR, Tse D, O'Brien TR, Skurnick J, VanDevanter NL, Padian N, Braun JF, Kotler DP, Wolinsky SM, and Koup RA (1996) Relative resistance to HIV-1 infection of CD4 lymphocytes from persons who remain uninfected despite multiple high-risk sexual exposures. *Nature Medicine* **2(4)**:412–417.
12. McNicholl, JM, Smith DK, Qari SH, and Hodge T (1997) Host genes and HIV: the role of the chemokine receptor gene CCR5 and its allele ($\Delta 32$ CCR5). *Emerg Infect Dis* **3(3)**:261–271.
13. Hütter, G, Nowak D, Mossner M, Ganepola S, Müßig A, Allers K, Schneider T, Hofmann J, Kücherer C, Blau O, Blau IW, Hofmann WK, and Thiel E (2009) Long-term control of HIV by CCR5 delta32/delta 32 stem-cell transplantation. *N Engl J Med* **360**:692–698.

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Science Policy



NIH Funding Outcome Uncertain as FY 2015 Looms

Congress Returns, Briefly

Congress returned from their August recess on September 9 facing a host of critical legislative issues to complete before the new fiscal year—FY 2015 begins October 1. For supporters of biomedical research, an all too familiar sense of déjà vu developed this summer as the federal appropriations process came to a grinding halt. The usual suspects are at fault: a wildly partisan and ideological divide over federal debt and government spending. With the mid-term election just weeks away, it is apparent that there will be no legislative action taken before FY 2015 begins, despite the efforts of Appropriation Committee leadership to move forward all 12 appropriations bills that have stalled at different stages in the legislative process over the past several months.

There are few working days left in September, and it seems certain that the NIH and other federal agencies are heading for a Continuing Resolution (CR) that will keep programs at these agencies up and running beyond the start of FY 2015. This outcome was not what legislators or the public had hoped for after Congress agreed to freeze discretionary spending at \$1.014 trillion and return to “regular order” to finish spending bills in a timely fashion. As a result, this breakdown will mean that in 7 out of the past 8 years Congress will fail to finish any of the spending bills by the end of the current fiscal year.

At the moment it is not clear what the terms of the CR would be. Typically, CRs are funded at the existing level of funding—essentially

a freeze of the budget. But while that scenario is most likely, it is not a sure thing, and funding levels for the NIH or any other agency could be higher or lower than in FY 2014. Moving forward on the operating assumption that there *will* be a CR, it is likely to be extended possibly through December. This would allow members of congress to leave Washington, DC, after October 1 to campaign and give them time to return following the election. As the CR deadline approaches, congress will try to finish negotiating passage of the spending bills (a dubious prospect), extend the CR for another month or two, or pass all or most appropriations bills as part of a large omnibus bill (leaving those bills not part of the omnibus in a new CR).

Following the mid-term elections, legislative action may be determined by which party controls the Senate. If republicans win a majority in the Senate, there is no real reason for them to finish spending bills in a lame-duck session. Republicans would likely instead wait until they take office in January. But if the Democrats hold the Senate, they likely will advocate for a second CR lasting through the middle of December. Then they will push the house GOP to negotiate an omnibus

appropriations package before the new congress begins in January. Outcomes are unclear.

The appropriation bill funding the NIH is the Labor/Health and Human Services & Education spending bill. Ideally it would be best for the Labor/HHS bill to be part of any possible omnibus bill. But that is unlikely as Labor/HHS is typically among the more contentious spending bills to pass. The NSF and the FDA, each funded by different spending bills, have a better chance of landing in an omnibus.

For the NIH, a CR would probably be the least favorable outcome. While the House has not acted, the Senate has already approved the FY 2015 Labor/HHS Appropriations bill and provided the NIH an increase of \$606 million (2%) above the FY 2014 mark. According to the Senate report accompanying the bill, this funding increase would bring the NIH's budget back to the FY 2013 level before sequestration began. The Senate report further notes that "Due to the impact of inflation, restraining growth in the discretionary spending caps is tantamount to a cut." While we don't yet know the precise terms of the pending CR, we can expect that the NIH's budget will not increase by \$606 million.

Budget Cuts Really Do Hurt

This Summer, the Coalition for Health Funding (CHF)—of which ASPET is a member—released a report, ***Faces of Austerity: How Budget Cuts Hurt America's Health***, that tells the stories of individuals harmed by federal budget cuts. The report and stories look at the impact of budget cuts across many public health agencies, including the NIH.

As the CHF report demonstrates, continued health cuts do more harm than good. The report can be viewed at www.cutshurt.org.

The Coalition for Health Funding also shared with its membership some interesting testimony before congress that clearly explains why the discretionary budget won't grow. Scott Lilly, senior fellow at the

Center for American Progress, offered this analysis before the House Rules Committee Subcommittee on the Legislative and Budget:

"Perhaps the biggest failing of the current process is that it has truly failed to inform our citizenry as to why the federal budget is growing at such a rapid pace. The answer is quite simple, but it would be difficult to find by listening to the debates on budget resolutions. The problem is that it requires a great deal more money to pay for the retirement benefits of the 60 million people who will be 65 years old and older 10 years from now than it costs to pay for the benefits of the 45 million people in that age group today. And it

costs a lot more to pay for the benefits of those 45 million people than it did to pay for the benefits of the 30 million seniors we had in this country 25 years ago.

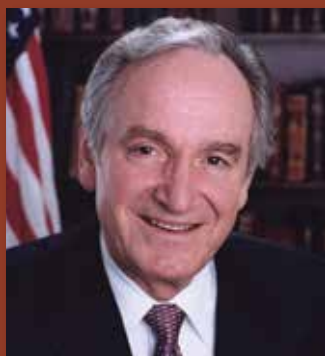
That is it. That is the budget problem. Real per-capita spending by the federal government has increased by 30 percent in the past 25 years. There are only three programs that account for all of that growth: Social Security, Medicare, and Medicaid. We spend less in real per-capita dollars today on everything else in government outside of those three programs than we spent then.

Specifically, we spend less in real per-capita dollars on discretionary programs than we did in

1988, the last year of the Reagan administration. But Congress spends about 80 percent of its time fighting over the size and scope of a group of programs that have not grown and are not growing.

I think the current budget process contributes to that disconnect between rhetoric and reality. Discretionary programs represent only one-third of total government outlays. Most of the controversy is focused on nondefense discretionary programs, and they are only half of the total, so they account for only 16 percent of the total budget.”

Senate Bill Would Increase Funding for the NIH



**Senator Tom Harkin
(D-IA)**

In July, Senator Tom Harkin (D-IA) introduced the Accelerating Biomedical Research Act (S. 2658). Harkin’s bill would allow for an increase in NIH funding through an offset by adjusting the discretionary budget caps mandated by the Budget Control Act. The bill was co-sponsored

by Senators Durbin (D-IL), Franken (D-MN), and Klobuchar (D-MN). There are no Republican co-sponsors. Harkin’s bill would give Appropriators the authority to increase funding for the NIH beyond the current \$29.9 billion for the NIH each fiscal year. In total, appropriations may provide up to \$46.2 billion at the end of the seven-year period from FY 2015–2021. The additional funding allows increases of 10% in each of the first two years, with 5% increases in the following years. The budget cap adjustment would allow the Appropriations Committees to restore the purchasing power the NIH would have had if funding had kept pace

with inflation since 2003, the last year of the NIH doubling effort that began in 1998.

Senator Harkin, who is retiring at the end of his term, has been a long-standing champion for medical research. In his statement introducing the bill, he said, “It is time for us on a bipartisan basis to reverse this erosion of support for biomedical research to ensure America’s standing as a world leader in this field. This is life-saving medical research that is giving hope to tens of millions of Americans suffering from chronic disease or living with a disability. I believe passionately that Congress has the responsibility to give researchers around the country the resources they need to fulfill their mission of saving lives, while upholding America’s traditional global leadership role in this area.”

While Harkin’s bill will not move forward, ASPET is appreciative of Senator Harkin’s tireless advocacy for the NIH and biomedical research while serving in the House and Senate since 1975.

ASPET endorsed Senator Harkin’s bill. You can read the list of other organizations endorsing the Accelerating Biomedical Research Act at http://www.aspet.org//ASPET_Supports_Senator_Harkin/.

ASPET Washington Fellows Program at Penn State University

Prasad Krishnan, PhD
Chair, Penn State Postdoctoral Society, Penn State University



(From left to right) Erin Noble, Penn State Postdoctoral Society Executive Council Member, Congressman Glenn Thompson (5th Congressional District, PA), and Prasad Krishnan, Chair, Penn State Postdoctoral Society

Last April, as president of the Penn State Postdoctoral Society (PSPS), I helped organize a brown bag lunch session on research advocacy in collaboration with the Graduate Women in Science (GWIS) Society. The speaker at the session was Jim Bernstein, Director of Government and Public Affairs at ASPET. His presentation “What’s next for federal funding of biomedical research? Developing effective science advocates for NIH in times of turmoil” gave an audience of graduate and postdoctoral students an overview of the funding issues faced by NIH and other organizations. Jim explained the goals of the ASPET Advocacy Outreach Program, how NIH has reached its current funding predicament, the political and economic obstacles preventing NIH from growing, and a few common misconceptions about NIH that are held by legislators and the public. His presentation concluded with a discussion on tactics and strategies such as engaging the public, communicating with local media, and developing relationships with legislators that could help turn NIH’s funding situation around. The event was the first of its kind held on campus for postdoctoral students. Jim’s talk generated much interest in the audience and inspired them to think

more about what could be done to improve the funding situation for NIH. At a breakfast and dinner arranged by PSPS, Jim also met with graduate and postdoctoral interested in exploring career options in research advocacy.

I am also a 2014 ASPET Washington Fellow, a program that began in 2013 to facilitate graduate students, postdocs, and early career scientists to learn how to successfully advocate for research. As part of my fellowship, last winter, I had an opportunity to visit Capitol Hill in Washington, D.C., and together with Jim, met my senators and house representative. Not only were these meetings informative but they also made me realize how important a role we as scientists, particularly early career scientists, play in informing lawmakers about the importance of federally funded research and the subsequent consequences of cutting that investment.

Not only were these meetings informative but they also made me realize how important a role we as scientists, particularly early career scientists, play in informing lawmakers about the importance of federally funded research and the subsequent consequences of cutting that investment.

As a result of my visit to Capitol Hill and after bringing the ASPET Advocacy Outreach Program to Penn State, I collaborated with Erin Noble, another postdoc at Penn State, and arranged for the PSPS to meet with Congressman Glenn Thompson and his staff at his office in Bellefonte, PA, not far from State College. Representative Thompson was aware of the scientific community’s concern about the budget cuts for the NIH and the diminishing career opportunities

for qualified postdocs. Congressman Thompson shared his commitment to support funding for the NIH and was aware of the role that federal funding has played in improving public health. However, he also noted that the current fiscal situation dictates federal funding priorities. He also expressed the general concern on Capitol Hill about the slow progress in finding cures for many diseases. Many advances have been made in technology; however, these are not reflected in generating new therapeutics. The postdocs explained to the congressman and his staff about the complexity of a human cell and the amount of progress that has been made in the field of genetic and molecular biology fields. The scientific community

is on the threshold of coming up with breakthroughs, and this is the time for sustained support for research. Our team told Congressman Thompson that we would send him information on how the NIH and scientific research impact the economy. We sent the Congressman's office success stories provided by the NIH, the FASEB state fact sheets on federal funding, and the recent Coalition for Health Funding report, *Faces of Austerity: How Budget Cuts Hurt America's Health*, [www.cutshurt.org/].

Penn State's Postdoctoral Society is on the forefront of research advocacy and proud of our commitment to the cause of NIH, and we are thankful for all of the support given to us by ASPET.

Meet ASPET's AAAS Fellow Adam J. Kuszak



Adam Kuszak was one of ASPET's 2013 Washington Fellows.

ASPET member Adam Kuszak recently earned an exciting AAAS Fellowship in the NIH's Office of Dietary Supplements (ODS). Dr. Kuszak earned his PhD in pharmacology from the University of Michigan Medical School in 2009. Prior to coming to ODS, he completed a post-doctoral fellowship with the National Institute of

Diabetes and Digestive and Kidney Diseases.

Dr. Kuszak talks about his early career development and interests in public policy:

How did your interest in pursuing a career in biomedical research develop?

My fundamental interest in science stems from an innate desire to explore and understand our world and was definitely nurtured by my parents. My father is a retired professor of pathology and ophthalmology, and during the summers off from high school I would go to his lab to observe, learn, and even help out with some experimental

analysis. That is where I specifically became focused on pharmacology. My father's lab was analyzing lens tissue samples from the eyes of mice in a drug trial for diabetes therapeutics. I was fascinated by the idea of studying physiological systems, both at the organ and cellular level, and their interplay with the environment and chemical compounds. Working on these drug-trial samples, and later studying novel retinoid compounds for apoptotic activity in model breast cancer cells in the laboratory of Dr. Margaret Clagett-Dame at the University of Wisconsin, cemented my commitment to pursue research that was connected to therapeutics and public health.

What were your research pursuits at Michigan?

My thesis in Dr. Roger Sunahara's laboratory investigated the activation and allosteric regulation of the mu-opioid receptor (MOR), the receptor for endorphins, morphine, and heroin. MOR is a G protein-coupled receptor (GPCR), and one of three main opioid receptor isoforms (the other two are the delta and kappa opioid receptors). MOR primarily interacts with Gi and Go heterotrimeric G proteins to modulate the activity of adenylate cyclase and ion channels. The lab was, and still is, very interested in understanding GPCR

signaling from a structure/function perspective, and at the time there was growing evidence of receptor oligomerization and differential G protein coupling in a variety of GPCR systems. Matthew Whorton, who now heads his own lab at the Vollum Institute, developed a superb reconstitution system to study isolated GPCR-G protein complexes. My work demonstrated agonist binding and G protein coupling to monomeric MOR, demonstrating oligomerization was not a requisite for activation. I was also able to show differential activation of Gi versus Go heterotrimers, suggesting methods of signaling specificity, and began to explore the allosteric modulation of agonist binding.

You were one of ASPET's 2013 Washington Fellows. When did your interest in public policy develop and did the ASPET Washington Fellows Program satisfy that interest and aid your professional development?

My interest in “science for policy” and “the policy of science” really developed during my second year of postdoctoral studies at the NIH. The NIH campus has a host of interest groups to explore any number of scientific disciplines. The announcement of an NIH Fellows Science Policy Discussion Group sparked my interest as an exciting new way to think about scientific research and the biomedical enterprise. Those discussions became the most anticipated part of my week, and the following year I lead the group as one of the co-chairs. Exploring the interplay of biomedical research with legislative, societal, and economic issues and working with experts from policy offices and advocacy groups cemented my desire to pursue this realm for my career.

The ASPET Washington Fellows Program was a great experience. It was also a very interesting endeavor advocating for strong budget support for NIH funding since the inaugural class served just as sequestration was coming into effect. Each fellow meets with the offices of their home district congressmen and senators, so my colleague Katie Davis and I, met with Maryland legislators who have a solid history of supporting NIH research

funding. It was very satisfying to develop a brief presentation that provided the unique perspective of young investigators and students just starting to pursue a science education. We really tried to give the people meeting us new information that they could use to convince others of the importance of sustained biomedical funding.

The ASPET Washington Fellows Program was instrumental in my career development.

The Washington Fellow Program was a positive experience in every way. I was able to explore a particular avenue of science advocacy, participate in the policy making process within ASPET leadership meetings, and I made many professional connections that opened the doors to many other opportunities. The ASPET Washington Fellows Program was instrumental in my career development.

Tell me something about your interview process for the AAAS Fellowships. Exhausting?

Yes, in some ways it was exhausting, but it was also exhilarating. The entire application process is rather extensive. As an applicant you submit your CV, a few essays, and reference letters. As a semi-finalist you prepare a sample policy briefing memo addressing a specific and relevant topic, and present your position to a selection committee who critique your proposal and assess your candidacy. At the finalist stage you go to D.C. to meet with specific offices who are interested in seeing if you are a good fit for their needs, and of course you are trying to assess the same thing of them. The in-person interviews occur over the course of a week. The exhausting part of that process can come from racing all over D.C. to make tightly scheduled meetings at locations you've never been to before, essentially going through multiple back-to-back job interviews while also constantly trying to line up even more interviews.

But as I said, it is also very exciting. You are afforded unparalleled access to high-ranking officials and experts throughout multiple government agencies and divisions for the interviews. Along with interviews at nearly every level of the NIH, I also meet with offices at NSF and the Department of Defense. Several of my peers with biomedical PhDs interviewed at the State Department and Congressional offices. Everyone you speak with is excited to meet you and learn about your experiences and goals. And everyone is clearly passionate about their work—you can't help but get excited about jumping in and working within that community at the nexus of science, technology, and public policy.

Among your choices, why did you ultimately select the Office of Dietary Supplements?

I chose to serve my AAAS Fellowship at the Office of Dietary Supplements for a variety of reasons. There are several existing and well-defined projects which I will immediately jump into and perhaps take on some leadership roles. There are also multiple areas to develop new initiatives and coordinate efforts across several NIH Institutes and Centers, the FDA, USDA, and CDC, as well as non-profits, trade organizations, and professional medical societies. The ODS is positioned within the Office of Disease Prevention and Office of the Director, and I'll be able to contribute to a variety of NIH committees, panels, and workgroups. Our biggest challenges in public health won't be solved by a single entity, and I am enthusiastic to develop the skills necessary to bring together stakeholders from all sides, build consensus, and tackle issues from multiple angles. I think the ODS will give me the best array of opportunities to develop these vital approaches for science policy and outreach.

You have an interest in serving patient communities and public health. How do you expect your experience at ODS to complement that interest?

The ODS is one of the handful of NIH offices tasked with addressing a specific public health

concern, and in that way I will be directly working for patient communities. The office was established as part of the Dietary Supplement Health and Education Act of 1994, and its central mission is to conduct, promote, and communicate research on the benefits and risks of dietary supplement use for maintaining health and preventing chronic disease. I will be involved with each aspect of this mission: contributing to efforts to develop and validate analytical methods to assess supplement composition, performing research program portfolio analysis and systemic reviews of the existing scientific literature, and working to identify new areas of need for research support or program initiatives. In addition to these “behind the scenes” efforts for patient health, there are also many opportunities for disseminating knowledge and communicating directly with patients and health care providers through online databases, informational fact sheets, newsletters, workshops, and symposia.

So while you need to predominantly stay focused on the research to earn your PhD, you must also find and pursue as many opportunities as you can to explore your scientific career interests outside of the research lab.

Crystal ball time—it is 2024. Where are you? And what are you doing?

Well, I think if my predictive powers were that accurate I might be in a different line of work. Ultimately, I see myself continuing to pursue roles that facilitate biomedical research and development, promote interactions between various policy stakeholders, like scientists, politicians, patients, the general public, and enrich analytical thinking and science literacy among non-scientists. Science policy positions at the National Institutes of Health, the National Science Foundation, and non-government advocacy groups are the kinds of opportunities I'm focusing

on for the immediate future. Long-term, I'd like to act more locally, working within the research policy and outreach offices of public universities or private research institutes.

What career advice would you have for graduate students looking at options beyond the bench?

In most scientific careers away from the bench, having a doctoral degree is highly desirable, if not outrightly required. But doctoral programs don't often have a component to explore non-research careers. So while you need to predominantly stay focused on the research to earn your PhD, you must also find and pursue as many opportunities as you can to explore your scientific career interests outside of the research lab. Just about

any fellowship or job you apply for beyond the bench will look for experiences and credentials different than papers and grants. You need to do your best to obtain those varied experiences and skills. Communicating science through a blog or letters to local publications, working with professional societies or advocacy groups, or performing science education outreach at school programs or museums are just a small number of examples of areas to pursue when deciding what career path best suits your passions and goals. You can also check out the NIH Office of Intramural Training and Education and the AAAS websites; both provide a great resource for exploring non-research PhD careers.

Access ASPET Journals on your Mobile Device

All four publications available:

- *The Journal of Pharmacology and Experimental Therapeutics*
- *Pharmacological Reviews*
- *Molecular Pharmacology*
- *Drug Metabolism and Disposition*



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Education News

Message from the New Education Manager



Greetings ASPET members!

I am so pleased to serve in the newly created position of Education Manager. I look forward to working with the staff and membership to bring a renewed focus to science education in

general and pharmacology education in particular. In the meantime, I want to let you know a little more about what brought me to this position. My scientific background is in evolutionary biology and ecology.

As a graduate student at the University of Maryland at College Park, I discovered both the joys and challenges of teaching and developed a keen interest in science education and the policies and practices that could yield systemic improvement in the way post-secondary science is taught. After completing my PhD, I accepted a competitive Science & Technology Policy Fellowship from the American Association for the Advancement of Science.

As a fellow, I spent two years at the National Science Foundation's Division of Undergraduate Education, contributing to a comprehensive evaluation of the scope and impact of the division's funded education efforts. I was also engaged in a national initiative working to improve post-secondary biology education called *Vision & Change in*

Undergraduate Biology Education. My most recent position was as a project manager within the Office of Undergraduate STEM Education at the Association of American Colleges and Universities. In that position, one of my key roles was as a liaison to a group of 11 professional societies in the science, technology, engineering, and mathematics (STEM) fields. These societies collaborated to leverage their programs, policies, and influence to improve teaching and learning in their respective fields. Through this work, I came to appreciate the unique and important role that such societies have in shaping the professional culture of each discipline, especially with regard to advancing effective teaching practices.

Improving the quality of education should interest not only those who teach undergraduates or advise graduate or professional students, but anyone who has a stake in the health and future of the discipline. The potential that societies like ASPET have to improve teaching and learning is precisely what drew me to this position. I look forward to working with all of you to advance our education efforts and am particularly excited to collaborate with the Pharmacology Education Division. Please feel free to get in touch with me at cfry@aspet.org.

Catherine L. Fry

Catherine Fry

Institutional Summer Undergraduate Research Fellowship (SURF) Program

New and renewing applications are due **October 1 for Summer 2015**

ASPET's institutional SURF Program provides undergraduate students an introduction to pharmacology and the opportunity to work in the laboratories of a research institution. The SURF program is intended to heighten interest in science as a career, with an emphasis on pharmacology graduate training to increase the number of young scientists entering the research discipline.

The SURF program is intended to heighten interest in science as a career, with an emphasis on pharmacology graduate training to increase the number of young scientists entering the research discipline.

To apply for an institutional SURF program, the director of the SURF program must be an ASPET member. Additionally, there must be at least five ASPET members included in the faculty of the summer program. A course of study for the summer must be proposed.

The SURF programs are evaluated by an ad hoc committee comprised of members of the Division of Pharmacology Education. The evaluation looks primarily at the overall program

offered, the individual research opportunities, the funding available to supplement the ASPET award, and the track record of the program for sending undergraduates on to graduate school. Funding is awarded for 3 years contingent upon the timely receipt of a progress report. Approximately one-third of the programs turn over each year. Funding is provided by Anthony and Theresa Zannoni Scholarship Fund, the Dalton-Zannoni Fund, the Corporate Associate Fund, and the General Fund.

SURF scholars are expected to receive at least a \$2,800 stipend for a minimum of ten weeks participation in the program. ASPET support for an undergraduate fellowship program to include up to five students is \$1800/student (maximum of \$9000). The request for funding should include matching funds of at least \$1000/student from local resources. Undergraduate student membership at ASPET is free.

For the summer of 2014, ASPET funded a total of 21 institutional SURF Award (includes ongoing programs, renewals, and newly funded programs).

For additional information visit www.aspet.org/awards/SURF/; or contact Catherine L. Fry, PhD, ASPET's Education Manager at cfry@aspnet.org, tel: 301-634-7782.

ASPET also offers Individual SURF awards. For more information visit: www.aspet.org/awards/SURF/individual/.

Professor Margarita L. Dubocovich Talks about the ASPET SURF Program



*Dr. Margarita Dubocovich
University at Buffalo, SUNY*

Margarita L. Dubocovich, PhD is a distinguished SUNY professor and chair of the Department Pharmacology and Toxicology and senior associate dean of Inclusion and Cultural Enhancement at the School of Medicine and Biomedical Science at the University at Buffalo (UB), SUNY. Dr. Dubocovich received her bachelor's degree in 1971 and her PhD

degree in 1976, both in biological chemistry from the University of Buenos Aires School of Chemistry and Natural Sciences. A long-time ASPET member, Dr. Dubocovich is well known for her mentoring efforts and here she talks about the SURF Program for undergraduate students at the University at Buffalo.

How long has UB been administering SURF programs and how long have you been the director of the SURF program?

I've been doing this a long time. When I was at Northwestern University, I was director of the SURF program from 2001 to 2006. In 2007, our SURF program was not renewed, and I submitted it again when I came to Buffalo in 2009. We hosted our first SURF class at UB in 2010. We are now in our second year of our three-year renewal (fifth year overall).

Why did you become involved in SURF Programs?

I really wanted to provide a mechanism for undergraduate students to experience research and enter STEM careers in molecular pharmacology, neuropharmacology, toxicology and the pharmaceutical sciences. Our SURF program at UB is aimed to provide basic concepts and research experience in drug discovery, which I believe is a natural fit within our preceptors' labs.

What is the primary educational experience that undergraduate students might benefit from by participating in the program?

We want our SURF program to be a stepping stone to graduate school, although a few SURF scholars select medical school or other professional careers. Our SURF program is now part of UB's Pharmacology and Toxicology Department in the School of Medicine and Biomedical Science, and in the Department of Pharmaceutical Sciences in the School of Pharmacy and Pharmaceutical Sciences. When students are accepted into the SURF program, we try to match their interests with an appropriate mentor in one of the departments. They write an abstract under the guidance of their mentors who provide appropriate readings, and more importantly, a hands-on research experience. SURF scholars spend 90% of their time in the lab. In the first week, they attend a laboratory course in which they learn basic research techniques and skills such as pipetting, buffer preparation, protein measurements, sterile techniques, and safety regulations among others. If they are working with animals, we also provide them relevant training on proper handling and online tutorials to obtain appropriate certifications.

SURF scholars spend 90% of their time in the lab.

During the last week in the program, each SURF scholar gives both oral and poster presentations to mentors, faculty, and peers at a mini-symposium organized by CLIMB UP, the umbrella program that encompasses several summer programs including SURF, iSEED, CLIMB PRO, and BSURE. The event culminates with a reception where students socialize and enjoy the famous Buffalo-style chicken wings.

On the final day of the program, SURF Scholars participate in the Buffalo Summer Research Day, which brings together over 100 summer students from UB and affiliated institutions. All students take

part in the poster session, and one SURF scholar is selected to make an oral presentation in the now traditional student symposium. The event culminates with a keynote address given by a prominent local researcher who provides inspiring and encouraging words to our departing scholars.

What might a typical day be like for a SURF participant once they arrive at UB?

Basically, they are in the laboratory from 8:30–5:00, Monday through Friday, and often longer. They do real experiments in “real” labs. We grouped the majority of programming on Wednesday afternoons so as to not interfere with lab work. First, students participate in communications workshops where graduate students and postdoctoral mentors help them prepare their oral and poster presentations. SURF students formulate research questions and hypotheses which are tested in the laboratory, which helps build their final oral presentations and posters. Next, our students participate in our weekly BIOSTEM Discovery Series, which are one-hour presentations from prominent UB researchers who cover current and exciting research projects as well as describe their career trajectories, serving as role models. These presentations help students discover future career paths, which are usually what the students enjoy hearing about the most. In addition, each year we host the annual CLIMB UP lecture, in which a prominent leader in educational diversity visits UB



2014 SURF Fellows (from left to right) Andrew Patt, senior biochemistry major at SUNY Geneseo; Shannon Tierney, junior biology/psychology major at Canisius College; Kathleen Rusnak, junior biology major at SUNY Geneseo; Jessica Smith, junior biochemistry major at the University at Buffalo, SUNY; Alexandra Van Hall, junior chemistry major at the University at Buffalo, SUNY.

and presents a motivational talk to the students. This year, on July 14, *Dr. Marino De Leon* of Loma Linda University presented “Keeping Your Eyes on the Goal,” inspiring students to stay focused as they forge their own paths in science.

Several of our SURF Scholars won travel awards to attend the ASPET Annual Meeting to present their summer research. It is a real pleasure to watch them present their research with pride and enthusiasm.

Do you know how many SURF students continue to pursue a research career or do many chose medical school or some other career path?

Over the last four years we have had 20 SURF students. Seven are currently in postdoctoral programs, three are in medical school with a couple of others considering careers in medicine, one is in pharmacy school, two pursued graduate degrees, one is in a nursing program, and the others are undecided or still finishing their undergraduate work.

How have the department and faculty benefited from their long association with SURF?

Many of our students, particularly our Buffalo area students, have continued to work with their mentors into the academic year. In some cases we have even had some of these students join labs. Some are doing postdoctoral work; others have joined faculty in their labs for consecutive summers following their SURF year. A few of the students were awarded SURF Individual Fellowships.

What satisfaction do you get as program director?

We are happy that we can provide this outstanding opportunity to the next generation of scientists. I really do this with pleasure, and each year the program gets better. Once they have a research poster, we encourage the students to apply for fellowships to attend the ASPET Annual Meeting during Experimental Biology. Several of our SURF Scholars won travel awards to attend the ASPET

Annual Meeting to present their summer research. It is a real pleasure to watch them present their research with pride and enthusiasm.

Is there any time available for fun?

Of course there is! We have weekly dinners on Wednesdays. Each year we take SURF students to Niagara Falls and get drenched at the Cave of the Winds, where we tour underneath the waterfall! This year we have organized an architectural tour of

Buffalo, a trip to the Buffalo Museum of Science, and students have gone to the zoo and attended Taste of Buffalo and the Allentown Art Festival. Social activities culminate with our annual picnic with good food, games, kayaking, and camaraderie. Students keep in touch with us and each other via our Facebook page, and we are proud to say that each year they make connections and friendships that last far beyond their time participating in the program.

For more information on the University at Buffalo SURF program visit: www.buffalo.edu/climb/climb-up/climb-up-details/SURF.html or www.facebook.com/CLIMBUPatUB

Application deadline for the 2015 Institutional SURF Fellowships is October 1, 2014. Submit your application soon! For more information, visit: www.aspet.org/awards/SURF/institutional/

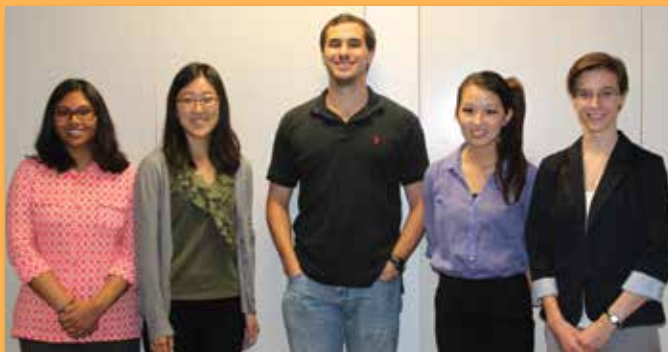
Bristol-Myers Squibb Toxicologists Host Summer Undergraduate Fellows from Rutgers University

With contributions from Lauren Aleksunes, Debra Laskin, and Wendy Freebern (Division of Toxicology)

Each summer, the Drug Safety Evaluation Department of Bristol-Myers Squibb in New Brunswick, NJ, hosts fellows from the Rutgers University Summer Undergraduate Research Fellowship (SURF) Program. Dr. Wendy Freebern and scientists from the local pharmaceutical company educated the students in various aspects of preclinical safety evaluation. Speakers included scientists from toxicology operations and veterinary sciences who discussed the important role of toxicity testing in drug development.

Additional talks focused on organ system-based assessment of new drugs including clinical pathology, immunotoxicology, genetic toxicology, and reproductive toxicology. Students toured the central pharmacy as well as clinical pathology and histopathology laboratories and viewed state-of-the-art equipment in the immunotoxicology laboratory. The field trip concluded with small group meetings between students and scientists over lunch. The

Summer Undergraduate Research Fellowship Program at Rutgers University is supported by grants from the American Society for Pharmacology and Experimental Therapeutics, the Society of Toxicology, the Ernest Mario School of Pharmacy, and NIH R25ES020721.



ASPET SURF Fellows (from left to right) Barkha Jain, Ji Yeon Park, Kyle Buckley, Jaimie Chen, and Shelbie Burchfield visited Bristol-Myers Squibb and toured laboratories in July 2014.

High School Students Explore Toxicology at Rutgers University

With contributions from Lauren Aleksunes, Grace Guo, and Debra Laskin (Division of Toxicology)

Forty-eight high school students from New Jersey and surrounding states participated in a one-week long toxicology program hosted by the Environmental and Occupational Health Sciences Institute and the Ernest Mario School of Pharmacy at Rutgers University. Through interactive exercises with graduate students and faculty, the participants were trained in various aspects of toxicology including dose response relationships, epidemiology, pharmacokinetics, and experimental design.

In the laboratory, students learned how to isolate DNA, run PCR, perform cytopspins, stain slides, and separate DNA by electrophoresis. During this activity-packed week, the students also heard about careers in toxicology, medicine, public health, and pharmacy from Rutgers alumni and shared their research findings with instructors, friends, and family

members. More information about the program can be obtained at bit.ly/V11Ge9.



Participants worked with graduate student instructors to assess lung pathology.

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High school students described their experience learning about toxicology.

ASPET BIG IDEAS INITIATIVE UPDATE

Thank you for all your submissions! Round 1 submissions have been reviewed and those selected for Round 2 have now been notified. Round 2 proposals will be reviewed by Council at the Fall Council Meeting. Stay tuned for more details!





Journal News

New Editorial Board Members

All four ASPET journals have gained new editorial board members since last June.

Craig Svensson, PharmD, PhD, Purdue University, became a member of the *Drug Metabolism and Disposition* Editorial and Advisory Board.

Robin L. Thurmond, PhD, Janssen Research & Development, and Xiao-Feng Yang, MD, PhD, Temple University, joined the *JPET* Editorial and Advisory Board.

Terry Kenakin, PhD, University of North Carolina, Chapel Hill, is now a *Molecular Pharmacology* Editorial and Advisory Board member.

Stephanie Watts, PhD, Michigan State University, and Richard Ye, MD, PhD, Shanghai Jiao Tong University, are new associate editors for *Pharmacological Reviews*.

The Board of Publications Trustees welcomes these researchers to their respective journals and is grateful for their service.

New Feature for ASPET Journals

A new feature has been added to ASPET's journals: complimentary ePrints.

When the copyedited and formatted version of an article goes online, the corresponding author is sent a message containing a link for 15 complimentary ePrints. The link may be shared with colleagues or posted on a personal website. It will allow the user to download the article PDF. There is no time limit for the use of the 15 ePrints, but it expires after 15 downloads.

For all ASPET journals, the fully formatted version is available to subscribers and through pay-per-view during the first 12 months after publication. For manuscripts published in *DMD*, *JPET*, and *Molecular Pharmacology*, the Fast Forward manuscript version is freely accessible upon acceptance and remains freely accessible after the formatted version goes online.



Members-in-the-News

Achievements, Awards, Promotions, and Scientific Breakthroughs

James Halpert, PhD

Dr. James Halpert, former ASPET president and secretary-treasurer, former editor of *Drug Metabolism and Disposition*, and 2010 winner of the Bernard B. Brodie Award in Drug Metabolism, became the eighth Dean of the School of Pharmacy at the University of Connecticut in June 2014.

Dr. Halpert brings to the position a wealth of leadership experience. Prior to accepting the deanship, he was the associate dean of scientific affairs at the Skaggs School of Pharmacy & Pharmaceutical Sciences at the University of

California, San Diego and was previously chair of the Department of Pharmacology and Toxicology at the University of Texas Medical Branch.

He has made seminal contributions to our understanding of the structural basis of drug metabolism and has been at the forefront of studies on cytochromes P450 2B and 3A subfamilies.

Dr. Halpert began this new chapter of his already accomplished career on June 1, 2014. He has been an ASPET member since 1985 and primarily affiliated to the **Drug Metabolism Division**.



Dr. James Halpert
University of Connecticut

James Barrett, PhD

Dr. James Barrett, professor and chair of the Department of Pharmacology & Physiology and founding director of the Drug Discovery and Development Program at Drexel University College of Medicine and founding director of the Clinical and Translational Research Institute at Drexel University, has been elected to serve as councilor on the International Union of Basic and Clinical Pharmacology (IUPHAR) executive committee.

Dr. Barrett received his PhD from Pennsylvania State University followed by postdoctoral training in neuropsychopharmacology at the Worcester Foundation for Experimental Biology. He has served on the faculty at the University of Maryland and at the Uniformed Services University of the Health Sciences (USUHS) where he was professor in the Department of Psychiatry. Between academic positions, he held senior level positions for approximately 15 years in the pharmaceutical and biotechnology area for companies such as Wyeth, Adolor Corporation, and Memory Pharmaceuticals.

He has published more than 275 scientific articles, books, and abstracts in the areas of neuropharmacology, neurobiology, behavioral pharmacology, translational research, and neuroscience and serves on several editorial boards. An ASPET member since 1978, Dr. Barrett served as ASPET president, chair of the Board of Publications Trustees, and president of the Behavioral Pharmacology division of the society.

He has served on the Board of Directors for the Federation of American Societies for Experimental Biology, where he was a member

of the Science Policy Committee and the Public Affairs Committee as well as chair of the *“Breakthrough Series in Science”* and *“Horizons in Bioscience”* series. Dr. Barrett recently joined the board as series editor for the *Handbook of Experimental Pharmacology*. He has received the Solvay-Duphar Award for Research on Affective Disorders, the George B. Koelle Award from the Mid-Atlantic Pharmacology Society for contributions to teaching and research and, most recently, the P.B. Dews Lifetime Achievement Award for Research in Behavioral Pharmacology.

Dr. Barrett’s current research emphasis is in the area of pain, its co-morbid pathologies, and on basic mechanisms and new therapeutics. He is primarily affiliated to the **Behavioral Pharmacology Division**.

Margarita L. Dubocovich, PhD

Dr. Margarita L. Dubocovich, professor and chair of the Department of Pharmacology and Toxicology at the University of Buffalo, SUNY, has been named a State University of New York Distinguished Professor, the highest faculty rank in the SUNY system.

Dr. Dubocovich is considered a pioneering authority on melatonin and the regulation of its receptors in the brain and body. She is credited with discovering melatonin receptor subtypes that have significantly revolutionized the scientific understanding of melatonin and its effect on circadian rhythms, sleep disorders, and depression.

Since 1985, her research has been funded by the National Institutes of Health, the National Science Foundation, and major pharmaceutical companies. Her lab is currently



Dr. James Barrett
Drexel University



Dr. Margarita L. Dubocovich
University of Buffalo, SUNY



**Dr. Rajendram
Rajnarayanan**
University of Buffalo, SUNY



Dr. Angeline Lyon
Purdue University

researching melatonin's mechanism of action at the MT1 and MT2 G-protein coupled receptors. The ultimate aim of her research team is to discover novel drugs that act on each subtype.

Dr. Dubocovich has published more than 170 research articles in professional journals and has been an ASPET member since 1983 and primarily affiliated to the **Neuropharmacology Division**.

Rajendram Rajnarayanan, PhD

Dr. Rajendram Rajnarayanan, assistant professor in the Department of Pharmacology and Toxicology at the University at Buffalo, SUNY, has been honored with the 2014 President Emeritus and Mrs. Meyerson Award for Distinguished Undergraduate Teaching and Mentoring. The award recognizes exceptional teaching and undergraduate mentoring at the university.

Dr. Rajnarayanan has encouraged students, especially those from underrepresented groups, to pursue their interests in biomedical research and is helping to lead programs that offer mentoring and professional development in addition to fostering student success from the undergraduate level through doctoral study. He is also the associate director of University at Buffalo's (UB) CLIMB (Collaborative Learning and Integrated Mentoring in the Bioscience) program.

Dr. Rajnarayanan is a co-investigator on the National Institutes of Health-funded project "Enabling Access to Cutting-Edge Biomedical and Behavioral Science." With this \$1.9 million grant, UB aims to increase the number and success of underrepresented doctoral students in biomedical and behavioral science programs. He has been

an ASPET member since 2010 and primarily affiliated to the **Molecular Pharmacology Division**.

Angeline Lyon, PhD

Dr. Angeline Lyon recently accepted the position of Assistant Professor of Chemistry and Biological Science in the Department of Chemistry at Purdue University. Dr. Lyon earned her PhD in 2009 under the direction of David Hoffman at the University of Texas at Austin. She then completed postdoctoral training under the direction of John Tesmer at the University of Michigan. Dr. Lyon is a past winner of the ASPET Molecular Pharmacology postdoctoral oral presentation competition and is currently a member of the Molecular Pharmacology Executive Committee.

Her current research interests include understanding the molecular mechanisms regulating PLC β and PLC ϵ under basal and activating conditions. These studies incorporate biochemical and cell-based functional assays along with an innovative combination of X-ray crystallography and electron cryo-microscopy. Taken together, these studies will provide much needed insight into two key enzymes that contribute to cardiovascular function and disease, and will ultimately aid in the identification and development of novel therapeutics that modulate signaling by these enzymes.

Dr. Lyon has been an ASPET member since 2009 and primarily affiliated to the **Molecular Pharmacology Division**.

Carl Faingold, PhD

Dr. Carl L. Faingold has recently published a book titled *Neuronal Networks in Brain Function, CNS Disorders, and Therapeutics* (Elsevier)

with co-editor Hal Blumenfeld, MD, PhD.

Dr. Faingold is a founding faculty member of Southern Illinois University School of Medicine in Springfield, Illinois, where he is currently Distinguished Professor in the Department of Pharmacology. He is in his 19th year as department chair. As a member of the American Medical School Pharmacology Chairs (AMSPC), he has taken part in the writing of the AMSPC Knowledge Objectives in Pharmacology and was co-editor with Richard Eisenberg, PhD, of the 2012 update and expansion of these pharmacology teaching objectives.

Dr. Faingold's current book approaches the brain in a unique way, based on neuronal networks and the interactions between them in the intact behaving animal. The 33-chapter book was written by 53 authors from 7 countries and comprises nearly 500 pages. This volume brings together a wide variety of research approaches over many fields in brain research and culminates with proposing a new and global understanding of how CNS drugs may work on neurons in specific network sites in the intact individual. As a pharmacologist, Dr. Faingold emphasizes the critical importance of the correct therapeutic dosage in determining the site and mechanism of CNS drug action.

Dr. Faingold is also a co-editor with Drs. Lynn Wecker, George Dunaway, Lynn Crespo, and Stephanie Watts of *Brody's Human Pharmacology* (Mosby, 2010). An ASPET member since 1977, Dr. Faingold is primarily affiliated to the **Neuropharmacology Division**.

Beth Habecker, PhD

Dr. Beth Habecker has accepted the position of interim chair of the Department of Physiology and Pharmacology at the Oregon Health & Science University. She formally assumed the role after the current chair, David Dawson, PhD, who played a substantial role in the school's education mission, stepped down on July 1st, 2014.

A member of the faculty since 1997, Dr. Habecker leads an active research program while maintaining a significant role in education and community service.

Dr. Habecker received her PhD in pharmacology from the University of Washington and completed a postdoctoral fellowship with Story Landis, PhD, the director of the National Institute of Neurological Disorders and Stroke. She has been an ASPET member since 2002 and primarily affiliated to the **Neuropharmacology Division**.

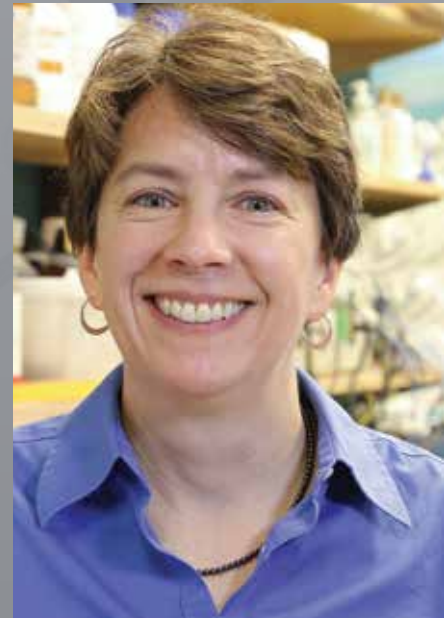
Kelly Karpa, PhD

Dr. Kelly Karpa is an associate professor in the Department of Pharmacology at the Pennsylvania State University College of Medicine where she directs medical pharmacology instruction. The recipient of several prestigious pharmacology awards and known for her work in probiotics, Dr. Karpa was selected in 2013 as a Distinguished Educator by her colleagues at Penn State University College of Medicine.

As a Macy Faculty Scholar, Dr. Karpa is launching an inter-professional educational (IPE) program that teaches third year medical students, second year nurse practitioner students, and final year pharmacy students safe and



Dr. Carl L. Faingold
Southern Illinois University



Dr. Beth Habecker
Oregon Health & Science University



Dr. Kelly Karpa, PhD
Penn State University



Dr. Richard M. Kostrzewa, PhD
East Tennessee State University

effective medication prescribing. Her goal with this new curriculum is to help students transition between having “head knowledge” of drug facts to application of pharmacologic principles in the care of authentic patients. The IPE curriculum involves instruction and assessments with standardized patients and team-based learning to provide instruction pertaining to medication optimization, medication communication, medication and dose selection, medication monitoring, and medication intensification. Skills and behaviors learned in the classroom will be reinforced by practice with patients in the clinics/wards during clerkship rotations.

The Macy Faculty Scholars Program, supported by the Josiah Macy Foundation, provides two-year grants to innovative faculty leaders who are implementing reforms in health professions education to address the dramatic changes occurring in medical practice and health care delivery.

Dr. Karpa has been actively involved with ASPET and has co-chaired the Graduate Education and Recruitment Committee (GREC). In this role she has reviewed institutional and individual SURF applications and SURF travel awards and has served on several site-planning committees for the biennial National Directors of Graduate Studies meetings. Within ASPET, she was a 2012 recipient of a Pharmacology Educator Award and was inducted into the Academy of Pharmacology Educators in 2013. She has been an ASPET member since 2010 and primarily affiliated to the **Pharmacological Education Division**.

Richard M. Kostrzewa, PhD

Dr. Richard M. Kostrzewa, professor in the Department of Biomedical Sciences in the Quillen College of Medicine at East Tennessee State University, announced the release of the 2-volume edition of the *Handbook of Neurotoxicity* (Springer New York), of which he is editor-in-chief. The handbook is a compendium providing an overview on neurotoxins as well as processes and mechanisms attending neuronal cell death or glial perturbations associated with neurodegenerative disorders, psychiatric states, or neuronal dysfunction attending neurological disorders.

Dr. Kostrzewa's interest in neurotoxins was inaugurated with his doctoral dissertation at the University of Pennsylvania, defining 6-hydroxydopa as an overt neurotoxin, and discerning its mechanisms and actions. After working at the VA Medical Center, Tulane Medical Center, and LSU Medical Center in New Orleans, Dr. Kostrzewa joined the newly instituted Quillen College of Medicine in 1978, where he continued his research on neurotoxins. His work is now mainly focused on dopaminergic system interactions with serotonergic nerves, in relation to animal models of Parkinson's disease (PD); and with the process of dopamine receptor supersensitivity as it relates to PD, schizophrenia, and tardive dyskinesia. He serves as editor-in-chief of the journal *Neurotoxicity Research*. An ASPET member since 1975, he is primarily affiliated with the **Neuropharmacology Division**.

Dr. Brian D. Kangas, instructor at McLean Hospital/Harvard Medical School, was awarded the 2014 B.F. Skinner New Researcher Award from Division 25 of the American Psychological Association. An invited address entitled “Recent Advances in Operant Conditioning Technology” was delivered at the APA convention in Washington, DC. He is an ASPET member since 2011 and primarily affiliated to the **Behavioral Pharmacology Division**.

Dr. Mark Hernandez was promoted to the rank of associate professor of physiology and pharmacology at the Alabama College of Osteopathic Medicine. He is an ASPET member since 2008 and primarily affiliated to the **Pharmacological Education Division**.

Dr. Anil Kumar from the University of Missouri-Kansas City serves as president of the Society of Neuro-Immune Pharmacology for 2014–2015. He is an ASPET member since 2012 and primarily affiliated to the **Neuropharmacology Division**.

Dr. Alice Young, professor of psychology, pharmacology, and neuroscience at Texas Tech University, was awarded the 2014 Med-Associates Brady-Schuster Award from Division 28 of the American Psychological Association. She is an ASPET member since 1988 and primarily affiliated to the **Behavioral Pharmacology Division**.

Dr. Mark Millan is recipient of the 2014 Ariens Prize. This award is bestowed every year by the Dutch Pharmacological Society in memory of Everhardus Jacobus Ariens who made groundbreaking contributions in the area of receptor pharmacology. Dr. Millan will be giving the Ariens Lecture in Holland on October 6, 2014. Dr. Millan received his graduate and doctoral degrees from University of Cambridge, England. In 2005, he was identified by the Web of Science as top 1% neuroscientist for citation. Currently he is at Institute de Recherches Servier, Paris, France, and is also an honorary professor at the University of Glasgow. He is an ASPET member since 2000 and primarily affiliated to the **Neuropharmacology Division**.

2014 ANNUAL MEMBERSHIP SURVEY

This year's survey focused on ASPET's Divisions and how well your Primary Division is serving your membership needs.

To view results of this survey, visit: www.aspet.org





New Members

REGULAR MEMBERS

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Univ of Texas Southwestern Med School

Mark G. Angelos
Ohio State Univ

Radu Aricescu
Univ of Oxford, UK

Gagani Athauda
Florida International Univ

Thomas J. Beveridge
Ferring Pharmaceuticals, NJ

Rick A. Bevins
Univ of Nebraska-Lincoln

Sudeepa Bhattacharyya
Univ of Arkansas for Med Sci

Maurizio Bifulco
Univ of Salerno, Italy

Jeffrey R. Bishop
Univ of Illinois-Chicago College of Pharmacy

Larisa H. Cavallari
Univ of Florida

Abhishek Chandra
Univ of Pennsylvania

Alastair Cribb
Univ of Calgary, AB

Jerod Denton
Vanderbilt Univ Med Ctr, TN

Donald R. Gerecke
Rutgers Univ, Ernest Mario School of Pharmacy, NJ

Pritmohinder Gill
Univ of Arkansas-Arkansas Children's Hosp

Wendyam A. Guiguemde
St. Jude Children's Research Hosp, TN

Lynn E. Heasley
Univ of Colorado Anschutz Med Campus

Mukul R. Jain
Zydus Research Centre, India

Constantinos Koumenis
Univ of Pennsylvania School of Med

Ashok Kumar
Univ of Florida

Su-Jun Lee
Inje Univ College of Med, Korea

Silu Lu
Univ of Mississippi Med Center

Nael A. McCarty
Emory Univ-Emory Children's Center, GA

Derek C. Molliver
Univ of New England, ME

Gerhard Multhaup
McGill Univ, QC

Rita Nahta
Emory Univ, GA

Augen A. Pioszak
Univ of Oklahoma Health Sci Center

John Rudd
Chinese Univ of Hong Kong

Stanley V. Smith
Univ of Mississippi Med Center

Ralph Snodgrass
VistaGen Therapeutics Inc, CA

Pia Vogel
Southern Methodist Univ, TX

Danny Winder
Vanderbilt Univ School of Med, TN

John G. Wise
Southern Methodist Univ, TX

Yanchun Xu
Woman's & Infant Hosp, RI

Xiao-Feng Yang
Temple Univ, PA

William Zamboni
Univ of North Carolina-Chapel Hill

Fu-Ming Zhou
Univ of Tennessee

POSTDOCTORAL MEMBERS

Adeleke Badejo
Tulane Univ Health Sciences Center, LA

Anna K. Kopec
Michigan State Univ

Sydney Murphy
Univ of Mississippi Med Center

Blessing Oyejeme-Okerenta
Univ of Port Harcourt, Nigeria

Kingsley C. Patrick-Iwaunyawu
Univ of Port Harcourt, Nigeria

Maria M. Posada
Lilly Research Laboratories, IN

Suowen Xu
Univ of Rochester, NY

Yuansheng Zhao
The Hamner Insts for Health Sciences, NC

GRADUATE STUDENT MEMBERS

Bdour M. Almohammad
Michigan State Univ

Ali Alquraini
MCPHS Univ, MA

Abigail L. Brewer
Washington State Univ

Brianna S. Cagle
Kansas Univ Med Center, MO

Hardik J. Chandasana
CSIR-Central Drug Research Inst, India

Yashpal S. Chhonker
CSIR-Central Drug Research Inst, India

Marangelie Criado-Marrero
Ponce School of Medicine, PR

Ifeoma C. Ezenyi
MPharm, National Inst for Pharmaceutical Research & Development, Nigeria

Jonathan Klabnik
West Virginia Univ

Stephanie Lunn
Univ of Alberta

Abdullah Al Maruf
Univ of Toronto, ON

Kelly A. McGlynn
Univ of Rochester Med Center, NY

Margaret Ann M. Nelson
East Carolina Univ, NC

Tarimobo M. Otobo
Niger Delta Univ, Nigeria

Shahinaz M. Shalaby
Georgia Regents Univ

Abhishek Sharma
CSIR-Central Drug Research Inst, India

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Saurabh G. Vispute

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Yuchen Wang

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Ran Wei

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Univ of Illinois at Chicago

Brent M. Young

Dalhousie Univ, NS

Raymond J. Zhang

Univ of North Carolina

**UNDERGRADUATE
STUDENT MEMBERS****Laura E. Abbott**

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Megan S. AbbottUniv of Texas Health Sci Center -
San Antonio**Redwan K. Abdo**

Community College of Aurora, CO

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Univ of Puerto Rico-Rio Piedras

Bryce Adams

The Univ of Findlay, OH

Negin Alizadeh-Rad

Univ of Louisville, KY

Jordan A. Brown

Morehouse College, FL

Alyssa Brunal

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Kyle Buckley

Rutgers Univ, NJ

Shelbie L. Burchfield

Rutgers Univ, NJ

Kiristen D. Camper

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Tougaloo College, MS

Samantha R. Hewett

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Kenneth Hu

Rutgers Univ, NJ

Barkha Jain

Rutgers Univ, NJ

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Sterling Payne

Ithaca College, NY

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Rutgers Univ, NJ

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San Diego State Univ, CA

Melissa J. Ruggiero

Kansas Univ Med Center

Kathleen M. Rusnak

Univ at Buffalo, NY

2015 Membership Renewal

Be sure to watch your email for your 2015 Dues Notice later this month. 2015 is going to be a great year for ASPET Members with the Annual Meeting taking place in Boston this March, continued growth of the Education Department, and further exploration of the Big Ideas Initiative. We hope you continue your membership and take advantage of all of the many benefits ASPET membership has to offer. Thank you for your valued support of ASPET!

In Sympathy

ASPET notes with sympathy the passing of the following members:

Garold Yost
Donald Franz

Sofia Saari

Otterbein Univ, OH

Dennis Sholler

Rutgers Univ, NJ

Daniel Simmons

Rutgers Univ, NJ

Jessica A. Smith

Univ at Buffalo, NY

Sam L. Snider

Vanderbilt Univ, TN

Jacob L. Stanage

Univ of Michigan

Sarah E. Stovar

Washington & Jefferson College, PA

Diane N. Streifthau

Kansas Univ Medical Center

Wesley R. Sun

Vanderbilt Univ, TN

Hank S. Swerdloff

Dartmouth College, NH

Ryan P. Tarpey

Univ of Michigan

Marvin Y. Thomas

Morgan State Univ, MD

Shannon M. Tierney

Canisius Coll, NY

Fangel Tung

Rutgers Univ, NJ

Chasity Uzuegbu

Rutgers Univ, NJ

Alexandra K. Van Hall

Univ at Buffalo, NY

Gloriana Villarreal

Univ of Texas Health Sci Center

Patricia Walchessen

Univ of Texas Health Sci Center-San Antonio

Kaiwen Wang

Rutgers Univ, NJ

Chengyu Weng

Univ of North Carolina-Chapel Hill

Moya Willis

Univ of Colorado

Kathleen E. Winters

Univ of Texas Health Sci Center at San Antonio

Jeffrey Yang

Rutgers Univ, NJ

Bing Q. Zheng

Truman State Univ, MO

Grant F. Zurcher

Hendrix College, AR

ASPET Hires New Member Services Manager



Yennifer Hernandez joined ASPET on August 18th as the **Member Services Manager** to lead our membership and subscriptions team. As the **Member Services Manager**, she will be available to help members renew their membership and subscriptions, assist

members and subscribers with their accounts, and help ASPET reach out to new and potential members. Yennifer comes to ASPET after a number of years providing member services with the Endocrine Society.

Member-Get-A-Member Campaign

After the success of last year's Member-Get-A-Member campaign, ASPET will be launching the 2014 Member-Get-A-Member campaign this September! Any current active member who recommends a new regular, affiliate, or postdoctoral member will receive a complimentary ASPET lunch box with our new logo. In addition, any current member who recommends a new member join ASPET (including new student and undergraduate members) will receive entry in the raffle for the Grand Prize, a \$150 gift card!

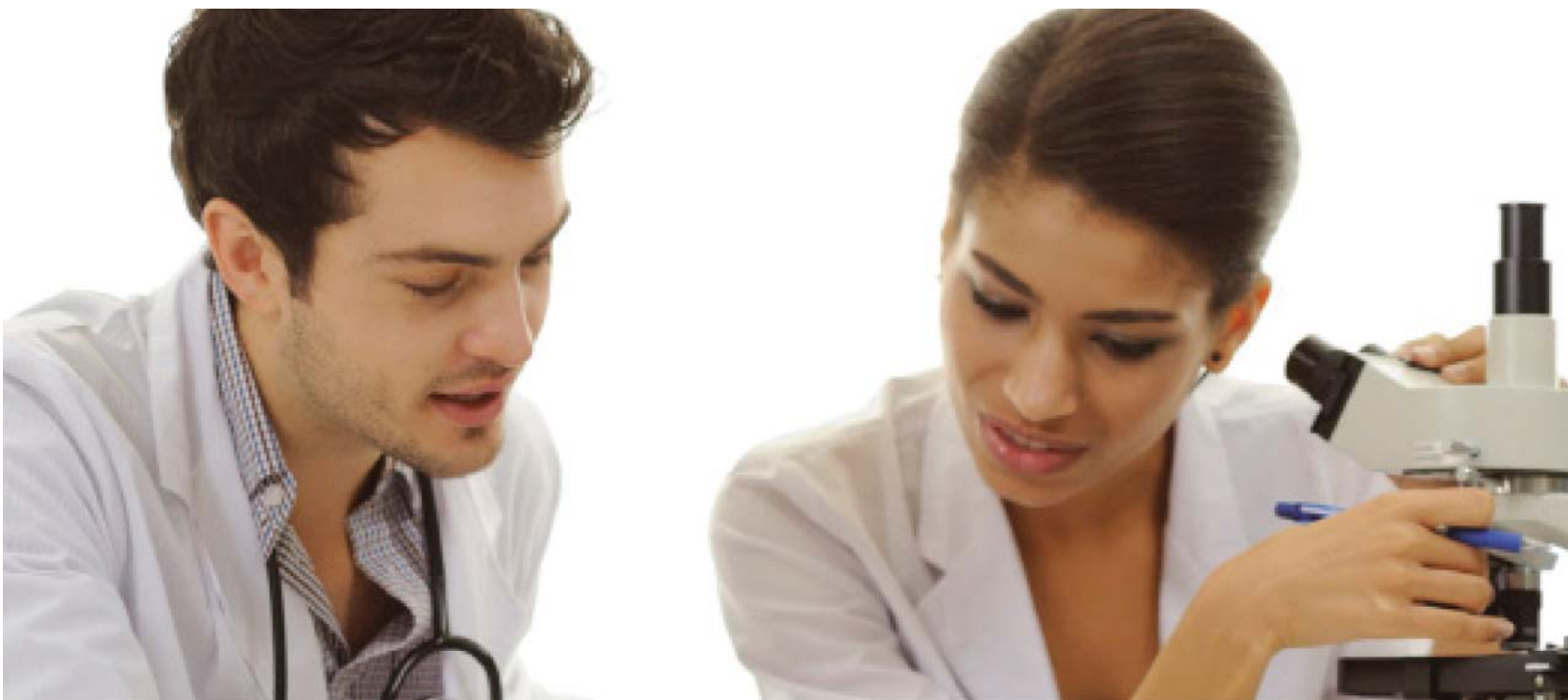
Speak with your students, professional contacts, and other interested individuals and let them know about the exciting benefits of ASPET Membership. Helping to grow the ASPET membership ensures the strength of the organization and allows us to continue to offer our many benefits and explore new ways to help grow the field of pharmacology and experimental therapeutics.

How Well Do You Know Your ASPET Membership Benefits?

1. When you attend the ASPET Annual Meeting at Experimental Biology as a society member, you are presented with several opportunities to grow your network. What types of ASPET events help you interact with your peers?
 - a) Receptions and dinners
 - b) Workshops and symposia
 - c) Division mixers
 - d) Networking walk
 - e) All of the above!
2. ASPET's public affairs department provides society members with:
 - a) Public affairs advocacy for research funding and science policy favorable to pharmacology and biomedical research
 - b) Opportunities to participate in the Washington Fellows Program and the Advocacy Outreach Program
 - c) Capitol Hill preparation
 - d) Monthly legislative updates by email
 - e) All of the above!
3. Members get free manuscript submission and free full-text online access to which ASPET journals:
 - a) *Drug Metabolism and Disposition*
 - b) *Pharmacological Reviews*
 - c) *The Journal of Pharmacology and Experimental Therapeutics*
 - d) *Molecular Pharmacology*
 - e) All of the above!
4. As a member you have access to ASPET's online Career Center. How do you benefit from it?
 - a) You can post your resume on the career center
 - b) You can look for jobs in your area of specialty and proactively manage your career goals
 - c) If your department has a job opening, you get reduced prices to post jobs on the ASPET Career Center
 - d) You get access to the National Healthcare Career Network
 - e) All of the above!
5. As an employer, if you post a position opening on the ASPET Career Center, your job also appears on:
 - a) The ASPET Homepage in the Job Postings box
 - b) The ASPET LinkedIn Group, which has over 1,700 members
 - c) The ASPET Twitter Feed, which has over 760 followers
 - d) The ASPET Newsbrief, which gets emailed to all members twice a month
 - e) All of the above!
6. Student members benefit from ASPET membership through:
 - a) Free membership for the first year
 - b) Opportunities to apply for travel awards to attend the ASPET Annual Meeting at Experimental Biology
 - c) Opportunities to present their work and win cash prizes through the Best Abstract Award Competition
 - d) Networking opportunities through divisions, mixers, and social media
 - e) All of the above!
7. Members can stay up-to-date with important ASPET news, information, deadlines, member achievements, and more through:
 - a) The twice monthly email newsletter, *ASPET Newsbrief*
 - b) The ASPET Facebook page, Twitter Handle, and LinkedIn Group
 - c) www.aspet.org
 - d) The quarterly newsletter, *The Pharmacologist*
 - e) All of the above!
8. Membership to ASPET offers which of the following exciting benefits?
 - a) Free online subscription to the ASPET quarterly newsletter, *The Pharmacologist* and email newsletter, *ASPET NewsBrief*
 - b) Opportunities to contribute to the Society by participation in elections, committees, and member surveys
 - c) Free listing and online access to the FASEB directory
 - d) Reduced subscription rates for the *FASEB Journal*
 - e) All of the above!

Answer key for ASPET Membership Benefits: 1.e, 2.e, 3.e, 4.e, 5.e, 6.e., 7.e, 8.e

VISIT THE ASPET CAREER CENTER TODAY!
WWW.ASPET.ORG/CAREERCENTER/



WHAT YOU NEED: ASPET'S CAREER CENTER HAS IT

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- Sign up for automatic email notifications of new jobs that match your criteria
- Free & confidential résumé posting
- Access to jobs posted on the National Healthcare Career Network (NHCN)
- Career management resources including career tips, coaching, résumé writing, online profile development, and much more

Employers:

- Searchable résumé database
- Hassle-free posting; online account management tools
- Reach ASPET's Twitter followers (over 650) and LinkedIn Members (over 1,500)
- Post to just ASPET or to entire NHCN network
- Sign up for automatic email notifications of new resumes that match your criteria
- Job activity tracking

ASPET is committed to your success:

The ASPET Career Center is the best resource for matching job seekers and employers in the pharmacology and related health science fields. Our vast range of resources and tools will help you look for jobs, find great employees, and proactively manage your career goals.



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Chapter News

Great Lakes Chapter

2014 Annual Meeting in Review

On June 13, 2014, the Great Lakes Chapter of ASPET (GLC-ASPET) hosted its annual meeting at Rosalind Franklin University of Medicine and Science, North Chicago, to foster interactions among pharmacologists in the Great Lakes region and to provide a forum for graduate students and post-doctoral fellows to present their research. Over 130 pharmacologists attended the meeting including 59 undergraduate and graduate students, 18 post-doctoral fellows, and researchers from several universities and biopharmaceutical companies.

The annual meeting had a very interesting program that included a young investigators symposium, poster presentations by undergraduate and graduate students as well as postdoctoral fellows, and a scientific symposium on "Stem cells: Current and Future Use in Pharmacology" that featured nationally and internationally recognized researchers in stem cell research.

Dr. Stewart, CEO & scientific director, Ottawa Hospital Research Institute, University of Ottawa, discussed in his talk "Stem Cell Therapies in Cardiovascular Disease" the promise of stem cell therapy for repair and regeneration of damaged organs and for restoring their function

after injury or chronic disease. He also addressed the significant limitations of current cardiac cell therapy and the need for strategies to overcome these limitations and to increase the stem cells' efficacy for providing more substantive benefit in terms of cardiovascular repair and regeneration.

Dr. Brenda Russell, professor of physiology and biophysics, University of Illinois at Chicago, discussed in her talk "Mechanobiology and Stem Cells" the intimate interplay between the mechanical microenvironment and cell phenotype and behavior. Dr. Russell addressed the significant potential of using intrinsic cellular responses to local micromechanical changes to reduce maladaptive repair processes and promote more effective healing.

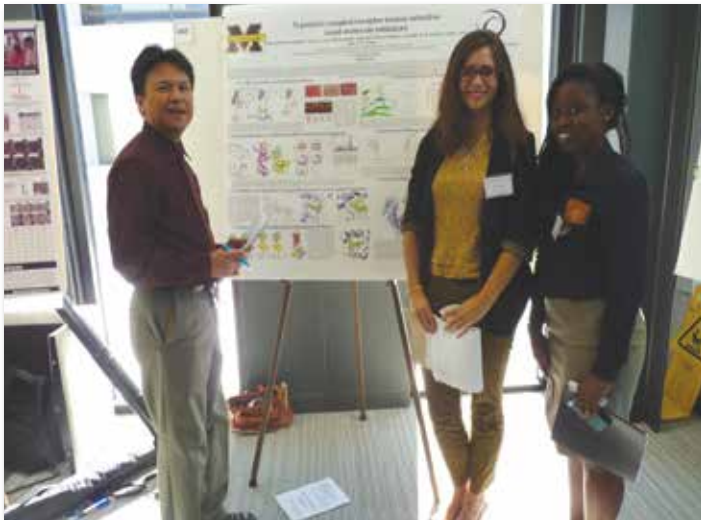
Dr. Eric Lagasse, director of the Cancer Stem Cell Center at the McGowan Institute for Regenerative Medicine, University of Pittsburgh, discussed in his talk, "Growing a Surrogate Liver: Advantages and Consequences," the challenge of determining a suitable location and testing the hypothesis that transplantation of distinct normal cell/tissue types directly into the lymph nodes would engraft and demonstrate ectopic liver. He described several interesting studies



Professor Russell gave a talk on the mechanobiology of stem cells.



Dr. Stewart discussed the promise of stem cell therapy for the repair and regeneration of damaged organs.



Poster presentation at the GLC chapter annual meeting

in his lab that provide a new concept to use the lymph node as an *in vivo* bioreactor in which to regenerate functional organs.

Dr. Daniel A. Peterson, director of the Center for Stem Cell and Regenerative Medicine, Rosalind Franklin University of Medicine and Science, presented in his talk, “Regulating Neural Stem Cell Fate and Recruitment,” his work on converting oligodendrocyte progenitor cells that do not normally adopt a neural fate to functional neurons. He discussed how targeted recruitment of converted oligodendrocyte progenitor cells may offer a new therapeutic option for brain repair.

To read a full report on the 2014 GLC Annual Meeting, please visit
www.aspet.org/2014_GLC_Meeting_in_Review

Upstate New York Chapter

2014 Annual Meeting in Review

The Upstate New York Pharmacology Society held its third annual meeting on Monday, May 19, 2014 at the University at Buffalo Center for the Arts. Scientific presentations at the meeting highlighted the theme “Development and Disease across the Lifespan.”

Dr. Burns C. Blaxall, professor of pediatrics at the University of Cincinnati, delivered the keynote address entitled “New approaches to an old disease: Therapeutic discovery for heart failures.” Dr. Blaxall, director of translational research at the Heart Institute of the Cincinnati Children’s Hospital Medical Center, described his recent animal model data demonstrating how small molecule $G\beta\gamma$ inhibition can be applied as a systemic pharmacologic therapy for heart failure. Additional invited thematic speakers

were Vincent Tropepe, PhD, from the University of Toronto and Anton M. Bennett, PhD, from Yale University. Dr. Tropepe, associate professor of cell and systems biology, presented his studies with zebrafish demonstrating how social environment can modulate neurogenesis, particularly that specific sensory neuronal populations are most sensitive to changes in the social context. Dr. Anton M. Bennett, professor of pharmacology and comparative medicine, presented his studies of how germ line mutations resulting in abnormal signaling of protein tyrosine phosphatases may underlie the pathophysiologic manifestations of human diseases such as Noonan syndrome and nonalcoholic fatty liver disease.

Presidential Graduate Student Symposium speakers included 7 advanced graduate students

from regional universities and research institutes: Wendy Swetzig (Roswell Park Cancer Institute), Rafael Gil de Rubio (University of Rochester), Jocelyn Wang (Cornell University), Zethan Koch (D'Youville College), Jing Wang (University at Buffalo), Vineet Dhiman (Roswell Park Cancer Institute), and Hannah Stoveken (University of Rochester). Early Career Scientist presentations were made by Dr. Alicia Walf (Rensselaer Polytechnic Institute), Dr. Sihem Ait-Oudhia (University at Buffalo), and Dr. Stewart D. Clark (University at Buffalo). In addition, 34 poster presentations were made with awards and prizes being presented to numerous students judged best-in-class for undergraduate, graduate, and doctoral research.

The meeting was capped by the announcement of the new UNYPS President-Elect, Dr. Paul Kammermeier of the University of Rochester. The next UNYPS meeting will be held May 18, 2015 at the University of Rochester.



Graduate and undergraduate students from universities and research institutes across New York State presented their research during scheduled sessions at the Upstate New York Pharmacology Society meeting.



**Mid-Atlantic Pharmacology Society
2014 ASPET Regional Chapter Annual Meeting
"Drug Discovery Innovations"
October 28, 2014 8:00 AM - 5:00 PM
Temple University School of Medicine
Philadelphia, PA**

**Keynote Speaker: Jeffrey Conn, PhD
Vanderbilt University**

Other Invited Speakers Include:

**James Barrett, PhD
Drexel University**

**Wayne Childers, PhD
Moulder Center for Drug Discovery, Temple University**

**John Pascal, PhD
Thomas Jefferson University**



Jeffrey Conn, PhD

The MAPS Annual Meeting will include a Keynote Presentation, invited speakers, the annual trainee (postdoctoral, graduate and undergraduate student) RESEARCH POSTER COMPETITION, with two trainees selected for oral presentations, and a PANEL DISCUSSION focused on "Bioventure Approaches to Drug Discovery", ending with a networking reception/award ceremony for all attendees.



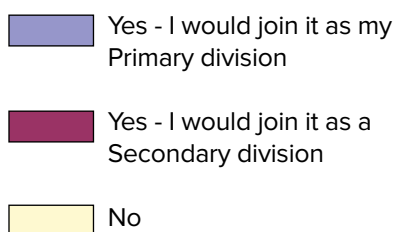
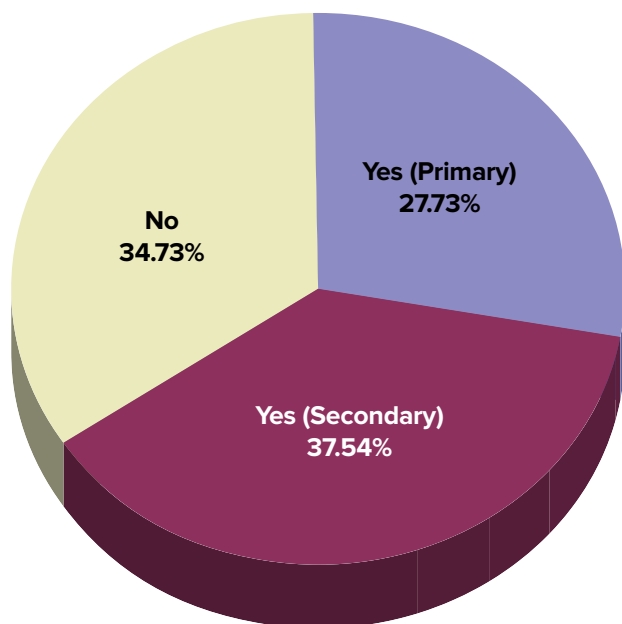
Division News

New Cancer Pharmacology Division

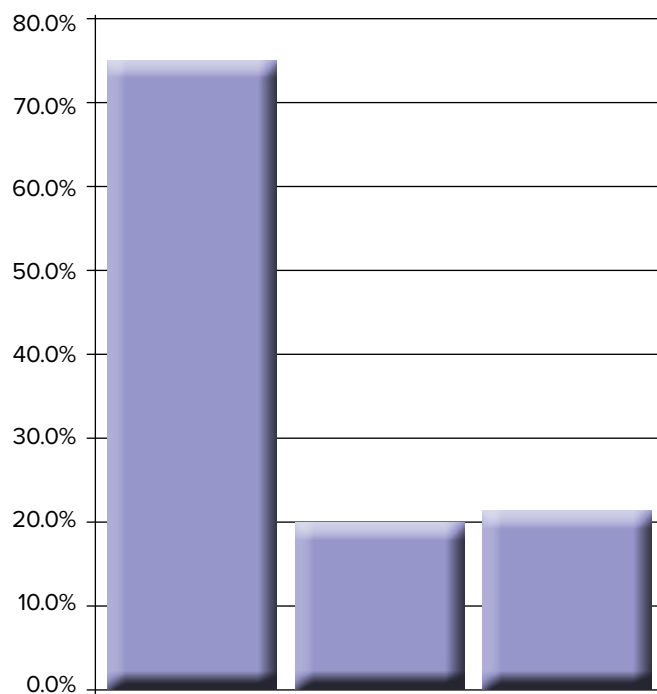
Earlier this summer, the ASPET Council and Council of Division Chairs sent out a survey to gauge member interest in the formation of a new Cancer Pharmacology Division. Due to a very positive response (over 200 people expressed interested in joining), the Council has decided to move forward with establishing this new division. Stay tuned for more details and information as it develops on www.aspet.org.

Results of the Cancer Pharmacology Division Survey

Please keep in mind that ASPET members may join as many divisions as they would like as long as they choose at least one (1) division as their primary division. Would you be interested in joining the new Cancer Pharmacology Division?



What is your level of interest in participating in a new Cancer Pharmacology Division? Check all that apply.



I would like to be actively involved and receive more information as the new division is formed.

I would like to participate in the Executive Committee of the new division.

None of the above.



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Members: \$15.00 + Shipping



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Gray hat with embroidered ASPET logo - one size fits all
Members: \$10.00 + Shipping



Einstein T-shirt

Black cotton with Albert Einstein quote
Adult Sizes: S, M, L, XL, XXL
Members: \$15.00 + Shipping



6-Pack Cooler Lunch Bag

Gray cooler bag - use as a lunch bag or fit up to six 12 oz beverage cans
Members: \$10.00 + Shipping



Cooligraphy T-shirt

Black cotton with stylized ASPET design in red and gold
Adult Sizes: S, M, L, XL, XXL
Members: \$15.00 + Shipping



Upright Lunch Bag

Gray and black upright lunch bag with side mesh pocket
Members: \$10.00 + Shipping



Explore Pharmacology T-shirt

White cotton with cartoon design
Adult Sizes: S, M, L, XL, XXL
Members: \$15.00 + Shipping



Mug

Gray mug with ASPET logo
Members: \$10.00 + Shipping



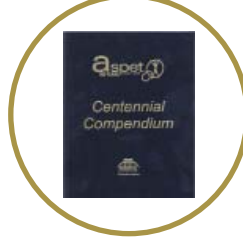
Kids T-shirt

White cotton ASPET donkey cartoon design
Child Sizes: XS, S, M, L, XL
Members: \$12.00 + Shipping



Travel Mug with Lid

Tall khaki travel mug with silicone lid
Members: \$12.00 + Shipping



Centennial Compendium

Compilation of articles published to celebrate ASPET's centennial
Members: \$5.00 + Shipping



Meetings & Congresses

September 2014

66th Clin. Endocrinology Update

www.endocrine.org/ceu

Sept. 4–6, San Francisco, CA

Eurotox: 50th Cong. Europ. Socs. Toxicol.

www.eurotox2014.com

Sept. 7–10, Edinburgh, UK

11th Intl. Symp. Resistance Arteries

www.isra2014.org

Sept. 7–11, Banff, Canada

4th Intl. Conf. Pharmaceutical Regulatory Affairs

regulatoryaffairs2014.com

pharmaceuticalconferences.com

Sept. 8–10, Raleigh, NC

5th Intl. Cong. Cell Membranes & Oxidative Stress: Focus on Calcium Signaling & TRP Channels

www.cmos.org.tr/2014

Sept. 9–12, Isparta, Turkey

37th Ann. Mtg. Japan Neurosci. Soc.

www.neuroscience2014.jp/en/information/index.html

Sept. 11–13, Yokohama, Japan

NIEHS-supported Tamburro Symp. Environmental Chemicals & Liver Disease

louisville.edu/gimedicine-symposium/events/main

September 11–12, 2014, Louisville, KY

Amer. College Clin. Pharmacology Ann. Mtg.

www.accp1.org/2014_meetings_welcome.shtml

Sept. 14–16, Atlanta, GA

5th RSC / SCI Symp. GPCRs in Medicinal Chem.

www.rsc.org/ConferencesAndEvents/conference/alldetails.cfm?evid=115797

Sept. 15–17, Basel, Switzerland

ACORD—Australia & Asia Pacific Clinical Oncology Res. Dev. Workshop

acord.org.au/index.asp

Sept. 14–19, New South Wales, Australia

14th Intl. Cong. Ethnopharmacology

14ise-slf.atalca.cl

Sept. 23–26, Puerto Varas, Chile

Soc. for Women's Health Res. X Conf.: What A Difference an X Makes

www.womenshealthresearch.org/site/PageServer?pagename=2014XconferenceDC

Sept. 23, Washington, DC

8th Intl. Symp. Cell/Tissue Injury & Cytoprotection/Organoprotection

www.congressline.hu/iscitico2014

Sept. 24–26, Budapest, Hungary

7th Santorini Conf. Biologie Prospective

www.santorini2014.org/santorini_accueil.php

Sept. 25–27, Thira, Santorini, Greece

13th Ann. Intl. Conf. Frontiers in Cancer Prevention Res.

www.aacr.org/Meetings/Pages/MeetingDetail.aspx?EventItemID=22#.U-JMeqP5RvY

Sept. 28–Oct. 1, New Orleans, LA

12th Ann. Intl. Conf. Neuroprotective Agents

www.neuroprotective.org

Sept. 28–Oct. 1, Charlottesville, VA

FASEB Sci. Res. Confs.: AMPK: Biological Action & Therapeutic Perspectives

secure.faseb.org/FASEB/meetings/summrconf/selecttopic.aspx

Sept. 28–Oct. 3, Lucca, Italy

NY Academy of Sciences: Elucidating GPCR Functional Selectivity: Novel Opportunities for Drug Development

www.nyas.org/Events/Detail.aspx?cid=ab85c049-16fd-46a7-9ccf-336c28eeb518

Sept. 30, 2014, New York City, NY

October 2014

APS Intersociety Mtg.: Comparative Approaches to Grand Challenges in Physiology

www.the-aps.org/mm/Conferences/APS-Conferences/2014-Conferences/Comparative

Oct. 5–8, San Diego, CA

2014 SACNAS Nat. Conf.

sacnas.org/events/national-conf

Oct. 15–19, Las Vegas, NV

27th ECNP Cong.

www.ecnp-congress.eu

Oct. 18–21, Berlin, Germany

2014 Amer. Soc. Human Genetics Ann. Mtg.

www.ashg.org/2014meeting

Oct. 18–22, San Diego, CA

14th Ann. Mtg. Safety Pharmacology Soc.

www.safetypharmacology.org

Oct. 19–22, Washington, DC

19th North Amer. ISSX Mtg./ 29th JSSX Mtg.

www.issx.org/?page=Upcoming

Oct. 19–23, San Francisco, CA

2014 Soc. Forensic Toxicologists Ann. Mtg.

www.soft-tox.org/meeting

Oct. 19–24, Grand Rapids, MI

5th European Workshop on Lipid Mediators

workshop-lipid.eu

Oct. 23–24, Istanbul, Turkey

2014 Intl. Psychogeriatric Assn. Mtg.

www.ipa-beijing2014.org/

Oct. 23–26, Beijing, China

Translational Cancer Res. for Basic Scientists Workshop

www.aacr.org/Meetings/Pages/MeetingDetail.aspx?EventItemID=21#.U-JPE6P5RvY

Oct. 26–31, Boston, MA

Intl. Conf. & Exhibit. on Biowaivers & Biosimilars

www.pharmaceuticalconferences.com/biowaivers-biosimilars-2014

Oct. 27–29, Hyderabad, India

Intl. Conf. & Exhibit. on Pharmacovigilance & Clinical Trials

www.pharmaceuticalconferences.com/pharmacovigilance-clinical-trials-2014/

Oct. 27–29, 2014, Hyderabad, India

NY Academy of Sciences: Pharmacologic Resolution of Inflammation as a Novel Therapeutic Approach

www.nyas.org/Events/Detail.aspx?cid=1212ceec-c23c-4a26-a0b0-d72cdf1cfca7

Oct. 28, 2014, New York City, NY

November 2014

2014 Ann. Mtg. of Amer. Assn. Pharmaceutical Scientists

www.aaps.org/annualmeeting/

Nov. 2–6, San Diego, CA

2014 HIV Drug Therapy Conf.

www.hivglasgow.org

Nov. 2–6, Glasgow, UK

Amer. Soc. Nephrology: Kidney Week 2014

www.asn-online.org/education/kidneyweek/

Nov. 11–16, Philadelphia, PA

ABRCMS

www.abrcms.org/

Nov. 12–15, San Antonio, TX

5th Ann. Mtg. Soc. for Social Neuroscience

s4sn.org/2014-annual-meeting-washington-dc

Nov. 13–14, Washington, DC

24th Neuropharmacology Conf. - Elsevier

www.neuropharmacology-conference.elsevier.com

Nov. 13–14, Arlington, VA

62nd Amer. Soc. Cytopathology Ann. Scientific Mtg.

cytopathologymeeting.org/2014/

Nov. 14–17, Dallas, TX

Neuroscience 2014

www.sfn.org/annual-meeting/neuroscience-2014

Nov. 15–19, Washington, DC

EORTC-NCI-AACR Intl. Symp. Molecular Targets & Cancer Therapeutics

www.aacr.org/Meetings/Pages/MeetingDetail.aspx?EventItemID=18#.U-JQnaP5RvY

Nov. 18–21, Barcelona, Spain

December 2014

3rd Intl. Conf. Obesity & Weight Management

obesity2014.conferenceseries.net

Dec. 1–3, San Francisco, CA

Amer. Assn. Cancer Res. Mtg. on Tumor Immunology & Immunotherapy

www.aacr.org/Meetings/Pages/MeetingDetail.aspx?EventItemID=26#.U-PYh2ePKUK

Dec. 1–4, Orlando, FL

2nd World Cong. Clinical Lipidology

clinical-lipidology.com/

Dec. 5–7, Vienna, Austria

2014 Amer. Soc. Cell Biology Mtg.

www.ascb.org/2014meeting/

Dec. 6–10, Philadelphia, PA

53rd Ann. Mtg. Amer. Coll. Neuropsychopharmacology

www.acnp.org/annualmeeting/default.aspx

Dec. 7–11, Phoenix, AZ

San Antonio Breast Cancer Symp.

www.sabcs.org/

Dec. 9–13, San Antonio, TX

2014 British Pharmacological Soc. Mtg.

www.bps.ac.uk/meetings/Pharmacology2014

Dec. 16–18, London, England, UK

January 2015

Immunology of Fungal Infections

www.grc.org/programs.aspx?id=14930

Jan 18–23, 2015, Galveston, TX

New Frontiers in GPCR Signaling: From Biased Agonism to Disease Progression

www.grc.org/programs.aspx?id=14785

Jan 31–Feb 1, 2015, Ventura, CA

February 2015

Connecting G Protein-Coupled Receptor Mechanisms to Physiological Functions

www.grc.org/programs.aspx?id=11687

Feb 1–6, 2015, Ventura, CA

AMSPC Annual Meeting

www.amspc.org/annual-meetings/

Feb 04–08, St. Kitts, Caribbean

Exploring the Intersection of Stem Cell and Cancer Biology

www.grc.org/programs.aspx?id=17096

Feb 14–15, Ventura, CA

Glycans as Mediators of Interactions

between Molecules, Cells and Organisms

www.grc.org/programs.aspx?id=15615

Feb 28–Mar 1, 2015, Lucca, Italy

STUDENTS: Join ASPET in Transforming Discoveries into Therapies

Membership is open to all students who have an interest in developing new medicines to fight diseases

Student Member Benefits Include:

- **FREE membership** for undergraduate students; graduate students receive free membership for the first year, then \$30/year
- **Networking and career opportunities** among fellow students, faculty, and members that are doing research in your field of study
- **Travel Awards** for graduate students, and recent Summer Undergraduate Research Fellows to attend the ASPET Annual Meeting and the World Congress of Pharmacology
- Opportunities to present your research and win **Best Abstract Awards** for students at the ASPET Annual Meeting (cash prizes)
- **Reduced student rates** to attend the ASPET Annual Meeting
- **Free activities and sessions** of student interest at the ASPET Annual Meeting
- **Automatic notification** of events and opportunities of specific interest to students
- Access to the **ASPET Online Career Center**



ASPET.ORG

American Society for Pharmacology and Experimental Therapeutics

LET'S STAY CONNECTED:



 ASPET
Transforming Discoveries into Therapies



Division for Neuropharmacology

Please Join Us for a Reception at Neuroscience 2014

Attending Neuroscience 2014? Be sure to connect with friends and colleagues at the ASPET Division for Neuropharmacology Social.

Date

Sunday, Nov. 16

Time

6:30 PM - 8:00 PM

Location

Marriott Marquis,
Washington, D.C.

Room

Dogwood



Non-ASPET members are welcome to attend to learn about ASPET's Division for Neuropharmacology. Lite fare and beverages will be provided.

Save the Date!



Annual Meeting
at Experimental Biology
March 28 - April 1, 2015
Boston, MA

