

# Society of Toxicology NEWSLETTER

NOVEMBER/DECEMBER 1990

## Chemicals and Acceptable Risk, the Public and the Press

*A special forum presented by the Society of Toxicology*

*Sunday, February 24, 1991, 5-8 p.m.*

The Committee on Public Communications and the Foundation for American Communications (FACS), under the direction of Jack Cox, have designed this forum to help academic toxicologists develop a better understanding of the news process and its coverage of environmental, health and safety issues. The session will also provide an opportunity for the exchange of ideas among the news sources and journalists involved in toxicology coverage.

This FACS panel discussion will feature Professor Stephen Presser of Northwestern University Law School and will involve Jack Cox and 8-10 panelists. Professor Presser has moderated a series of forums around America for FACS on food and safety issues. The panel will feature print and broadcast reporters and editors, corporate news sources, advocacy groups and toxicologists who are familiar with the news process.

Professor Presser will use the Socratic method, a teaching technique in which the instructor asks the panelists questions designed to illuminate materials or issues familiar to the panelist. Used primarily in American law schools, it is also an exceptionally effective way to enliven panel discussions. When employed by an adept moderator, the Socratic method quickly penetrates to the core of issues and disputes and leads to much more entertaining and absorbing presentations than are possible through lecturing. The major objective of the forum will be to assist those toxicologists who wish to become more involved in the discussion and debate about the use of acceptable risk and chemicals. ●

## Toxicology Education Foundation

Throughout its 30-year history, the Society of Toxicology has maintained an overall commitment to education, particularly the education of graduate and undergraduate toxicology students. With a general decline in the numbers of students enrolled in scientific programs, especially in the area of toxicology, SOT has taken steps to ensure that the study of toxicology remains a compelling and attainable goal for students.

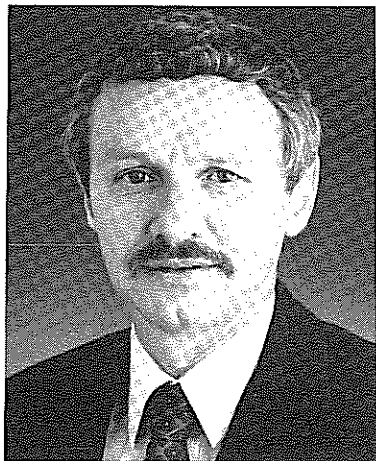
One of the most exciting and far-reaching steps taken by SOT is the initiation of The Toxicology Education Foundation. The Toxicology Education Foundation will work with SOT and provide funds to encourage and facilitate the education and training of individuals in the science of toxicology. The Foundation will seek to assist with not only the education and training of the next generation of toxicologists, but also with efforts to inform the general public about the vital role toxicologists play in our increasingly complex society.

The Toxicology Education Foundation will depend primarily on the support of SOT members via a multifaceted giving program. As toxicology professionals, SOT members who support the Toxicology Education Foundation contribute directly to the health and well-being of their field. Immediate Past President, **Roger O. McClellan, DVM**, serves as President of the Board of Trustees of the Foundation.

The initial members of the Board of Trustees are **Roger O. McClellan**, President, **Curtis D. Klaassen**, Vice President, **James S. Bus**, Treasurer, **Florence K. Kinoshita**, Secretary, and **Donald J. Reed**, Trustee. The Board of Trustees are individuals who are serving or have recently served on the Council of the Society to help assure appropriate linkage between the Society and Foundation. ●

**Q**: Which five presidents of the Society of Toxicology in the last decade were either faculty or graduate students at the University of Iowa in the 1960s?

*answer on page 9*



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**Deadline for next issues:**

**February 10, 1991**  
**April 10, 1991**  
**June 10, 1991**

**1991 SOT Annual Meeting**

February 25–March 1  
Loews Anatole Hotel  
Dallas, Texas

## President's Message

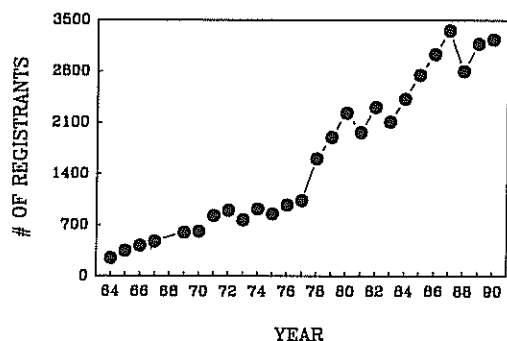
As most of you know, this is the thirtieth year since the founding of the Society of Toxicology. The annual meeting in Dallas, Texas, this February 25 - March 1, will be our thirtieth annual meeting. In this president's message, I want to inform you about the exciting program planned for you in Dallas, as well as reminisce about past annual meetings.

We have had our annual meeting in various sections of the country. Listed below are the specific sites:

1962	Marlborough-Blenheim	Atlantic City, NJ
1963	Hilton Hotel	Cincinnati, OH
1964	Williamsburg Lodge	Williamsburg, VA
1965	Williamsburg Lodge	Williamsburg, VA
1966	Williamsburg Lodge	Williamsburg, VA
1967	Marriott Motor Hotel	Atlanta, GA
1968	Shoreham Hotel	Washington, DC
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1970	Marriott Motor Lodge	Atlanta, GA
1971	Shoreham Hotel	Washington, DC
1972	Williamsburg Lodge	Williamsburg, VA
1973	Waldorf Astoria Hotel	New York, NY
1974	Washington Hilton	Washington, DC
1975	Williamsburg Lodge	Williamsburg, VA
1976	Marriott Motor Hotel	Atlanta, GA
1977	Royal York	Toronto, ON
1978	Hyatt Regency	San Francisco, CA
1979	Marriott Hotel	New Orleans, LA
1980	Sheraton Washington	Washington, DC
1981	Town & Country Hotel	San Diego, CA
1982	Sheraton Boston Hotel	Boston, MA
1983	Caesar's Palace	Las Vegas, NV
1984	Atlanta Hilton Hotel	Atlanta, GA
1985	Town & Country Hotel	San Diego, CA
1986	Hyatt Regency Hotel	New Orleans, LA
1987	Washington Hilton	Washington, DC
1988	Loews Anatole Hotel	Dallas, TX
1989	Atlanta Hilton Hotel	Atlanta, GA
1990	Fontainebleau Hilton	Miami, FL

Many of the early annual meetings were held in Williamsburg, Virginia, however, the Society grew and we no longer could meet in Williamsburg. Thus, we moved to larger cities with convention hotels. At the present time there are very few hotels that are large enough for our Society. As a result, many of our future meetings will need to be in convention centers.

The growth of our meetings has been phenomenal over the years. Noted below is a figure that illustrates the number of registrants at our annual meetings. At the first few annual meetings, only a few hundred attended, and now we have grown to over three thousand. There was gradual growth of our annual meeting during the first 15 years of the Society. However, in the next 10 years (1977-1987) our annual meeting saw an exceptionally rapid increase in attendance. It appears that our annual meeting is continuing to grow, but at a more gradual rate.

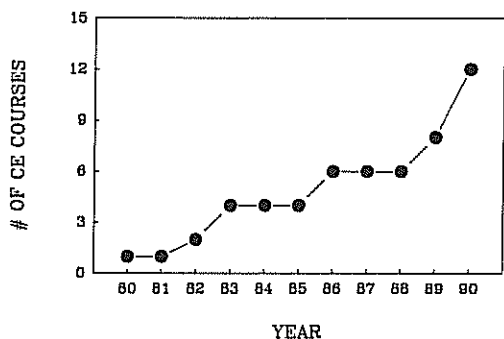


We are extremely fortunate this year to be able to hold our annual meeting at the Loews Anatole Hotel in Dallas, Texas. Dallas is centrally located and has an excellent airport. The Loews Anatole is the largest hotel in the Southwestern United States. The accommodations are extremely nice and there are large lobby areas where you can sit and talk with colleagues. The hotel has a number of restaurants and lounges (18), millions of dollars of artwork, and in essence is a city itself. However, the West End is only a five-minute cab ride from the Loews. What is really remarkable is that the price to stay at the Loews is less than a hundred dollars a day. There are also a number of other very satisfactory hotels within walking distance that are available at even lower rates.

Even more important than the individual accommodations are the meeting rooms. These are superb at the Loews. We have two additional auditoriums for symposia this year that were previously used as movie theaters. The Loews also has a new convention center where the exhibits and posters will be displayed. Additionally, this convention center will provide a snack bar with coffee, sodas, sandwiches etc., as well as places to sit and talk with your fellow scientists.

Our annual meetings for the last decade have started with continuing education courses. As noted in the figure below, the first course was taught in 1980.

These courses have been extremely popular and now about a dozen are available to select from. Unfortunately, you can select only two, one for Monday morning and one for Mon-



day afternoon. The list of courses this year are:

Novel Techniques in Inhalation Toxicology  
Advanced Neurotoxicology

Introduction to Physiologically-Based Pharmacokinetic Modeling

Implementing Physiologically-Based Pharmacokinetic Models

Toxicity of Agents: Metals

Advanced Immunotoxicology

Female Reproductive Toxicology

Advanced Molecular Toxicology: Application of Molecular Biology in Toxicology

Naturally Occurring Toxins

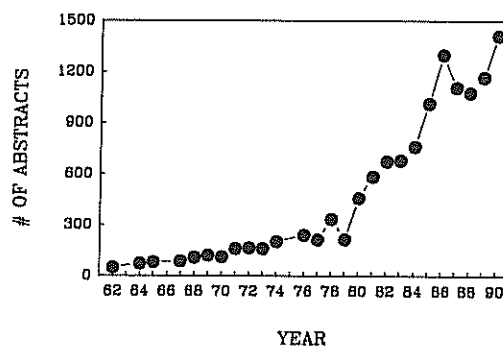
Environmental Toxicology

Risk Communication: Problems, Perceptions and Practice

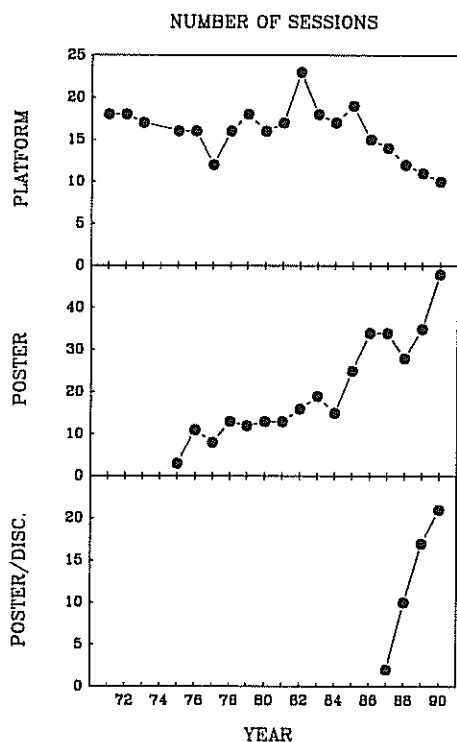
In addition to the continuing education courses on Monday, there will be a special forum late Sunday afternoon (5 p.m.-8 p.m.), entitled "Chemicals and Acceptable Risk, the Public and the Press." This discussion will be led by Mr. Jack Cox of the Foundation for American Communications along with a panel of distinguished scientists, regulators and media representatives. This should be both an entertaining and educational session.

On Tuesday morning the scientific sessions will begin. This largely centers around the abstracts that the membership submit. The figure below illustrates the increased number of abstracts over our 30-year history. As can be seen during the first few years there were fewer than one hundred abstracts, and now we have more than a thousand. However, much more important than the growth in quantity has been the increase in quality of the abstracts. Almost everyone who attends our meeting is extremely impressed with the science presented.

Not only has the quantity and quality of science presented at our annual meetings changed over the years, so has the style of presentations. As noted in the figure below, platform sessions were our only style of presentation until 1975. It is interesting to note that the number of platform sessions has remained relatively constant over the years even though our meeting has become much larger.

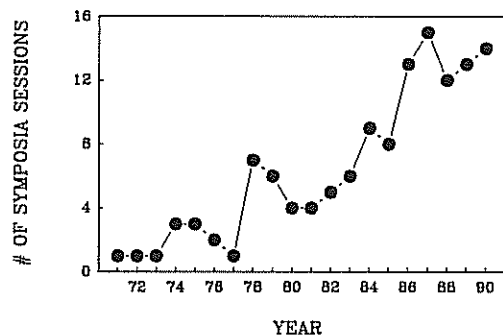


In fact, the number of platform sessions has decreased the last few years. The reason for this change is that we have adopted additional ways to present our findings. In 1975 we started poster sessions, and now more information is transferred at our annual meeting using this media than any other. In 1987 we introduced poster/discussions. This has been extremely popular and it tends to incorporate the best aspects of platform and poster sessions. This media has grown from 2 to 20 sessions in four years.



Of course, symposia are a hallmark of our annual meeting. As noted in the figure below, in the early years of our society there was only one symposium each year. Now we have more than a dozen. The Specialty Sections have been extremely helpful in developing symposia the last few years. This year the Program Committee has selected the following symposia for our annual meeting:

Quinone Chemistry and Toxicity  
 Delayed Manifestations of Developmental Neurotoxicity  
 Assessment of Reproductive Potential in the  
 Non-Pregnant Female  
 Health Effects of Atmospheric Acid Aerosols: A Model



Problem in Inhalation Toxicology and Air Pollution  
 Risk Assessment  
 Assessment of Exposure to Pulmonary Toxicants: Use of  
 Biological Markers  
 An Update on Exposure and Effects of Lead  
 Mouse Liver Carcinogenesis: Mechanisms and Relevance  
 Molecular Approaches to Understanding Retinoid  
 Teratogenicity

Neurotoxicology Risk Assessment: State of the Art  
 Involvement of Cytoskeleton in the Mechanisms  
 of Chemically Induced Neurotoxicities  
 Cell Membranes as Targets for Chemical Toxicants  
 Exogenous Modulation of *In Vitro* Hematopoiesis  
 Risk Assessment and Immunotoxicology  
 Transgenic Animals for Mutagenesis and Carcinogenesis  
 Testing  
 Indirect Mechanisms of Immune Modulation

There will also be a public communications workshop entitled "Toxicology, Toxic Substances and the Public."

In addition to the scientific program, two meetings of the membership will be held. On Wednesday at noon an issues session will be convened as a forum for the membership to ask questions and provide insight on the present operation, as well as the future, of our Society. Later in the day on Wednesday (4:00 p.m.), the annual business meeting will be held. During this meeting the membership will be informed of the Society's activities during the past year. As an added attraction, a drawing of two free air tickets will be given to an attendee of the business meeting.

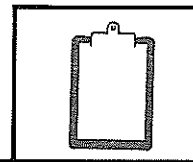
Of course, an Annual Society of Toxicology Meeting would not be complete without some planned social activities. On Monday evening the Society of Toxicology Welcoming Reception will be held. This will be an ideal opportunity to renew acquaintances and make new friends. This should also be somewhat nostalgic for some of us, because it will be held in a beautiful ballroom, without scientific exhibits, as was the tradition in the early years of the Society.

On Tuesday evening, the social evening will consist of a unique Southwestern experience offering the best of the Old West at the Circle R Ranch. This evening will include an all-you-can-eat Western barbecue, a rodeo show, square dancing, horse-back riding, and many other events. On Wednesday evening, the annual banquet will be held. In addition to an excellent meal, you will learn who won the various Society Awards for the year.

For more details on the Thirtieth Annual Meeting, please see this as well as the previous newsletter. In December, the Preliminary Program and Registration Materials will be sent to the membership and in January, the final program and the *Toxicologist*, which includes abstracts of all presentations including symposia, will be mailed.

Many people have worked together to try to make the Thirtieth Annual Meeting of the Society of Toxicology the best ever. In addition to the various committees this year who have obviously worked diligently, we also have to thank all the people who have worked over the last thirty years to give us a solid foundation to build this meeting on. We are confident that the quality of this meeting should be the best ever, and as this meeting will be held in Texas, the Texans want it to be not only the best, but also the biggest. So "ya'll come." ●

## Announcements



### Air Force Research Grants

The Society of Toxicology is pleased to announce the availability of the Air Force Office of Scientific Research Toxicology Grants. They include: One Post-Doctoral Research Award consisting of a two-year grant of \$40,375 per year (a new grant annually) and a New Investigator Research Award, a one-year grant (non-renewable) for \$61,750.

Interested parties should submit written requests for details and application to: Air Force Grants Review Committee, c/o Society of Toxicology, 1101 Fourteenth Street, NW, Suite 1100, Washington, DC 20005.

Closing date for grant submission is **January 15, 1991**. Grant work begins in the summer of 1991. ●

### 1991 Graduate Student/Postdoctoral Awards

#### Immunotoxicology Specialty Section

The Awards Committee of the Immunotoxicology Specialty Section of the Society of Toxicology is pleased to announce its intention to confer up to five monetary awards in recognition of the best platform and/or poster presentations in immunotoxicology by graduate students and/or postdoctoral fellows at the SOT Annual Meeting in Dallas, TX, February 25-March 1, 1991. Candidates for these awards are requested to submit a copy of their abstract as well as copies of all figures and data tables that will be presented at the meeting. The submitted material will be evaluated by the Awards Committee prior to the annual meeting and 10 semifinalists will be selected. Semifinalists will be judged by the Awards Committee during their scheduled presentation at the meeting. Up to five winners will be selected from the semifinalists. Winners will be announced at the annual meeting of the Immunotoxicology Specialty Section.

All documents should be submitted by **January 25, 1991**, to: **Dr. Nancy I. Kerkvleit**, College of Veterinary Medicine, Oregon State University, Corvallis, OR 97331, (503) 737-2890, fax, (503) 737-0502. All materials will be treated as confidential information. ●

#### Carcinogenicity Specialty Section

The Carcinogenicity Specialty Section of the Society of Toxicology will offer three awards for the best abstracts presented at the 1991 Annual Meeting of

SOT in Dallas, Texas. Cash awards for the first (\$500), second (\$300) and third (\$200) ranked abstracts will be presented with a framed certificate at the meeting of the Carcinogenesis Specialty Section in Dallas. It is expected that recipients will be present to receive their award. Students should submit three copies of their abstract and cover letter. Students must be the primary author of the abstract and abstracts may only be submitted to one Specialty Section. The cover letter from the sponsoring member of SOT should indicate the student's role in the project and may expand upon the importance of the work in the context of carcinogenesis.

Interested candidates should submit in triplicate their abstract and cover letter by **December 31, 1990** to: **Dr. B.D. Roebuck**, Department of Pharmacology & Toxicology, Dartmouth Medical School, Hanover, NH 03756. Concerns regarding the application procedures should be addressed to Dr. Roebuck at (603) 646-7676. ●

#### Metals Specialty Section

In recognition and support of excellence in graduate student research, the Metals Specialty Section invites graduate students to apply for two awards and postdoctoral students for one award to be presented at the upcoming Society of Toxicology Annual Meeting in February of 1991. Each award will be based on work submitted in the form of an abstract to be presented at the annual meeting and will include a cash stipend of \$400. Abstracts will be evaluated with the authors'/sponsors' names removed and will be judged on the basis of quality of study design and interest/importance of results, with additional consideration of quality/clarity of written presentation and relevance of the study to human exposures.

Each student applicant must be first author of the abstract, which must describe research performed while a student. Qualified applicants should send their name, address, abstract, and a letter of support from a full member of SOT to the address listed below. The letter of support should state that the work was done while a student, should clearly designate either graduate or postdoctoral student category, and should indicate that this is the only specialty section award sought with this work. Abstracts must be submitted by **January 1, 1991**. An awards committee will then select the winners, and awards will be presented at the 1991 Specialty Section Meeting in Dallas, Texas.

Send abstracts to: **Dr. Carol Walsh**, Secretary/Treasurer, Metals Specialty Section, c/o Boston University School of Medicine, 80 E. Concord St., L-603, Boston, MA 02118. ●

## Toxicology Information Numbers

Included with this Newsletter is a listing of numbers that may be useful to members. The list includes telephone numbers for various government offices and "hotlines" that provide information in various areas relating to potential health and/or environmental impacts of chemicals. This listing was compiled by **Dr. Elaine Faustman** while she was a member of the Committee on Public Communications. From time to time, updated listings will be printed in the SOT Membership Directory. Members who have suggestions for additional numbers that might be included in the list should send the appropriate information to the Chair, Committee on Public Communications, c/o SOT Headquarters. ●

## 1989-90 Annual Report

Due to significant printing and mailing costs, the 1989-90 Annual Report will not be mailed to the entire SOT membership. It will be available upon request from the SOT headquarters office. Please contact Donna Thomas in the headquarters office for a copy.

The Treasurer's Report for the 1989-90 fiscal year is enclosed with this newsletter. ●

## Position Statement Regarding Use of Animals in Toxicology

(Adopted by the Society of Toxicology in January 1986)

The Society of Toxicology is dedicated to acquiring knowledge for the improvement of the health and safety of humans and other animals and the protection of their environment.

To fulfill this objective, the Society is committed to the design and conduct of the best possible scientific research. To ensure this commitment, the Society views as necessary the use of laboratory animals in toxicological research and testing except in those procedures where valid, scientific alternative techniques are available. The code of ethics of the Society of Toxicology states that each member shall "observe the spirit as well as the letter of the laws, regulations, and ethical standards with regard to the welfare of humans and animals involved in any experimental procedures." The Society supports careful consideration of the number of animals used and encourages reduction where scientifically feasible. The Society strongly encourages and supports the development of valid, scientific alternatives to current animal research testing procedures. ●

## SOT Ballot Process

The Society of Toxicology has developed a process for the election of officers, councilors and members of the Education and Membership Committees that ensures the confidentiality of members' votes and tallying of the results.

Members are provided a photograph and complete bio sketch of each candidate, which are mailed with the ballot to all voting members by **January 1, 1991**, as provided by the By-laws. Preparation of this package is no small task, as it occurs during the preparation of the Annual Meeting Program and *Toxicologist*. The cooperation of the candidates in providing this material to headquarters by **November 30, 1990** to meet this tight deadline is appreciated.

Two return envelopes are provided with the mailing: an outer envelope, which is addressed to SOT, and an inner envelope, which ensures the privacy of the members' vote. When the completed ballots are received in the SOT office, the member's name and signature are verified against the list of voting members. On the closing day for receipt of ballots, February 1, 1991, the unopened envelopes containing the ballots are sent to an independent accounting firm. The accounting firm then provides the results to the President and the Executive Secretary, who notify all candidates of the results.

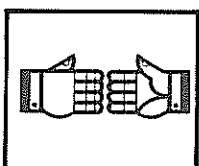
Although several members have questioned the need for two envelopes, the system works well and confidentiality is ensured. Please remember in completing your ballot to vote for the correct number of candidates for each category of candidates and to print and sign your name on the outer envelope. Envelopes that are not so marked will not be forwarded for tabulation. ●

## Society of Toxicology Seeks Regional Chapter Updates

The Society of Toxicology actively seeks items that update members about the happenings within all Regional Chapters. Any Chapter that has had or made plans for activities of interest to SOT members should have information about them included in the SOT Newsletter. These activities would include highlights of meetings, notices of future events and other Regional information.

Information for inclusion in the Newsletter should be sent to SOT headquarters for receipt by the 10th of the month preceding the date of a specific newsletter. For example, items for inclusion in the March/April 1991 Newsletter must be received by February 10, 1990. ●

## Regional Chapter News



### National Capital Area Chapter

A packed house of over 150 attended the Chapter's conference on Chemically Induced Dermal Toxicology, held at the National Library of Medicine on June 25. The full-day conference dealt primarily with new research on mechanisms, emerging technologies and alternative test methods for skin sensitization, irritation and contact urticaria. On October 11, the Chapter held an afternoon symposium at the NLM on Recent Developments on Alternative Methods for Toxicity Testing. The next scientific meeting will be held on January 17, 1991. The topic will be Advances in Neurotoxicity Testing. Following the afternoon symposium, the chapter will hold its annual banquet with **Dr. Curtis Klaassen** as the guest speaker. For further information, contact: **Dr. Norbert Page** (301) 948-9408. ●

### North Carolina Chapter

The North Carolina Chapter of the Society of Toxicology (NCSOT) and the NIEHS co-sponsored a highly successful high school teacher education program that sets a standard for other regional society chapters in cooperative programs benefitting the community as well as the Society. The SRC Competitiveness Foundation, a non-profit organization which is rapidly becoming established as an innovator in the field of education at all levels, supported 15 local high school science teachers that rotated through four Research Triangle Park institutions (NIEHS, EPA, Microelectronic Center of NC, and Research Triangle Institute), each of which provided weeklong "training" in a specific area of science. The NCSOT and NIEHS collaboration focused on "Toxicology and the Environment," with speakers from a number of disciplines and institutions. NCSOT members who participated were; **Drs. Doyle Graham, Mark Shanus, Linda Birnbaum, Bernard Schwetz, Christine Comment, Skip Matthews, Ray Yang, Michelle Medinsky, Patrick Carfagna, Gary Rosenthal, Ron Baron, Kevin Morgan, Kathryn Ramsay, and Julie Kinble.** Other speakers included **Dr. Greg Smith** from the North Carolina State Department of Epidemiology, **Melva Okun** and **Fran Lynn** of the UNC Institute for Environmental Studies, **Dr. Linda Little**, Executive Director of the Governors Waste Management Board, and **Daniel VenderMeer**, Director of Program Planning and Evaluation at the NIEHS.

Apart from overviews of various aspects of toxicology, the teachers got a taste of the complexities of risk estimation and the "art of toxicology" with interactive exercises using actual case studies as well as detailed discussions with presenters. The project was well received by the teachers and was a learning experience for the presenters as well. ●

### Midwest Chapter

A joint meeting of the Midwest Regional Chapter and the Great Lakes Discussion Group of the Society of Toxicologic Pathologists was held November 9, 1990 at the Ramada O'Hare Hotel in Chicago. The full-day symposium titled, "Investigative Team Approaches to Toxicologic Problems," featured presentations from toxicologist-pathologist "teams" that have worked together to elucidate mechanisms of toxicity. Scientists from **RJR Nabisco, Rohm and Haas, Co., Eli Lilly & Co., Upjohn Co.** and **SmithKline Beecham Pharmaceuticals** participated in the program organized by the Program Committee of the Midwest Chapter, **Dr. Barry Levine**, Chair, and **Dr. Stuart Levin** of the Great Lakes Discussion Group of the Society of Toxicologic Pathologists. ●

### Gulf Coast Chapter

The 1990 Fall Meeting of the Gulf Coast Regional Chapter of the Society of Toxicology was held November 15-17 at the Austin Stouffer Hotel and Resort. Symposia were presented on Environmental/Regulatory Toxicology and on Chemical Carcinogenesis. The meeting also included a poster session and oral presentations featuring the best of the graduate student abstracts. The Awards banquet featured **Dr. I. Glenn Sipes**, the 1985 Burroughs Wellcome Toxicology Scholar, as speaker. The **Ted Reynolds Award** for the best graduate student presentation at the meeting was also given at the banquet. ●

### Pacific Northwest Chapter

The Pacific Northwest Association of Toxicologists (Regional Chapter of the Society of Toxicology) held its Seventh Annual Meeting September 7-8, 1990 on the campus of Oregon State University in Corvallis, Oregon. The meeting was held jointly with the newly-formed Pacific Northwest Chapter of the Society of Toxicology and Environmental Chemistry. The highlight of the meeting was a symposium on "Aquatic Models in Environmental Toxicology," sponsored by the Marine/Freshwater Biomedical Sciences Center which featured presentations by **Dr. Dennis A. Powers**, Stanford University; **Dr. Peter A. Friedman**, Dartmouth Medical School; **Dr. John J. Lech**, Medical College of Wisconsin; and **Dr. Glenn W. Suter**, Oak Ridge National Laboratory, whose talk was sponsored by SETAC. Approximately 120 participants attended the symposium and scientific sessions which included 13 platform and 19 poster presentations. Awards of \$100 were presented to **Todd Sherer**, Washington State University and **Denise Laflamme**, University of Washington for best graduate student platform and poster presentations respectively. A new directory titled, *Toxicology Information Numbers*, was distributed at the meeting. This new resource, assembled by **Dr. Elaine Faustman**, University of Washington, focuses on the Pacific Northwest and includes telephone numbers for national and regional health, environmental, and labor and industries agencies related to the field of toxicology. ●

**30th Annual Meeting Information  
Loews Anatole Hotel  
February 25-March 1, 1991**

# DALLAS

## **Guest Hospitality Center and Program**

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Guests must be registered for the Annual Meeting to have access to the Hospitality Center and to be eligible for the discounted tour rates. Guests can register by using the Annual meeting registration form.

The Hospitality Center will be open daily beginning Sunday afternoon, February 24.

The Center will be staffed Sunday through Wednesday with a representative from a tour agency. He will provide information on the city, registration for the tours offered through the Society, or tour tickets purchased in advance of the meeting.

A special Guest Program has been planned for this meeting and will be printed in the Preliminary Program, to be mailed in December.

## **Social Evening**

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The social evening on Tuesday, February 26, will be a unique Southwestern experience offering the best of the Old West at the Circle R Ranch. The evening will include an all-you-can-eat Western Barbecue, a rodeo show, square dancing, horseback riding, and many other events that allow Annual Meeting attendees to enjoy the abundant Southwestern flavor and culture.

## **Reserving Space for Auxiliary Meetings**

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Specialty sections, committees, alumni organizations and others who wish to hold a meeting or social function at the Loews Anatole Hotel during the week of the Society meeting, February 25-March 1, 1991, should contact Clarissa Russell at Society headquarters as soon as possible, but no later than **January 4, 1991**. Space will be assigned on a first-come, first-served basis, after the SOT scientific and social programs have been accommodated.

Forms will be sent to Committees, Specialty Sections, Chapters and other groups who have held an ancillary function within the last two years.

## **Annual Meeting Banquet**

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All meeting registrants may sponsor and prepay for tables of 10 at the Annual Meeting Banquet and Awards Presentation, which will be held this year on Wednesday, February 27. Registrants who purchase tables may choose their seating arrangements prior to the banquet by stopping by the SOT office at the Loews Anatole. Requests will be honored on a first-come, first served basis.

## **SOT Offers Convenient Credit Card Payment**

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The Society of Toxicology accepts MasterCard, Visa, and now Diners Club payments for Annual Meeting registration, payment of annual dues, and other Society expenses. Using your credit card is convenient and efficient. International members also avoid the problems of converting funds to U.S. dollars.

Please remember to complete the appropriate form (e.g., registration or dues renewal) and return it to headquarters to ensure proper credit. ●

## **Regional Chapters and Specialty Sections to Meet**

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This year, the Specialty Sections will meet on Tuesday, February 26 from 5:00 - 6:30 p.m., immediately before the special evening out at the Circle R Ranch. The Mechanisms and Risk Assessment Sections will meet on Thursday, February 28 from 5:30 - 7:00 p.m.

Regional Chapters who wish to meet will do so on Wednesday, February 27, from 5:30 - 7:00 p.m.



## Placement Service Seminar

The Placement Service will again sponsor a seminar on Career Planning in Toxicology at the SOT Annual Meeting in Dallas. The Seminar will be held on Monday, February 25 from 5:30 to 6:30 p.m. Previous seminars have focused on specific areas of employment such as industry, government, and academia. The Placement Committee is seeking volunteers to present their views on present and future career opportunities in a particular sector, as well as the necessary requirements. The Seminar concentrates on what an employer looks for in a candidate interview, an employer's expectations of job performance, and the potential financial remunerations. A professional career planner is usually included in the panel of speakers to address strategies and approaches and some of the mechanics of pursuing the position for which a candidate is best suited.

If you are interested in making a presentation on potential careers in toxicology, please contact **Dr. Rudy von Burg** at (415) 865-1888. ●

## Special Noontime Sessions at the 1991 Annual Meeting

Tuesday, February 26  
Student Luncheon

Wednesday, February 27  
SOT Issues Session

Thursday, February 28  
6th Annual Burroughs Wellcome Toxicology  
Scholar Award Lecture by **Daniel Acosta, Ph.D.**

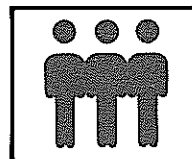
## VI International Congress of Toxicology in Rome, Italy

Enclosed with this Newsletter, please find an insert detailing the VI International Congress of Toxicology, June 28 - July 3, 1992 at the Hotel Cavalieri Hilton, in Rome, Italy. This international toxicology forum will offer a diverse program focused around the theme "Toxicology: A Science of the Well-Being of Mankind." ●

*Answer from page 1:*

**A**: Robert L. Dixon, James E. Gibson, Jerry B. Hook, Curtis D. Klaassen, and Gabriel L. Plaa. ●

## Member News



A presentation made by **Dr. Roger O. McClellan** at the Annual Preventive Medicine Day in October 1989 was published this summer as part of the event proceedings. The theme of the 1989 annual conference, hosted by the New York Lung Association, was "Breathing in New York City: Pollutants in the Urban Environment." Dr. McClellan addressed the topic of "Ozone" and its role in the urban environment. Other SOT members participating in the Conference were **Dr. Judith Graham**, who spoke on "Federal Regulations" and the late **Dr. Norton Nelson**, who delivered the final speaker presentation, "The Air We Breathe—Something Old, Something New."

**Toshio Narahashi, Ph.D.**, has received the 1989 Burdick & Jackson International Award for Research in Pesticide Chemistry. He received the award, presented annually by the Division of Agrochemicals of the American Chemical Society, on the basis of a series of electrophysiological studies of the mechanisms of action of neuroactive insecticides on the nerve membrane ion channels. ●

## Postdoctoral Opportunities List Under Development

The SOT office is developing a separate list of postdoctoral programs to respond to inquiries resulting from the Tox '90s educational/career materials. Most academic programs are already included in the Resource Guide. We are interested in getting information concerning those academic programs not listed in the Resource Guide and programs such as those available in research institutes and the pharmaceutical or chemical industry. If you would like to assure that your program is included among the SOT educational/career materials, please contact the SOT office, (202) 371-1393. ●

## 1991 Dues are Due!

A reminder: your 1991 dues must be received at headquarters by **March 31, 1991**, in order for you to continue to receive your journals. Please note that you may pay via MasterCard, Visa, or Diners Club.

## Poster Session for Minority Students at Dallas Meeting, February, 1991

The Tox 90s *ad hoc* Educational Issues Task Force wishes to remind SOT members of the Poster Session it is organizing for minority students. In conjunction with the SOT Education Committee's Toxicology Workshop for minority students at the Annual meeting in Dallas, a Poster Session of 15-20 posters, preferably from minority scientists and those who would like to interact with these minority students, is being organized for the morning session on Tuesday, February 26, 1991. The session is in addition to the normal presentation of the posters in a scientific session.

The primary object of such a poster session is to offer a specific opportunity for the minority students who would have participated in the Education Committee's Workshop on Monday, February 25, to attend a specific scientific session and to interact with other scientists. We are seeking minority and other scientists who would be willing to put up their posters for this special Poster Session. Minority scientists, graduate students, post-doctorates or established scientists interested in participating in this Poster Session should contact **Dr. Harihara M. Mehendale** (610) 984-1618 or **Dr. A. Jay Gandolfi** (602) 626-6696 as early as possible. All SOT members are welcome to be involved with this session, either to present their research or to interact with the minority students. ●

## Wanted: "Mentors" for Minority Student Programs at Annual Meeting

As recipients of an NIH-sponsored grant, the SOT Education Committee will be expanding their efforts to introduce toxicology to minority undergraduate science majors and their advisors at the 1991 meeting in Dallas. For this effort, the Education Committee is requesting assistance from SOT members, postdoctoral students and others willing to serve as "mentors" for these students between their arrival on Monday (when they will attend the Educational Program for Minority Students scheduled for 4:00 p.m.), and their departure on Tuesday (after they attend the Poster Session for Minority Students and their student luncheon). Mentors would help students find the rooms in which special sessions listed above will be held on Monday and Tuesday and generally make these students feel welcome at SOT. About 15-30 volunteers with responsibility for 1-2 students each are needed. ●

Anyone willing to volunteer for this important responsibility should contact Donna Thomas by **January 15, 1991**, at the SOT office, (202) 371-1393. Earlier identification of "mentors" however, would be very helpful for the planning efforts of the Education Committee and the SOT Executive office.

## Educational Program for Minority Students

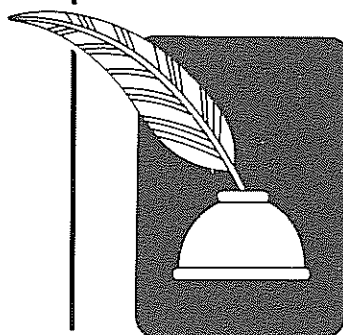
The SOT Education Committee will be sponsoring a program primarily directed toward the goal of introducing the discipline of toxicology to minority undergraduates and their advisors at the annual meeting in Dallas. This program will be held on Monday, February 25, at 4:00 p.m. Topics to be discussed include training of toxicologists and opportunities for employment of toxicologists. SOT members, graduate students, and others interested in toxicology education and early recruitment of minorities are invited and encouraged to attend this program, as opportunity will be available for interested persons to share their experiences as students and toxicologists with this potential source of new scientists. ●

## NIH Forum for New Investigators

The SOT Education Committee will be sponsoring a forum for investigators planning to seek support from the National Institutes of Health. This program, moderated by **Dr. A. Jay Gandolfi**, will be held Wednesday, 2:00 p.m. - 4:00 p.m. The forum will emphasize many of the specific aspects required for a young investigator to prepare a proper, competitive NIH grant. Panel members will include established investigator who have served on NIH study sections (**Drs. Richard Mailman** and **Mary Jo Vodicknik**), and who will provide insight into the preparation of applications that are more able to get good reviews. Also participating will be the Executive Secretary of the Toxicology Study Section (**Dr. Fred Marozzi**), and **Dr. Rochelle Long** of the Pharmacological Sciences Program, NIGMS, who will discuss grant-related activity within the NIH system. Each participant will review briefly areas of emphasis relative to obtaining grant funding for young investigators. The forum will then be open for an extended question and answer period. ●

# SOT 1991 Annual Meeting Symposia

Participants at the 1991 Society of Toxicology Annual Meeting will want to reserve adequate time to attend Annual Meeting symposia. This year's symposia include many of the most important issues in the field of toxicology as well as a number of subjects that have generated significant new interest. Once again, members from SOT's full professional spectrum have contributed their time and talents to produce a slate of superior symposia. 1991 Annual Meeting Symposia begin on Tuesday, February 26 and run through Friday morning, March 1. ●



## Quinone Chemistry and Toxicity

### Sponsored by the Mechanisms Specialty Section

*Chairperson: Terrence J. Monks, University of Texas, Austin, TX*

The human use of quinones dates back to antiquity. Crude plant preparations from senna and rhubarb were used as drugs and contained a variety of anthraquinones as the active constituents. Pigments prepared from henna and madder were used as cosmetics and dyes and contained derivatives of 1,4-naphthoquinone and anthraquinone respectively. Documented use of the *Cinchona* bark to control fever dates back to at least the 17th century. The quinones of polycyclic aromatic hydrocarbons are prevalent as environmental contaminants and provide an additional current source of human exposure to quinones. This symposium will focus on the chemistry of quinones, their role in the development of a variety of toxicities and potential mechanisms of action. Aspects of quinone chemistry essential for their biochemical (re)activity will be reviewed. The relative importance of redox cycling and arylation to the cytotoxicity of quinones will be illustrated by studies of structurally related quinones which differ in their relative ability to arylate and/or redox cycle. Several recent studies suggest that thioethers formed as products of the reaction of glutathione with quinones exhibit a variety of toxicological activity. Specific examples of these will be presented. The role of DT-diaphorase and the two electron reduction of quinones in the bioreductive activation of certain antitumor quinones will also be discussed. Thus, dependant upon the

structure of the quinone, DT-diaphorase may serve either a toxifying or detoxifying function. Finally the potential toxicity of endogenous quinones will be illustrated by studies in which the neurotoxicity of catecholamines has been investigated. Such neuronal degeneration may contribute to the pathology of aging and Parkinson's disease.

**Introduction**, Terrence J. Monks, University of Texas, Austin, TX

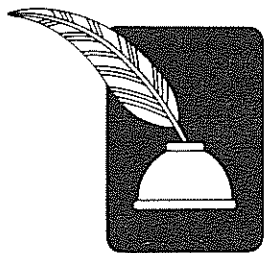
**Bio-organic Chemistry of Quinones**, Robert P. Hanzlik, University of Kansas, Lawrence, KS

**Relative Importance of Redox Cycling and Arylation in the Cytotoxicity of Quinones**, Gerry M. Cohen, University of London, London, England

**Toxicity of Quinone-Thioethers**, Terrence J. Monks, University of Texas, Austin, TX

**Bioreduction of Quinones: Activation and Deactivation by DT-diaphorase**, David Ross, University of Colorado, Boulder, CO

**The Toxicity of Endogenous Quinones**, Doyle G. Graham, Duke University Medical Center, Durham, NC



## Symposia

### Delayed Manifestations of Developmental Neurotoxicity

Sponsored by the Neurotoxicology Specialty Section

*Chairperson: Bernard Weiss, University of Rochester Medical Center, Rochester, NY and Kenneth Reuhl, Rutgers University, New Brunswick, NJ*

Interference with the complex processes of early brain development may not become apparent until much later in the life cycle. Even latencies extending into old age, after early exposure to neurotoxicants, have been observed. These are crucial issues for toxicology because they represent one of the ways in which developmental neurotoxicity could be expressed. Lead offers one cogent example; dentine levels measured at 7 years of age predicted high school failure and reading disability at age 18. Amyotrophic lateral sclerosis/Parkinsonism-dementia in the Western Pacific, associated with cycad seed consumption, may be acquired early in life and remain clinically silent for as long as 45 years. Its chemical triggers may provide clues to other degenerative disorders. Some clues to such long-latency manifestations are offered by animal studies. Mice exposed prenatally to methylmercury and certain pesticides, although overtly normal for most of their lives, begin to show signs of age-associated dysfunction earlier than controls. Anatomical studies disclose that disrupted brain development is one source of such findings, but these are also accompanied by endocrine and immune system disorders. Some of the new techniques of molecular toxicology can help dissect the mechanisms responsible for these apparent delayed toxic consequences, which exemplify the broad impact on social and economic problems that neurotoxic processes may exert.

#### **Introduction, Implications of Long-Latency**

**Neurotoxicity**, Bernard Weiss, University of Rochester Medical School, Rochester, NY

**Amyotrophic Lateral Sclerosis and Parkinsonism-Dementia (ALS/P-D) Complex: A Long-Latency Neurodegenerative Disorder Associated With Cycad Exposure**, Peter S. Spencer, Oregon Health Sciences University, Portland, OR

**Prenatal Neurotoxicant Exposure: Consequences in Advanced Age**, Joan M. Cranmer, University of Arkansas for Medical Sciences, Little Rock, AR

#### **Long Term Effects of Early Asymptomatic Lead**

**Exposure**, Herbert L. Needleman, University of Pittsburgh, Pittsburgh, PA

**Mechanistic Bases of Long-Latency Developmental Neurotoxicity**, Kenneth Reuhl, Rutgers University, New Brunswick, NJ

### Assessment of Reproductive Potential in the Non-Pregnant Female

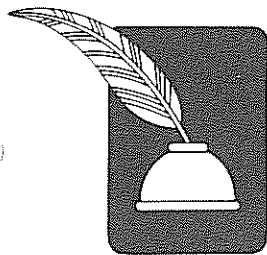
Sponsored by the Reproductive Specialty Section

*Chairpersons: Ralph L. Cooper, EPA, Research Triangle Park, NC, and Betsy Carlton, Rhone Poulenc, Research Triangle Park, NC*

Typical assessment of reproductive toxicity is based on paradigms that incorporate long-term exposure and rely primarily on measures of fertility as the main quantifiable endpoints. This approach does not always identify the sex affected and rarely can the target organ(s) and mechanism(s) of the compound's action be determined. Thus, development of alternative techniques to identify the target organ and mechanism associated with the loss of reproductive function following chemical exposure would greatly enhance the risk assessment process. In this regard, a great deal of recent research has focused on the effects of xenobiotics on sperm and other testicular endpoints. In contrast, there have been few systematic studies of the effect of toxicants on the reproductive system of the non-pregnant female. This is surprising in light of the facts that effects on reproductive success can be readily identified apart from any effects on pregnancy itself. Such studies could provide more sensitive measures of a toxicant's action and insight into the physiological mechanisms involved. This symposium will focus on methods to evaluate the effect of toxicants on the non-pregnant female, including the strengths and weaknesses of various procedures for identifying normal and aberrant ovarian function in rodents and humans, as well as the effect of toxicants on the processes of folliculogenesis, ovulation, oocyte maturation and fertilization.

**Introduction**, Ralph L. Cooper, EPA, Research Triangle Park, NC, and Betsy Carlton, Rhone Poulenc, Research Triangle Park, NC

**Monitoring Ovarian Cycles for Assessing Reproductive Toxicity: Comparison of Human and Rodent Cycles**, Claude L. Hughes, Jr., Duke University Medical Center, Durham, NC



## Symposia

**The Effects of Toxicants on the Neuroendocrine Control of Ovation**, Ralph L. Cooper, EPA, Research Triangle Park, NC

**Folliculogenesis and Ovarian Resilience**, Anne N. Hirschfield, University of Maryland, Baltimore, MD

**Assessment of Toxicant Insult on Oocyte Maturation and Fertilization**, Sally D. Perreault, EPA, Research Triangle Park, NC

### **Health Effects of Atmospheric Acid Aerosols: A Model Problem in Inhalation Toxicology and Air Pollution Risk Assessment**

#### **Sponsored by the Inhalation Specialty Section**

*Chairpersons: Richard B. Schlesinger, NYU Medical Center, New York, NY, and Judith Graham, EPA, Research Triangle Park, NC*

There is current concern about the potential health effects from acid aerosols in ambient air. Assessing risks from their inhalation is one of the most important emerging issues in air pollution toxicology, since epidemiological and human clinical studies suggest effects at fairly low exposure levels and animal toxicological studies suggest a role in development of chronic lung disease. Because of this integrated evidence, the EPA is considering the need for an ambient air quality standard for acid aerosols. But aside from the timeliness of this topic, there is also a broader issue of importance for those involved in inhalation toxicology and air pollutant risk assessment. From this perspective, atmospheric acids become a model of a complex mixture of air pollutants and how research programs can be developed and results used in the presence of major scientific uncertainty to achieve risk assessment. The purpose of this symposium is to present what is known about the health effects from acid aerosols within a framework that also treats the topic generically from the perspective of a model problem in the development of risk assessment. Attention will be focused on the need to understand exposure assessment, rather than merely health assessment; to develop and integrate programs using dosimetry, animal toxicology, clinical and field studies, and epidemiology; to understand the toxicologically active species within a complex mixture that is different in various regions of the country; and the desirability to consider complex mixture problems from a broad perspective.

**Introduction and Perspective**, Judith A. Graham, EPA, Research Triangle Park, NC

**Animal Toxicologic Evidence for Health Effects**, Richard B. Schlesinger, NYU Medical Center, New York, New York

**Controlled Clinical Studies: Evidence for Health Effects**, Mark J. Utell, University of Rochester Medical Center, Rochester, NY

**Epidemiologic Evidence for Health Effects**, Douglas W. Dockery, Harvard School of Public Health, Boston, MA

**Integration of the Evidence: Risk Assessment for Ambient Acid Aerosols**, Roger O. McClellan, CIIT, Research Triangle Park, NC

### **An Update on Exposure and Effects of Lead**

#### **Sponsored by the Metals and Risk Assessment Specialty Sections**

*Chairperson: Barbara D. Beck, Gradient Corporation, Cambridge, MA*

Despite knowledge of the toxicity of this metal since Roman times, lead remains a persistent public health concern. Lead is pervasive in the environment, found in a variety of media such as urban soils, house paint, and ambient air near smelters. In addition, concern has increased for low level effects of lead including neurobehavioral deficits in children and for possible carcinogenicity. This symposium will present current topics in the toxicology of lead as related to risk assessment, beginning with a multimedia exposure model aimed at predicting population distributions of blood lead. Next there will be a discussion of prospective studies, focused on neurobehavioral effects, and their relationship to definition of acceptable blood levels for both the fetus and the child. The third presentation will describe studies of lead carcinogenicity in animals, their implications for lead as a possible human carcinogen and the possible need to consider carcinogenicity in lead regulation. The last presenter will describe recent work on lead binding proteins and the importance of such proteins in differential susceptibility to lead. The symposium will link fundamental issues of lead exposure and toxicology to lead risk assessment. The symposium will be multidisciplinary in nature and therefore of interest to basic researchers, regulatory agency scientists, and industry scientists.



## Symposia

**Introduction**, Barbara Beck, Gradient Corporation, Cambridge, MA

**The Use of Site-Specific Data in Models for Lead Risk Assessment and Risk Management**, Allan H. Marcus, Battelle Columbus, Research Triangle Park, NC

**Neurotoxicity: Recent Findings and Their Implications**, David Bellinger, Children's Hospital, Boston, MA

**Nephrotoxicity and Carcinogenicity of Lead**, Robert A. Goyer, University of Western Ontario, London, Ontario, Canada

**Role(s) of Lead-Binding Proteins (PbBP) in the Renal and Neurotoxic Effects of Lead in the Rat**, Bruce A. Fowler, University of Maryland, Baltimore, MD

### Mouse Liver Carcinogenesis: Mechanisms and Relevance

*Chairperson: Jay I. Goodman, Michigan State University, East Lansing, MI*

The overall objective behind this symposium is to provide a forum for the presentation of current concepts in carcinogenesis. The liver of the B6C3F1 Mouse is uniquely prone towards development of both spontaneous and chemically-induced hepatomas. Therefore, it provides a good model system which is being employed successfully to discern mechanisms underlying the multistep/multistage process by which a normal cell is transformed into a cancer cell and progresses to a frank malignancy. This research enhances our understanding of fundamental aspects of biology. In addition, the practical significance here is that this inquiry is providing the type of information which is required in order to take a rational approach towards assessment of the carcinogenic potential which a chemical might pose. The presentations which comprise this symposium will illustrate how some of the most important questions faced in toxicology (e.g., high dose to low dose extrapolations, species to species extrapolations, the existence of thresholds, etc.) are being addressed in a rational manner through a mechanism of action based approach. Indeed, the linking of the "overall objective" and "practical significance," as noted above, will be the central theme of this symposium.

**Introduction**, Jay I. Goodman, Michigan State University, East Lansing, MI

**Mouse Liver Carcinogenesis: Initiation/Promotion/Progression**, Jerrold M. Ward, National Cancer Institute, Frederick, MD

**The Role of Cytotoxicity and Cell Proliferation in Mouse Liver Carcinogenesis**, James A. Popp, CIIT, Research Triangle Park, NC

**The Role of Cell Proliferation and Altered Gap Junction Expression in Mouse Liver Carcinogenesis**, James E. Klaunig, CIIT, Research Triangle Park, NC

**The Role of H-ras Proto-Oncogene Activation in Chemically Induced Mouse Liver Carcinogenesis**, Tony R. Fox, Dow Chemical Company, Midland, MI

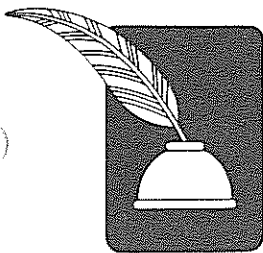
**Hypomethylation of Proto-Oncogenes: A Possible Mechanism Involved in the Promotion Stage of Carcinogenesis**, Jay I. Goodman, Michigan State University, East Lansing, MI

### Cell Membranes as Targets for Chemical Toxicants

#### Sponsored by the Mechanisms and Metals Specialty Sections

*Chairperson: William D. Atchison, Michigan State University, East Lansing, MI*

Cell membranes are the first target of exposure to toxicants. Thus interactions with the cell membrane represent some of the earliest signs of toxicity. Moreover, cell membranes maintain the ability to regulate a number of crucial processes associated with signalling within the cell, signalling other cells, controlling transport and secretory phenomena, and regulating and initiating intracellular processes. Cell membranes at the same time contain components unique to individual cells, as well as those which are ubiquitous to all cells. Thus study of interactions of toxicants with cell membranes provides some potentially exciting insights into mechanisms of cellular toxicity in general, as well as specific target-directed toxicity. Recently, major advances have been made in our understanding of the physiological and biochemical processes underlying the role of membranes in cell signalling. Despite this, the study of effects of toxicants on cell membrane function remains underdeveloped. This symposium is directed at examining mechanisms by which a variety of dissimilar toxicants including heavy metals, insecticides and antibiotics interact with membranes, particularly with processes associated with cell signalling. The four presentations will describe state-of-the-art methodology used to examine alteration of membrane function. The talks will focus on two areas, disruption of ion channel function, and alteration of membrane-associated second messenger systems.



## Symposia

**Introduction**, William D. Atchison, Michigan State University, East Lansing, MI

**Interactions of Pyrethroid Insecticides with Neuronal Sodium Channels**, Toshio Narahashi, Northwestern University Medical School, Chicago, IL

**Nerve Terminal Membranes as a Target Site of Action of Inorganic and Organic Mercurials**, William D. Atchison, Michigan State University, East Lansing, MI

**Interaction of Aminoglycoside Antibiotics with Calcium Channels and Membrane Phosphoinositides**, Jochen Schacht, University of Michigan, Ann Arbor, MI

**Lead Modulation of B-T Cell Interaction**, David A. Lawrence, Albany Medical College, Albany, NY

### Exogenous Modulation of *In Vitro* Hematopoiesis

#### Sponsored by the Mechanisms Specialty Section

*Chairpersons: Oliver P. Flint and Michael Kowolenko, Bristol-Myers Squibb Company, Syracuse, NY*

The bone marrow often serves as the target organ for a wide variety of toxicants. *In vitro* hematopoietic culture systems serve an important role in determining mechanisms of toxicity within this system. The ability to control differentiation and proliferation within bone marrow cell systems enables the investigator to identify both cellular and biochemical targets of select toxicants. The objectives of this symposium are to: 1) provide an overview of hematopoiesis which includes the various autocrine loops involved in hematopoiesis and shows how modification of one autocoid can alter hematopoiesis, 2) demonstrate how stromal cell cultures can be used to provide data on the effects of anti-neoplastics on hematopoiesis, 3) display how antivirals alter bone marrow cell responsiveness to distinct colony stimulation factors, and 4) demonstrate how hematopoietic cell lines can be used to evaluate the molecular toxicity of antiviral compounds. As more information is gained concerning the interaction between the cells and factors involved in hematopoiesis through these *in vitro* systems, a greater understanding of the mechanisms of toxicity can be expected.

**Introduction**, Michael Kowolenko, Bristol-Myers Squibb Company, Syracuse, NY

**Overview: Regulatory Factors Involved in Hematopoiesis**, Louis M. Pelus, SmithKline Beecham Pharmaceuticals, King of Prussia, PA

**Long Term Bone Marrow Cultures (LTBMC) as an *In Vitro* Model for Detecting Toxicity to Stromal Cells**. Daniel Wierda, Eli Lilly and Company, Greenfield, IN

**Inhibitory Effects of Nucleoside Analogs in *In Vitro* Hematopoiesis**, Michael Kowolenko, Bristol-Myers Squibb Company, Syracuse, NY

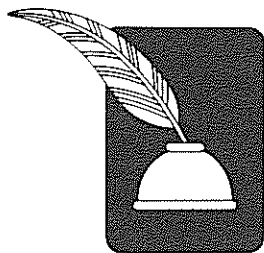
**3'-Azido-3'-Deoxythymidine (AZT) and its Metabolite, 3'-Amino-3'-Deoxythymidine (AMT), Selectively Inhibit Globin Gene Transcription in Human K-562 Leukemia Cells**, Jean Pierre Sommadossi, University of Alabama, Birmingham, AL

### Risk Assessment and Immunotoxicology

#### Sponsored by the Immunotoxicology and Risk Assessment Specialty Sections

*Chairpersons: Michael I. Luster, NIEHS/NIH, Research Triangle Park, NC, and Edwin V. Buehler, Hill Top Biolabs Inc., Cincinnati, OH.*

Although immunotoxicology, as a specialty in toxicology, has been recognized for a short period of time, immunotoxicologists have utilized well established models to evaluate xenobiotics for their potential to produce hypersensitivity responses or immunosuppression. These studies have provided a large data base of potential immunotoxic chemicals, information on their mechanisms and evidence that the immune system may be very sensitive to chemical injury. The first two speakers will focus on immunosuppression produced by xenobiotics. While sensitive models exist for quantitating immunosuppression, as of yet animal data have not been used to a significant extent in human risk assessment. This is probably due to the uncertainties of extrapolating high-dose animal studies to potential low-dose human exposure, as well as relating the significance of altered immune function tests to clinical outcome (i.e., neoplastic or infectious disease). The last two speakers will discuss hypersensitivity responses to chemicals using beryllium, proteins and low molecular weight compounds as examples. Discussions will focus on the development of specific animal models for studying these responses. Comparative human data will be provided. All speakers will also address the following questions: 1) Do immunotoxicology data lend themselves to risk estimation or quantification?, 2) Which types of immunotoxicology data are particularly suited to risk estimation/assessment activities?, 3) Can qualitative comparisons be made across species? If so, can



## Symposia

quantitative comparisons also be made?, 4) Can immunotoxic effects be readily interpreted in terms of human disease or impairment?

**Introduction:** Edwin V. Buehler, HillTop Biolabs, Inc., Cincinnati, OH

**Biological Considerations Derived From Animal Studies for Risk Quantification in Immunotoxicology,** Michael I. Luster, NIEHS/NIH, Research Triangle Park, NC

**Interspecies and Dose-Response Considerations for Extrapolation of Immunotoxicology Data,** Gerry M. Henningsen, NIOSH, Cincinnati, OH

**Risk Assessment and Respiratory Allergens: Immediate Hypersensitivity to Proteins and Low Molecular Weight Chemicals (LMWC),** Katherine Sarlo, The Procter and Gamble Company, Cincinnati, OH

**Cell-Mediated Immunity in Chronic Beryllium Disease. Implications of Animal and Human Data for Risk Assessment,** Lee S. Newman, National Jewish Center for Immunology and Respiratory Medicine, Denver, CO

### Transgenic Animals for Mutagenesis and Carcinogenesis Testing

Sponsored by the Molecular Biology Specialty Section

*Chairpersons: Louis E. Sendelbach and Natalie S. Rudolph, Transgenic Sciences Inc., Worcester, MA*

This symposium was organized to introduce to SOT an important new genetic technology that is being applied to toxicology testing: transgenic science. This refers to the generation of animals that contain and transmit genes from another species, such that the foreign genes are appropriately regulated in specific tissues at defined developmental stages. The goals of such genetic manipulation may be to alter phenotypes in particular species or strains to improve the efficiency of carcinogen screening, or to provide a specific target for studying mutagenesis *in vivo*. For example, mice expressing the bacterial *lacI* and *lacZ* genes as a mutagenesis target/reporter system may be used for *in vitro* detection of *in vivo* mutagenesis, whereas mice carrying selected activated protooncogenes may be highly susceptible to chemically induced tumor formation in certain tissues at specific ages. At the same time, it is important to include strain-specific properties and other factors that have

become standardized in large-scale screening studies. In general, these transgenic mice react to certain genotoxic or carcinogenic insults with a limited set of specific, well-characterized responses that are readily quantified. This should shorten many acute and chronic exposure studies, and could provide models for studying mechanisms of mutagenesis, carcinogenesis and chemoprevention. Ultimately, this technology may reduce the total number of animals required for such assays. The four speakers in this symposium will discuss general and specific aspects of transgenic models being designed for toxicology research and testing. The objectives are to summarize the current state of the art, and to stimulate thought and discussion among toxicologists working in different areas as to how transgenic technologies may be applied to their own testing needs and to the development of new mechanistic models.

**Introduction,** Louis E. Sendelbach, Transgenic Sciences, Inc., Worcester, MA

**Manipulating The Mouse Genome,** Frank Constantini, Columbia University, New York, NY

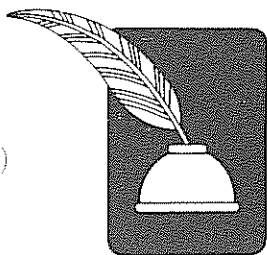
**Pathology and Toxicology Associated with Chemical Carcinogen Treatment of Transgenic Mice Carrying Oncogenes,** Ray Tennant, NIEHS/NTP, Research Triangle Park, NC

**Identification of Mutagenic Agents Using Transgenic Mice Containing a  $\beta$ -galactosidase Target Gene,** Donald L. Putnam, Microbiological Associates, Inc., Rockville, MD

**Transgenic Mice as Future Models for Genotoxicity and Human Diseases,** J. Christopher Cordaro, FDA, Washington, DC

**Concluding Remarks,** Natalie S. Rudolph, Transgenic Sciences, Inc., Worcester, MA ●





## Symposia

### Indirect Mechanisms of Immune Modulation

Sponsored by the Immunotoxicology Specialty Section

*Chairpersons: Nancy Kerkvliet, Oregon State University, Corvallis, OR and Virginia M. Sanders, NIEHS, Research Triangle Park, NC*

Xenobiotic-induced modulation of immune function occurs via direct and/or indirect mechanisms. Direct mechanisms of immune modulation involve interaction of the xenobiotic or its metabolite with an immune cell-associated receptor whose activation induces a modulatory signal. Direct mechanisms of immune modulation can be measured *in vitro*. Indirect mechanisms of immune modulation involve interaction of the xenobiotic or its metabolite with a non-immune cell-associated receptor whose activation induces the release of a biological messenger possessing immunomodulatory activity. Cells of the neuroendocrine system are both the primary target for the xenobiotic and the source of these messengers, although some messengers are released as a consequence of xenobiotic-induced tissue damage. These mechanisms of xenobiotic-induced immune modulation can only be measured *in vivo*. In some instances, xenobiotic-induced immune modulation occurs via a combination of direct and indirect mechanisms: An understanding of both mechanisms shall allow for: 1) a more definitive characterization of the seemingly contradictory immunomodulatory results produced by xenobiotics *in vitro* as opposed to *in vivo*, and 2) the design of pharmacologic interventions capable of modulating the intensity of the xenobiotic-induced effect. This symposium shall address four indirect mechanisms of immune modulation.

**Introduction**, Virginia M. Sanders, NIEHS, Research Triangle Park, NC

**An Overview of Neuroimmunomodulation in Immunotoxicology: Roles for the Hypothalamic-Pituitary-Adrenal Axis and the Sympathetic Nervous System**, Bruce A. Fuchs, Virginia Commonwealth University, Richmond, VA

**Indirect Immunological Effects of Morphine**, Steven B. Pruet, Mississippi State University, Mississippi State, MS

**Immunomodulatory Action of a Polychlorinated Biphenyl via Endocrine Dysregulation**, Nancy Kerkvliet, Oregon State University, Corvallis, OR

**Immunomodulation by Acute Phase Reactant, Serum Amyloid A (SAA) Protein**, Norbert E. Kaminski, Virginia Commonwealth University, Richmond, VA

### Molecular Approaches to Understanding Retinoid Teratogenicity

Sponsored by the Molecular Biology Specialty Section

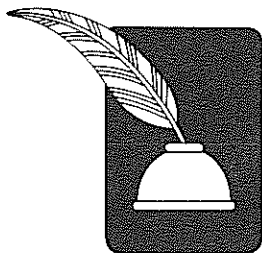
*Chairperson: Arthur A. Levin, Hoffmann-La Roche, Inc., Nutley, NJ*

Recent advancements in molecular and developmental biology have led to the identification of critical molecular events in embryonic development. This information is providing a framework for understanding abnormal development at the molecular level. Normal embryonic development is dependent on a delicate balance of spatially and temporally regulated gene expression. Retinoids control processes of normal development and can alter the expression of a family of developmentally significant genes: the homeobox genes. Recently discovered nuclear receptors for retinoic acid are now known to modulate gene expression through ligand-dependent transcriptional regulation. This symposium will explore the hypothesis that retinoid-induced teratogenesis results from the altered expression of developmentally-important genes in the embryo and will identify approaches to define cellular and molecular mechanisms of retinoid-induced teratogenesis. The speakers in this symposium will focus on: 1) cellular and molecular events occurring during teratogenesis, 2) the biochemistry and molecular biology of the nuclear retinoic acid receptors, 3) retinoid-responsive gene expression in embryos and embryocarcinoma cell lines 4) the role of retinoids as mediators of normal development and 5) the use of transgenic mice as a model system to study retinoid-responsive genes in teratogenesis.

**Introduction**, Joseph F. Grippo, Hoffmann-La Roche, Nutley, NJ

**Experimental Retinoid Teratogenesis: Selective Vulnerability of Regions of Physiological Cell Death to Retinoid Insult**, Ajit Alles, University of North Carolina, Chapel Hill, NC

**Biochemistry and Molecular Biology of Nuclear Acid Receptors, RAR alpha, RAR beta and RAR gamma**, Arthur A. Levin, Hoffmann-La Roche, Nutley, NJ



## Symposia

**Retinoid-Induced Alterations in Homeobox Gene Expression: Possible Molecular Markers of Teratogenic Events**, Joseph F. Grippo, Hoffmann-La Roche, Nutley, NJ

**Retinoids and the Molecular Basis of Pattern Formation in Vertebrate Morphogenesis**, Olof Sundin, Harvard Medical School, Boston, MA

**Retinoic Acid, Homeobox Genes and the Definition of the Anteriorposterior Axis in Mice**, Michael Kessler, Max Planck Institute for Biophysical Chemistry, Gottingen, Germany

### Neurotoxicity Risk Assessment: State of the Art

Sponsored by the Neurotoxicology and Risk Assessment Specialty Sections

*Chairpersons: Michael Dourson, U.S. EPA, Cincinnati, OH and John L. O' Donoghue, Eastman Kodak Company, Rochester, NY*

In 1983, the National Academy of Sciences (NAS) published a book entitled, *Risk Assessment in the Federal Government, Managing the Process*. NAS described the process of risk assessment as four, sometimes overlapping, areas: hazard identification (identifying the syndrome of toxicity caused by a chemical or physical agent), dose-response assessment (projecting the risk found in animal studies to the case in humans), exposure assessment (measuring or estimating the likely exposure to chemicals or physical agents in various media), and risk characterization (a complex weighing of all previous steps together in order to give a balanced view of the risk to a particular chemical or physical agent including the attendant uncertainties.) This symposium closely follows the pattern put forth by NAS. The first two presentations will focus attention on hazard identification by explaining both the types of toxicity testing that are now thought required to adequately assess neurotoxicity, and the process of weighing the various neurotoxicity data into a cohesive picture of a chemical's syndrome of toxicity. The next two presentations will focus on dose-response assessment by explaining both the current model used to project a dose likely to cause no toxicity in humans, and novel approaches to estimating the likely human dose-response curve to a chemical or physical agent.

**Neurotoxicity Testing Guidelines: Existing Guidelines and the Data They Provide to the Risk Assessor**, Michael W. Gill, Bushy Run Research Crater, Union

Carbide Chemicals and Plastics Co., Export, PA  
**Qualitative Evaluation of Neurotoxicity for Risk Assessment**, William F. Sette, EPA, Washington, DC

**Quantitative Risk Assessments: The Reference Dose (RFD) and Research To Improve This Model Including The Use of Average Uncertainty Factors**, Michael L. Dourson, EPA, Cincinnati, OH  
**Improving Quantitative Risk Assessment for Neurotoxins: Biologically Based Models are Essential**, Thomas B. Starr, Environ Corporation, Arlington, VA

### Involvement of Cytoskeleton in The Mechanisms of Chemically Induced Neurotoxicities

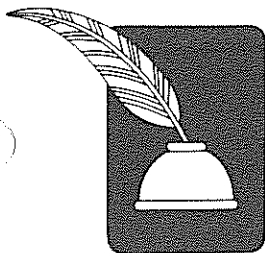
Sponsored by the Mechanisms Specialty Section

*Chairperson: Mohamed B. Abou-Donia, Duke University Medical Center, Durham, NC*

A number of neurotoxic chemicals interact selectively with cytoskeleton components. Early studies have used these chemicals as probes to investigate the function of the cytoskeleton. Recently, the action of some neurotoxicants on cytoskeletal proteins have been studied. The cytoskeletal is a structure that supports eukaryotic cells internally. It is formed of three main fibrillar proteins: microtubules, intermediate filaments, and actin filaments. Intracellular organelles are embedded in the cytoskeletal matrix. Our present knowledge of the mechanisms by which these cytoskeletal structures are involved in neurotoxicities is very fragmentary. We know very little about the effect of neurotoxicants on cytoskeleton dynamics in cells. Questions regarding the action of neurotoxicants on the functions of cytoskeleton and its regulatory role of cell metabolism, growth, and differentiation are yet to be answered. In this symposium we present studies on the involvement of the cytoskeleton in chemically induced neurotoxicities. First, we will briefly discuss the cytoskeleton: morphology, distribution, molecular composition, assembly, and disassembly. Then, we will present the role of these proteins in the development of chemically induced neurotoxicities.

**Introduction**, Mohamed B. Abou-Donia, Duke University Medical Center, Durham, NC

**Role of the Neuronal Cytoskeleton in the Reaction of Physical and Chemical Injury**, Michael L. Shelanski,



## Symposia

Columbia University, New York, NY  
**Molecular Mechanisms of Neurofilamentous Neuropathies Induced by Hexane and Carbon Disulfide**, Doyle G. Graham, Duke University Medical Center, Durham, NC  
**Changes in the Economy of Neurofilaments in Chemical Neurotoxicity**, John W. Griffin, Johns Hopkins University, Baltimore, MD  
**The Cytoskeleton: A Target for Organophosphorus Ester-Induced Delayed Neurotoxicity**, Mohamed B. Abou-Donia, Duke University Medical Center, Durham, NC

### Assessment of Exposure to Pulmonary Toxicants: Use of Biological Markers

#### Sponsored by the Inhalation Specialty Section

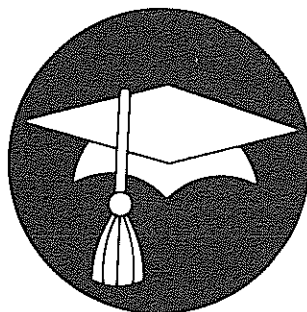
*Chairpersons: James A. Bond, CIIT, Research Triangle Park, NC and Rogene F. Henderson, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM*

Biological markers, commonly called biomarkers, are indicators of events in biological systems or samples. Biomarkers represent a change in a biological system that can be related to an *exposure to* or *effects from* a toxic agent. In toxicology, biological markers are also viewed as tools that are used to clarify the relationship between exposure and eventual health impairment. Biomarkers have been classified into 3 categories: 1) marker of exposure, 2) marker of effect, and 3) marker of susceptibility. This symposium will focus on the role of biological markers of exposure to pulmonary toxicants. In this context, biological markers of exposure are defined as the identification of exogenous substances, or the interaction of the substance within the organism, that is related to exposure to the substance. The presentations will focus on the role of various types of biomarkers as indicators of pulmonary toxicant exposure. Four major types of biomarkers of exposure to pulmonary toxicants will be discussed; these include: 1) parent compound and/or metabolites in the exhaled breath, 2) irreversible binding of the parent compound and/or metabolites to blood proteins (e.g. hemoglobin adducts, albumin adducts), 3) irreversible binding of the parent compound and/or metabolites to DNA (i.e., DNA adducts), and 4) parent compound and/or metabolites in the urine.

**Overview and Applications of Biological Markers of Exposure to Pulmonary Toxicology**, James A. Bond,

CIIT, Research Triangle Park, NC  
**Exhaled Breath as a Measure of Exposure to Volatile Organic Compounds**, Lance A. Wallace, EPA, Warrenton, VA  
**Blood Protein Adducts as Markers of Exposures to Toxic Chemicals**, Siv Osterman-Golkar, Stockholm University, Stockholm, Sweden  
**DNA Adducts as Molecular Dosimeters**, George W. Lucier, NIEHS, Research Triangle Park, NC  
**Urinary Naphthalene Mercapturates: Biological Monitors for the Stereochemistry of Aromatic Hydrocarbon Epoxidation *In Vivo***, Alan R. Buckpitt, University of California, Davis, CA  
**Strategies For The Use of Biological Markers of Exposure**, Rogene F. Henderson, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM ●

# Continuing Education Courses for 1991 SOT Meeting



The Continuing Education Committee-J. Donald de Bethizy, (Chairperson) James A. Bond, Donald A. Fox, Robin S. Goldstein, Janice E. Chambers, Andrew Parkinson, Kendall B. Wallace-is pleased to offer 11 courses this year for the upcoming SOT meeting in Dallas, TX. The course descriptions were published in the last newsletter and the titles and instructors are listed below.

In selecting courses for this year, the Committee relied heavily upon suggestions from the membership who responded to last year's course questionnaires. For example, over 90 percent of the respondents favored Advanced courses and offering selected courses in both the morning and afternoon sessions. This year there will be three Advanced courses (Neurotoxicology, Immunotoxicology and Molecular Biology) and three offered both in morning and afternoon sessions (Physiologically-Based Pharmacokinetic Modeling, Risk Communication and Molecular Biology.) Advanced courses will focus on selected issues or current concepts and individuals signing up for these courses will be expected to have a basic understanding of the area being covered.

We also received suggestions related to courses that might be oriented toward target organs and selected toxic agents. The Continuing Education Committee will continue a series of courses related to Target Organ Toxicity and Toxicity of Agents. This year, one course related to Target Organ Toxicity (Reproductive System) and two courses related to Toxicity of Agents (Metals and Naturally-occurring Toxins) will be offered. In addition, we will offer courses in Risk Assessment and Public Communication. ●

## Novel Techniques in Inhalation Toxicology

*Chairperson: Christopher R.E. Coggins, R.J. Reynolds Tobacco Co., Winston-Salem NC*

**Dosimetric Considerations**, Paul H. Ayres, R.J. Reynolds Tobacco Company, Winston-Salem, NC

**Studies with Human Volunteers**, Sidney C. Soderholm, University of Rochester Medical Center, Rochester, NY

**Animal Models of Non-Neoplastic Human Respiratory Tract Disease**, Jack R. Harkema, Inhalation Toxicology Research Institute, Albuquerque, NM

**Modelling of Alveolar Events**, Werner Stober, Chemical Industry Institute for Toxicology Research, Triangle Park, NC

## Advanced Neurotoxicology

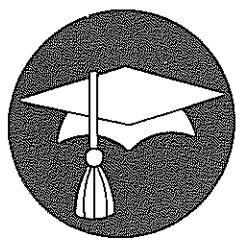
*Chairperson: Donald A. Fox, University of Houston, Houston, TX*

**The Role of Calcium in Physiological and Pathological Response to Chemicals**, James W. Putney, Jr., NIEHS, Research Triangle Park, NC

**Signal Transduction in a Regenerating Neuronal System**, Randall R. Reed, The Johns Hopkins University, Baltimore, MD

**Element Distribution and Water in Normal and Injured Axons**, Richard M. LoPachin, SUNY, Stony Brook, NY

**Cellular and Molecular Guideposts to Axonal Reactions and Repair**, Kenneth R. Reuhl, Rutgers University, Piscataway, NJ



## Continuing Education

### Introduction to Physiologically-Based Pharmacokinetic Modeling (morning session)

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*Chairperson: Michele A. Medinsky, CIIT, Research Triangle Park, NC*

**Principles of Physiologically-Based Pharmacokinetic Modeling: Model Structures, Compartments, and Philosophy**, Melvin E. Andersen, CIIT, Research Triangle Park, NC

**Determinants of Chemical Disposition: Predicting Behavior from Physiological Models**, Richard H. Reitz, The Dow Chemical Company, Midland, MI

**Applications of PBPK Models in Toxicology**, Harvey Clewell III, AAMRL/TH, Wright Patterson AFB, OH

**Future Directions in Physiologically-Based Modeling: Biologically-Based Tissue Response Models**, Rory B. Conolly, CIIT, Research Triangle Park, NC

### Implementing Physiologically-Based Pharmacokinetic Models (afternoon session)

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*Chairperson: Michele A. Medinsky, CIIT, Research Triangle Park, NC*

**Writing and Running PBPK Programs on the Computer: Setting up a Model for a Volatile Organic Chemical**, Rory B. Conolly, CIIT, Research Triangle Park, NC

**Interspecies Extrapolations and Interchemical Comparisons**, Michael L. Gargas, CIIT, Research Triangle Park, NC

**Route-to-Route Extrapolation: Incorporating Intravenous and Oral Routes into PBPK Models for Inhalation**, Richard H. Reitz, The Dow Chemical Company, Midland, MI

**Setting up Models for Multi-Day Exposures and for Evaluating Dose-Response Curves**, Harvey Clewell III, AAMRL/TH, Wright Patterson AFB, OH

### Toxicity of Agents: Metals

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*Chairperson: Michael P. Waalkes, National Cancer Institute, Frederick, MD*

**Metal Metabolism**, Robert A. Goyer, University of Western Ontario, London, Ontario, Canada

**Mechanisms of Metal Toxicity**, Thomas W. Clarkson, University of Rochester, Rochester, NY

**Therapeutic Intervention in Metal Intoxication**, H. Vasken Aposhian, University of Arizona, Phoenix, AZ

**Metal Carcinogenesis**, Michael P. Waalkes, National Cancer Institute, Frederick, MD

### Advanced Immunotoxicology

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*Chairperson: Ralph J. Smialowicz, EPA, Research Triangle Park, NC*

**Introduction**, Ralph J. Smialowicz, EPA, Research Triangle Park, NC

**Opportunities for *In Vitro* Testing in Immunotoxicology**, Michael I. Luster, NIEHS, Research Triangle Park, NC

**Cytokine Assays in Immunotoxicology: Applications and Practical Considerations**, Robert V. House, IIT Research Institute, Chicago, IL

**Rapid Screening Techniques for Xenobiotic-Induced Immunomodulatory Effects**, Stephen Nicklin, British Industrial Biological Research Association, Charshalton, Surrey, England

**The Influence of Genotype within Immunotoxicology**, Rodney R. Dietert, Cornell University, Ithaca, NY

### Female Reproductive Toxicology

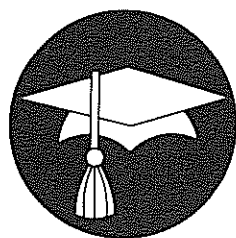
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*Chairperson: Patrick J. Wier, SmithKline Beecham Pharmaceuticals, King of Prussia, PA*

**Overview, Anatomy and Physiology**, Claude L. Hughes, Jr., Duke University Medical Center, Durham, NC

**Effects on Folliculogenesis and the Corpus Luteum**, Richard F. Walker, SmithKline Beecham Pharmaceuticals, King of Prussia, PA

**Hormonal Mechanisms of Female Reproductive Toxicity**, John A. McLachlan, NIEHS, Research Triangle Park, NC



## Continuing Education

**Female Reproductive Effects: Risk Assessment**, Donald R. Mattison, University of Pittsburgh, Pittsburgh, PA

### Advanced Molecular Toxicology: Application of Molecular Biology in Toxicology

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*Chairperson: Edward Bresnick, Dartmouth Medical School, Hanover, NH*

**Molecular Approaches to the Study of Mutagenesis**, Joshua Hamilton, Dartmouth Medical School, Hanover, NH

**Polymerase Chain Reaction - Application in Recombinant DNA Technology**, George Mark, Merck, Sharp and Dohme, Rahway, NJ

**Trans Regulation of Gene Expression**, Edward Bresnick, Dartmouth Medical School, Hanover, NH

**Approaches to Gene Therapy**, Brian Huber, Burroughs Wellcome and Co., Inc., Research Triangle Park, NC

### Naturally Occurring Toxins

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*Chairperson: Henry J. Segall, University of California, Davis, CA*

**Pneumotoxins from Natural Products**, Gary Yost, University of Utah, Salt Lake City, UT

**Pyrrrolizidine Alkaloids: Metabolism and Toxicity**, Henry J. Segall, University of California, Davis, CA

**Cyanobacterial (Blue-Green Algae) and *Fussarium* Toxins**, Val Beasley, University of Illinois, Urbana, IL

**Aflatoxins: Biotransformation, Toxicology and Carcinogenesis**, Roger Coulombe, Utah State University, Logan, UT

### Environmental Toxicology

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*Co-chairpersons: Foster L. Mayer, EPA Environmental Research Laboratory, Gulf Breeze, FL and Janice E. Chambers, Mississippi State University, Mississippi State, MS*

**Introduction:** Foster L. Mayer, EPA Environmental Research Laboratory, Gulf Breeze, FL

**Aquatic Toxicology: Toxicodynamics and Effects**, Denny R. Buckler, U.S. Fish and Wildlife Service, Columbia, MO

**Terrestrial Toxicology: Exposure and Effects**, Michael J. McKee, Southern Illinois University, Carbondale, IL

**Regulation and the Environment: Past, Present and Future**, Kenneth L. Dickson, University of North Texas, Denton, TX

### Risk Communication: Problems, Perceptions and Practice

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*Co-chairpersons: Jenifer S. Heath, Geraghty & Miller, Inc., Denver, CO, and Christopher F. Wilkinson, Versar, Inc., Springfield, VA*

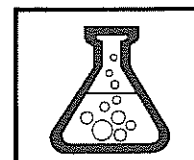
**Common Problems in Communicating Concepts of Toxicologic Risk**, Arthur L. Craigmill, University of California, Davis, CA

**Perception of Toxicologic Risk: Irrational and Capricious or Understandable?**, Paul Slovic, Decision Research, Eugene, OR

**The Risk of Public Debate**, Judith Shaw, NJ Department of Environmental Protection, Trenton, NJ

**Lessons from the Trenches: An Industry Perspective**, Donald Verrico, E.I. du Pont, Wilmington, DE ●

## Placement Services



### Assistant Professor-Toxicology

University of Connecticut School of Pharmacy, Section of Pharmacology and Toxicology. Anticipated, tenure-track position involves undergraduate and graduate teaching, development of an independent research program with emphasis in genetic toxicology and service with other faculty as a resource on toxic chemical issues. Research interest in the importance of xenobiotic metabolism is desirable. Candidate should have a broad knowledge of toxicology with a doctorate and publications in toxicology or a closely related field and at least one year of relevant postdoctoral experience. Send curriculum vitae, copies of recent publications and arrange for 3 letters of recommendation to be sent to Dr. Steven D. Cohen, Chairman, Search Committee, School of Pharmacy, 372 Fairfield Road, Storrs, CT 06269-2092. Screening will begin immediately and continue until the position is filled. AA/EOE. (Search #1A24) ●

### Post Graduate Research Program

Research efforts at the National Center for Toxicology Research, an FDA laboratory in central Arkansas, focus on testing the assumptions used in assessing risks posed by toxic chemicals emphasizing studies in biomarkers, modulators of toxicity, and extrapolation/exposure assessment. Current positions are available in the Divisions of Genetic Toxicology, and Reproductive and Developmental Toxicology; the Biometry Staff, and Microbiology Division. Postdoctoral stipends begin at \$31,750 per year. Appointments are for up to three years. A graduate degree received within past three years and U.S. citizenship or permanent resident alien status is preferred. Some faculty positions also available. Contact: Postgraduate Research Program at NCTR, Science/Engineering Education Division, Oak Ridge Associated Universities, P.O. Box 117, Oak Ridge, TN 37831-0117, (615) 576-3190. ●

### Environmental Toxicologist

The Dow Chemical Company, a recognized leader in Industrial Toxicology, has an exciting opportunity for an Environmental Toxicologist. This person will assume responsibility for the bioconcentration/metabolism area in our Environmental Toxicology and Chemistry Research Laboratory located in Midland, MI. ●

We are seeking an individual with doctoral level training who has demonstrated expertise in toxicokinetics of xenobiotics in aquatic animals. Strong communication skills, both written and oral, as well as excellent interpersonal skills are required to interact effectively in a team/work environment.

The Dow Chemical Company provides a stimulating and challenging scientific environment which allows for both scientific and professional growth. In addition, we offer a competitive salary and benefits package. Please send your resume to: Technical Recruiting, Department ET-1, The Dow Chemical Company, 1801 Building, Midland, MI 48674. An Equal Opportunity Employer M/F/H/V. ●

### Research Toxicologist

The Upjohn Company, a recognized leader in research, production and marketing of quality pharmaceuticals, invites applications for the position of Research Toxicologist in our Drug Safety Research Group.

As a member of a multi-disciplinary team, this Research Scientist will support and enhance the drug development process in our human and animal health businesses. This scientist will be responsible for the study design, implementation, supervision of study conduct, and the interpretation and reporting of drug safety studies required to characterize the toxicity of drug candidates in multiple laboratory animal species. These studies will support human safety and human food safety with a world-wide emphasis. This person will have excellent planning and organizational skills to conduct long-term (3 to 24 months) animal studies in accordance with GLP guidelines. Excellent written and oral skills are required for the preparation of technical reports and numerous personnel interactions. A Ph.D. or D.V.M. with Ph.D. in Toxicology or related discipline is necessary, as well as strong interest, knowledge and relevant experience in general animal toxicology. ABT certification or eligibility a plus.

Upjohn offers a competitive compensation and benefits package in addition to a stimulating, multi-disciplinary research environment at our modest laboratories in Kalamazoo, Michigan. You are invited to send your curriculum vitae to: The Upjohn Company, Corporate Recruiting/Code 5707-HA, 7000 Portage Road, Kalamazoo, MI 49001-0199. Refer to Job Code 5707-HA in your cover letter. An Equal Opportunity Employer M/F. ●

## School of Public and Environmental Affairs

The School of Public and Environmental Affairs at Indiana University provides graduate and undergraduate degree programs, as well as research, professional and technical services on the Bloomington, Fort Wayne, Indianapolis, Northwest (Gary), and South Bend Campuses of Indiana University. Recruitment is now underway for the 1991-92 academic year. Positions are tenure track. Teaching at graduate and undergraduate levels will be expected, along with demonstrated ability to establish and maintain an active applied research program. A strong commitment to public service, including community involvement, is important. All faculty are expected to have appropriate terminal degree and demonstration of research abilities.

Environmental Scientist/Engineer (Bloomington Campus) (Rank Open) - Area of research specialization open but preference given to candidates with hazardous waste, combustion engineering, or atmospheric sciences background. Post-doctoral research experience preferred.

Toxicologist/Environmental Scientist (Bloomington Campus) (Rank Open) - Area of research specialization open but preference given to candidates interested in the impact of pollutants on human health. Post-doctoral research experience preferred.

Interested applicants should send a curriculum vitae to the following address no later than January 1, 1991. However, the search will continue until suitable candidates have been selected. John L. Mikesell, Associate Dean for Academic Affairs, School of Public and Environmental Affairs, Indiana University, Bloomington, IN 47405. An Equal Opportunity, Affirmative Action Educator, Employer and Contractor, M/F. ●

### Position Wanted: Environmental Toxicologist: M.D., Ph.D.

Broad expertise in designing, conducting, and interpreting results of experimental studies on water and food pollutants. Provides leadership to develop assessment programs for plastic materials and substances. Risk assessment based on literature data analysis. Strong record of publications including several handbooks. Seeks position of research toxicologist. 12910 Ferntop Lane, St. Louis, MO 63141. ●

### Senior Scientist Nephrotoxicity

The Lilly Research Laboratories, a division of Eli Lilly and Company, is seeking a creative and highly motivated scientist to direct, within the Department of Biochemical Toxicology, a research program in nephrotoxicity.

Qualified candidates should have a doctoral degree in toxicology, pharmacology, or physiology with experience in nephrotoxicity research; strong in vitro and in vivo skills are required. The primary responsibilities will be to evaluate the nephrotoxic potential of new therapeutic agents, to investigate mechanisms of drug-induced nephrotoxicity, and to contribute to the drug development process. Post-doctoral training is preferable, but not essential.

The position provides an excellent research and development opportunity within a stimulating multi-disciplinary environment. Qualified applicants should send detailed curriculum vitae to: Mr. Gene P. Harvey, Personnel Manager, Lilly Research Laboratories, P.O. Box 708, Greenfield, IN 46140. We are an equal opportunity employer. ●

### Senior Toxicologists - Risk Assessment

The environmental industry is one of the most dynamic and fast-changing fields. McLaren/Hart, a top ten national environmental consulting firm, is setting the pace for the future. ChemRisk, a division of McLaren/Hart, specializes in conducting comprehensive risk assessments, environmental fate analyses, exposure assessments, toxic tort defense, Prop. 65 risk determination, occupational environmental toxicology and air quality assessments.

ChemRisk is currently expanding and is seeking senior level toxicologists to join our highly trained team. Opportunities are available in Portland, Maine; Springfield, Missouri; and Irvine and Alameda, California.

Candidates will have an advanced degree (Ph.D. preferred) in toxicology, industrial hygiene or related health science and two to five years of experience in health risk assessment. Experience in environmental consulting is preferred. Candidates must possess excellent technical and writing skills, proven communication/presentation abilities and management experience.

McLaren/Hart offers an excellent compensation and benefits package. For immediate consideration, please send resume and salary history to McLaren/Hart, Dept. SOTN, 11101 White Rock Road, Rancho Cordova, CA 95670. Affirmative Action/Equal Opportunity Employer. ●

### Consulting Toxicologist

Radian Corporation is seeking M.S. and Ph.D. toxicologists to join a team providing toxicology support to environmental and industrial projects. Duties include conducting multipathway health risk assessments; evaluating toxicological and environmental data; preparing reports on potential health effects from exposure to environmental substances; and participating in marketing efforts by writing proposals and making presentations. These are entry-level positions requiring 0-3 years of experience. Risk assessment experience in government, industry, or consulting a plus. Positions available in Austin,



Texas and Sacramento and Los Angeles, California. Send resume to Radian Corporation, Human Resources-EJH, P.O. Box 201088, Austin, Texas 78720-1088. An Equal Opportunity Employer. ●

### Postdoctoral Candidate

**T**he Department of Pathology/Toxicology at SmithKline Beecham Pharmaceuticals is seeking a postdoctoral candidate to study the mechanisms mediating chemically-induced biliary epithelial cell hyperplasia. The postdoctoral fellow will join a multidisciplinary team from Experimental Pathology, Investigative Toxicology and Drug Metabolism, providing an excellent opportunity for the trainee to broaden his/her areas of scientific and technical expertise. The Team will investigate potential mechanisms contributing to chemically-induced biliary epithelial cell injury and repair. The successful candidate will investigate the structural, functional and biochemical alterations associated with biliary epithelial cell injury and relate these changes to hepatic metabolism and biliary excretion of xenobiotics. This unique collaborative effort also provides an excellent opportunity for the postdoctoral fellow to gain a broad exposure to preclinical development within the pharmaceutical industry. A Ph.D. in Pathology, Toxicology, Biochemistry or a related field is required. Relevant experience in hepatobiliary physiology, or knowledge of in vivo or in vitro techniques to investigate hepatobiliary injury is desirable. The successful candidate will be expected to present the results of their work at local and national scientific meetings and publish in peer reviewed journals. Interested persons should send their curriculum vitae to Dr. Robin Goldstein, SmithKline Beecham Pharmaceuticals, 709 Swedeland Road, Mail Code L-66, King of Prussia, PA 19406. ●

### Faculty Position in Pulmonary Toxicologic Pathology

**T**he Institute of Environmental Medicine of New York University Medical Center at Tuxedo, N.Y., has an opening for a tenure track position for an experimental pulmonary pathologist at the Assistant or Associate Professor level. The applicant must have a D.V.M., Ph.D., or M.D. degree, or preferably, a D.V.M.-Ph.D. degree with board eligibility or certification in Veterinary Pathology. Experience in pulmonary pathology, electron microscopy, morphometry, and/or inhalation toxicology is highly desirable. The candidate will develop an independent research program in pulmonary toxicologic pathology using state-of-the-art methodologies; he/she will also intensively collaborate with other investigators of the Institute's Pulmonary Toxicology Program which focuses on respiratory effects of environmental pollutants and is headed by Drs. R. Schlesinger and M. Amdur. Applications including a C.V. and a summary of research interests and career goals, and the names (plus addresses and telephone numbers) of three references should be sent to Dr. Maarten C. Bosland, In-

stitute of Environmental Medicine, Lanza Laboratories, N.Y.U. Medical Center, Long Meadow Road, Tuxedo, N.Y., 10987, who can also be contacted for further information at (914) 351-2475. The search will remain open until the position is filled. N.Y.U. Medical Center is an Affirmative Action/Equal Opportunity Employer. ●

### Toxicologist

**K**RUG Life Sciences, the NASA Biomedical Operations and Research Laboratories contractor at Johnson Space Center seeks a qualified toxicologist for the Toxicology Laboratory. Candidates should have a Ph.D. or equivalent degree in Toxicology or other related discipline with specialization and research experience in biochemical toxicology. The major responsibility of this position is to provide toxicology support to the Environmental Health System of the Space Station Freedom by performing risk assessments and establishing Spacecraft Maximum Allowable Concentrations for airborne chemicals. Submit an application with a resume to June E. Richmond, Human Resources Manager, KRUG Life Sciences, Houston Division, P.O. Box 58827, Houston, Texas 77258. Employment Eligibility Verification Required. KRUG Life Sciences is an Equal Opportunity Employer. M/F/H/V. Smoke-free workplace provided. ●

### Toxicologist

**S**yntex has earned its reputation in the pharmaceutical industry for superior and innovative research. Our strong commitment to R&D has opened new doors in patient care around the world. We have an outstanding opportunity for a Toxicologist to join us in our Palo Alto research headquarters.

You will be responsible for designing, monitoring, and reporting preclinical toxicology studies in a variety of therapeutic areas. Information will be used to support national and international regulatory findings for new drug regulations.

To qualify, you'll need a Ph.D. in Toxicology or a related discipline with 2+ years' postdoctoral experience. You'll also need familiarity with regulatory requirements and the ability to work in a team-oriented environment. Excellent communication and interpersonal skills essential. Pharmaceutical or biotech background preferred.

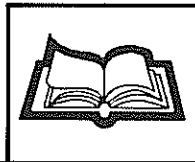
Syntex, located on the San Francisco peninsula, offers a competitive compensation and relocation package which includes an incentive bonus plan. For immediate consideration, please send your resume to: Syntex, Professional Staffing, Dept. KH/SC, 3401 Hillview Avenue, Palo Alto, CA 94303. We are an equal opportunity employer. ●

## Biochemist/Cell Biologist - Experimental Pathology

SmithKline Beecham Pharmaceuticals, a world wide leader in pharmaceutical research, has a challenging opportunity for a cell biologist in the Department of Experimental Pathology.

We are seeking a Scientist with a Ph.D. and 0-5 years postdoctoral experience to conduct research on the mechanisms of toxicity to support our drug development activities. The focus of the work will be to evaluate the effect of pharmaceuticals on membrane lipid, eicosanoid and sterol metabolism. Our scientists are encouraged to share their results with the scientific community through publication and presentation at meetings. Please send curriculum vitae to: Dr. Peter J. Bugelski, Department of Experimental Pathology, L-60, SmithKline Beecham Pharmaceuticals, P.O. Box 1539, King of Prussia, PA 19406. ●

## Publications of Interest



*Biochemistry of Chemical Carcinogenesis*, R.C. Garner and J. Hradec (eds.) Plenum Press, 223 Spring Street, New York, NY 10013.

*Biopharmaceutics and Clinical Pharmacokinetics*, M. Gibaldi, \$35.00, Lea & Febiger, 200 Chester Field Parkway, Malvern, PA 19355-9725; (800) 444-1785.

*Chirality: The Pharmacological, Biological and Chemical Consequences of Molecular Asymmetry* (Journal), \$128.00, Wiley-Liss, Inc., John Wiley & Sons, Inc., Periodicals, P.O. Box 836, Bound Brook, NJ 08805-9977; (212) 850-6543.

*Developmental Toxicology, Risk Assessment and the Future*, R.D. Hood (ed.), Van Nostrand Reinhold, 115 Fifth Avenue, New York, NY 10003.

*Environmental and Occupational Cancer: Scientific Update, 1990*, Princeton Scientific Publishing Co., Inc., P.O. Box 2155, Princeton, NJ 08543; (609) 683-4750.

*Food Safety Notebook* (journal), \$45 (12 issues), Lyda Associates, Inc., P.O. Box 700 Palisades, NY 10964; (914) 359-8282.

*In Search of Environmental Excellence*, B. Piasecki, P. Asmus, \$10.95 (paper) \$22.95 (cloth), Simon & Schuster Inc., 200 Old Tappan Road, Old Tappan, NJ 07675; (800) 223-2236.

*Functional Ecology*, \$33.00 (\$2.25 shipping), Blackwell Scientific Publications, Ltd., Osney Mead, Oxford, OX2 0EL.

*The Pharmacological Basis of Therapeutics*, Pergamon Press, Inc., Maxwell House, Fairview Park, Elmsford, NY 10523; (914) 592-7700.

*Testing and Evaluation of Drugs of Abuse*, M.W. Adler, A. Cowan (eds.), \$69.50, Wiley-Liss, Inc., A Division of John Wiley & Sons, Inc., 41 East 11th Street, New York, NY 10003. ●

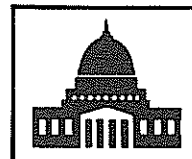
## Upcoming Conferences



**Naturally Occurring Radionuclides in Agricultural Products**, January 24-25, 1991, Ramada Resort and Florida Center, Orlando, Florida. For additional information, contact: IFAS Office of Conferences, University of Florida, 551 IFAS, Gainesville, FL 32611; (904) 392-5930.

**Advances in Controlled Clinical Inhalation Studies**, March 6-8, 1991, Hannover Medical School, Hannover, Germany. For more information, contact: Ms. Sharon Senzik, Associate Director, ILSI Research Foundation, 1126 Sixteenth St., NW, Suite 100, Washington, DC 20036; (202) 659-0789.

## Watching Washington



Rep. Henry Waxman (D-CA) has included federal protection for animal research facilities in his National Institutes of Health (NIH) reauthorization proposal, HR 5661. Title II of HR 5661 would protect Public Health Service (PHS) funded facilities from illegal activities of animal rights groups and support regional centers for primate research. HR 5661 is under consideration by the House Energy and Commerce Committee, chaired by Rep. Dingell (D-MI).

Secretary of Health and Human Services, Louis Sullivan, sent Dingell a six-page letter outlining objections to the bill and recommending "that it not be favorably considered." The letter gives only a cursory mention of Title II, stating that "the Administration has taken a position in opposition to such federal legislation." Mounting disagreement between Congress and the Administration increases the likelihood of a presidential veto for HR 5661. ●