Inhalation and Respiratory Specialty Section of the Society of Toxicology

President's Message:

Greetings fellow IRSS members, new and old. It's hard to believe that this year is almost over. I hope you all have had a successful and productive year. It's time to start thinking about the 2018 SOT Annual Meeting in San Antonio, TX. Please note that the deadline for submission of nominations for the IRSS awards is January 15, 2018. Matthew Campen, the Vice President-Elect and your point of contact has summarized the available awards and provided a link with more details about the submission process. In addition to the awards supported by the IRSS, there are a number of awards supported by the Regional Chapters, Special Interest Groups and other Specialty Sections of the Society of Toxicology to recognize the achievements of toxicologists, particularly graduate students and postdoctoral fellows. Please consider applying for any of these awards for which you are eligible or informing a qualified student, postdoctoral scholar or colleague about these awards. Full details and contact information for each award can be found on the SOT Awards webpage on the SOT website.

We are such a diverse group of scientists that it is hard to keep track of all the exciting areas of research in which we are involved. These awards are a great way to inform your peers, colleagues, mentors and potential employers of the outstanding work you are doing. A little shameless self-promotion never hurt anyone! As a group we were quite successful in gaining approval for a total of 5 symposia/workshops/roundtables for the 2018 Annual Meeting. It may seem a long way off, but it is never too early to start developing new program ideas to submit for the 2019 Annual Meeting. This year, through the hard work of our members including Irfan Rahman, Gunter Oberdorster, Matthew Campen, and Andrea De Vizcaya-Ruiz the IRSS launched a Webinar Series, and eJournal Club and finally a Podcast. This took a lot of effort from these individuals and others who provided support for these new activities. Congratulations and thank you to all. For those of us who are involved in conducting guideline-compliant inhalation studies for product registration and stewardship our Past President Flemming Cassee has provided a summary of key changes in the subacute OECD 412 test guideline. These changes represent a refinement in the study design to accommodate testing of nanomaterials and inclusion of additional endpoints that can reduce the overall use of animals while providing a robust data set for improved human health risk assessment. While I was unable to attend the 2017 Annual Meeting, I am glad to see that our IRSS award recipients have been captured for posterity on the final page of this newsletter. Congratulations to all! In closing, I would like to wish everyone a safe and very joyous holiday season. Take care of yourselves and your loved ones. See you in San Antonio.

The application deadline for the IRSS awards is January 15, 2018. Please see the IRSS website for further details of the awards listed below and send your nominations and supporting documentation to Vice President-Elect Matthew Campen.
https://www.toxicology.org/groups/ss/IRSS/awards.asp

- Paper of the Year Award
- Career Achievement Award
- Young Investigator Award
- Postdoctoral Award

Student Awards:
- Graduate Student Award
- Mary Amdur Student Endowment Award
- Donald E. Gardner Endowment Award

FINANCE REPORT

As of July 31, 2017 we have $8,990 in general funds to be utilized for our annual meeting and the associated materials for the meeting (fees, food, rentals, awards, etc.).

We have $57,398.31 in the Don Gardner Endowment and $92,280.33 in the Mary Amdur Endowment. So far we have procured two new sponsors for the specialty section: 1 will sponsor an additional student scholarship and the other will support our annual meeting.

Join us in San Antonio March 11-15, 2018!!

The IRSS has 5 symposia/workshops already lined up:

- **Workshop:** Assessing the Dose of Particles in Toxicological Studies: Advances in Dosimetry Models for *In Vitro* and *In Vivo* Applications in Light of Risk Assessment
  - Monday March 12, 9:15am-Noon
- **Symposium:** Alternative Testing Strategies for Nanomaterials and Ultrafine Particles
  - Monday March 12, 1:45pm-4:30pm
- **Symposium:** Mitochondria Biogenesis and Dysfunction in Cellular Senescence in Cardiopulmonary System
  - Tuesday March 13, 8am-10:45am
- **Roundtable:** Alternative Toxicology Approaches to Evaluate Next Generation Nicotine Products
  - Tuesday March 13, 11:00am-12:20pm
- **Symposium:** Stressors from Within: Neuroendocrine Regulation of Air Pollution-Induced Pulmonary and Systemic Health Effects
  - Tuesday March 13, 1:30pm-4:30pm

The IRSS launched the following new educational programs in 2017

Webinar Series

The **webinar** series included the first webinar by Gary Miller, PhD, Professor, Rollins School of Public Health, Emory University, Atlanta, GA on '*Exposomes and Exposomics in Inhalation Toxicology*' held on February 14, 2017. Chairs: Irfan Rahman, PhD Professor, University of Rochester, Rochester, NY and Gunter Oberdorster, PhD, Professor, University of Rochester, Rochester, NY.

The first webinar was well received by the participants (~40) and we received direct feedback from several participants. We continue to strive and will be launching next webinar on *Adverse Outcome Pathways*.

eJournal Club

The IRSS officers then launched **E-journal club** which has been approved by the SOT. The main aim of the E-journal club is to facilitate the review of a specific research study/article and to discuss implications/relevance of the study to inhalation toxicology. This will serve as a forum for new collaborations and interaction for junior and senior researchers to share ideas, methodologies, and concepts in inhalation and respiratory toxicology. The first journal club was scheduled for October 16, 2017. Several other papers have been identified and scheduled in January 2018 and April 2018.
The main panel members for podcasts are Irfan Rahman, PhD from the University of Rochester and Matthew Campen, PhD, University New Mexico Sciences Center, Albuquerque, NM, along with Panelist/Moderator: Andrea De Vizcaya-Ruiz, PhD.

Podcast

Finally the **podcast**, the SOT officials are in support of this new educational activity. This will be brief interview comprising of 4-5 brief questions from the eminent inhalation toxicologists which will be recorded and put on the IRSS site for dissemination. This is hosted by Irfan Rahman, PhD, University of Rochester, Rochester, NY.
We encourage all to participate in these educational activities.

NEXT Webinar:

We have our next webinar scheduled on **February 6 (Tuesday) at 12 noon EST.**

Title:

Adverse Outcome Pathway Framework in Inhalation and Respiratory Toxicology

Speaker:

Sabina Halappanavar, PhD Research Scientist, Genomics and Nanotoxicology Laboratory
Mechanistic Studies Division, Health Canada Adjunct Professor, Department of Biology
University of Ottawa

Revised OECD guidelines for inhalation toxicity

By Flemming Cassee, IRSS Past President

The Organisation for Economic Co-operation and Development (OECD) is an intergovernmental organisation that provides technical guidelines (TG) and guidance documents on how to perform inhalation toxicity studies that, if applied, will result in mutual acceptance of data by all member states. An expert meeting on Inhalation Toxicity Testing for Nanomaterials was held on 19-20 October 2011 in The Hague, the Netherlands that resulted in recommendations to revise the TGs for inhalation to accommodate testing of nanomaterials [1]. Under the leadership of the USA and the Netherlands, both TG412 (28-day repeated dose) and TG413 (90-day) have been revised and the new versions were published on October 9 of this year [2, 3].

TG 412 is designed to fully characterize test chemical toxicity by the inhalation route for a subacute duration (28 days), and to provide robust data for quantitative inhalation risk assessments. The primary impetus for revising this test guideline was to accommodate the testing of nanomaterials and to reflect the evolving state-of-the-science for the testing of inhaled gases, vapours, and aerosols. The 2009 version of TG 412 required particulate aerosols to have a mass median aerodynamic diameter (MMAD) of 1-3 µm with a geometric standard deviation (σg or GSD) of 1.5-3.0. To accommodate the testing of nano-range aerosols and to enhance deposition in the pulmonary region, a new standard should be met whenever possible: MMAD of ≤2 µm with a σg of 1-3. Justification should be provided in the study report if this standard cannot be met, including a description of efforts taken to meet it, such as milling.

The revision particularly addresses the actual design of the main study, its dependency on the physical form of the test chemical (gas, vapour, liquid aerosol, or solid aerosol) and whether a range-finding study or other information indicates that the test chemical deposited and retained in the lung causing adverse local or systemic effects. At a minimum, the main study comprises groups of 5 male and 5 female rodents exposed to the test chemical for 6 hours per day over a 28 day (4-week) period at three or more concentration levels, and to filtered air (negative control) or the vehicle (vehicle control). The animals are then sacrificed within 24h after the end of the exposure period. Animals are generally exposed 5 days per week, but exposure for 7 days per week is also allowed. Bronchoalveolar lavage (BALF) is performed for all test chemicals. To achieve this, the lungs are divided: The left lung is used for histopathology, the right lung for BALF analysis. If recovery groups are planned, these should also allow for BALF analysis by lung splitting. If a test chemical is likely to be retained in the lung, the study director may consider additional post-exposure observation (PEO) periods that include lung burden measurements that can inform on lung clearance behaviour and translocation, the latter being particularly relevant in case the testing chemical is a solid nanomaterial. This test guideline also suggests additional optional investigations, such as toxicokinetics, and/or systemic toxicity evaluations (e.g., immune, hepatic, neurologic and/or cardiovascular effects evaluations) to better characterize the overall toxicity of a test chemical.

Similar changes were applied in TG413 for a 90-day exposure study. At present, we are still working on an update of GD39: GUIDANCE DOCUMENT ON ACUTE INHALATION TOXICITY TESTING . The purpose of a GD is to assist the regulated community and regulators in selecting the most appropriate acute inhalation TG so that particular data requirements can be met while reducing animal usage and suffering. For more information visit the OECD website: http://www.oecd-ilibrary.org/environment/oecd-guidelines-for-the-testing-of-chemicals-section-4-health-effects_20745788

1. INHALATION TOXICITY TESTING: EXPERT MEETING ON POTENTIAL REVISIONS TO OECD TEST GUIDELINES AND GUIDANCE DOCUMENT No. 35 http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2012)14&doclanguage=en
2. http://www.oecd-ilibrary.org/docserver/download/9741201e.pdf?expires=1507707426&id=id&accname=guest&checksum=BEC15F3C3BB230FE5B817FA46B756DD1
3. http://www.oecd-ilibrary.org/docserver/download/9741301e.pdf?expires=1507707471&id=id&accname=guest&checksum=3DB78F0D2E5773BC8C7CB85D428D9D4F

Congratulations to the 2017 IRSS Award Recipients!

Paper of the Year: Desinia B. Miller, Ghio AJ, Karoly ED, Bell LN, Snow SJ, Madden MC, Soukup J, Cascio WE, Gilmour MI, and Urmila P. Kodavanti. Ozone Exposure Increases Circulating Stress Hormones and Lipid Metabolites in Humans.
Am J Respir Crit Care Med. 193:1382-91, 2016.

Sarah Carratt, Ph.D.
University of California at Davis
Graduate Student Award

Sheryse Taylor
Rutgers University
Mary Amdur Award

Katherine Duke, M.S.
North Carolina State University
Mary Amdur Award

Samantha Snow, Ph.D.
U.S. Environmental Protection Agency
Postdoctoral Award

Megan Rebuli, Ph.D.
University of North Carolina
Postdoctoral Award

Matthew McGraw, M.D.
University of Colorado
Donald Gardner Inhalation Toxicology Education Award

Kym Gowdy, Ph.D.
East Carolina University
IRSS Young Investigator Award

Mike Foster, Ph.D.
Duke University
IRSS Career Achievement Award