

YOUR HEALTH & THE ENVIRONMENT

News from the University of Rochester Environmental Health Science Center

Fall 2018

EHSC Members to Participate in New Center for Research on Flavored Tobacco Products

Center member Irfan Rahman, PhD, Professor of Environmental Medicine, Dentistry, Medicine (Pulmonary), and Public Health Sciences, played a key role in developing a project to study flavored tobacco products.

One of only nine projects to earn funding through the federal Tobacco Centers of Regulatory Science (TCORS) program, the Western New York Center for Research on Flavored Tobacco Products, (CRoFT), will unite teams from Roswell Park Comprehensive Cancer Center and the University of Rochester Medical Center in an effort to better document and understand the health effects of one of the fastest-growing trends in tobacco use.



Irfan Rahman, PhD

The five-year, \$19.05 million grant from the National Cancer Institute will be shared by Roswell Park and URM. Based at Roswell Park, the program will be led by Richard O'Connor, PhD, and Maciej Goniewicz, PhD, PharmD who will analyze various combustible and electronic tobacco products, their consequences for health and how users interact with these products.

Collaborators from URM, led by Rahman and Deborah Ossip, PhD, Professor of Public Health Science, will contribute critical resources in biomarker screening, genetic/epigenetic analysis and toxicology assessment.

Continued on page 2

In This Issue

Page 1-2

EHSC Members to Participate in New Center for Research on Flavored Tobacco Products

Page 3

Rand Lab Working to Identify How Humans Metabolize Methylmercury

Page 4—8

The EHSC Welcomes New Center Members

- Marissa Sobolewski, PhD
- Jacques Robert, PhD
- Matthew McGraw, MD
- Xin Li, PhD
- Kirsi Järvinen-Seppo, MD, PhD

Page 9

Center Members Present at Developmental Programming and Disease Workshop

Page 10

Korfmacher Invited as Environmental Justice Panelist to Albany Law School

Page 11

Lead Summit Brings Together Cleveland and Rochester Organizations

Page 12

Finger Lakes Occupational Health Services (FLOHS) awarded 5-year grant from New York State

Page 13

Toxicology Graduate Program Welcomes New Students

Continuation from page 1 of “*EHSC Members to Participate in New Center for Research on Flavored Tobacco Products*”

Isaac Sundar, PhD a Research Assistant Professor in Department of Environmental Medicine who is affiliated with Rahman’s lab will be the lead investigator for Biomarkers and Epigenomics Core.

Several additional center members will contribute to research on health implications of vaping including Martha Susiarjo, PhD, (Assistant Professor of Environmental Medicine), Matthew McGraw, MD (Assistant Professor of Pediatrics) and Daniel Croft, MD, MPH, (Assistant Professor of Medicine).

Current federal regulations prohibit the sale and manufacture of flavors other than menthol in combustible cigarettes, but not in other tobacco products, including e-cigarettes. Data published last year from the PATH Study, the largest prospective U.S. study of tobacco use, indicated that use of flavored products was highest among youth and young adult tobacco users, with 80% of tobacco users ages 12-17 and 73% of tobacco users ages 18-24 reporting having used a flavored tobacco product in the previous 30 days. CRoFT will provide research to inform future outreach and regulatory interventions to protect public health, particularly among young users.

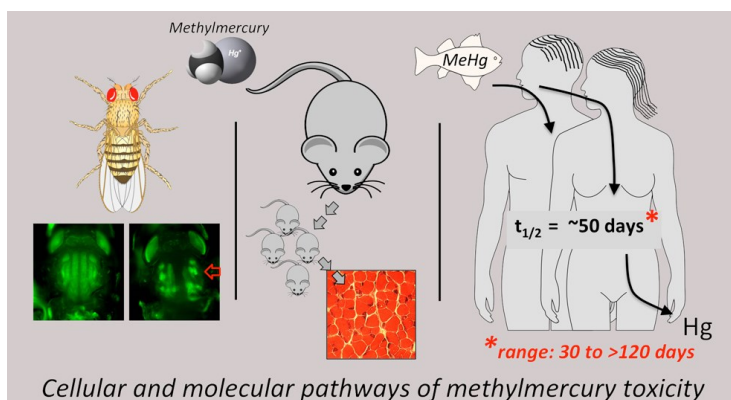
“There are a number of flavoring chemicals that are regarded as safe for incorporation into food and drink, but we have such limited data about what happens when these products are inhaled,” says Rahman. “We’re going to study the impact on public health when these chemicals are added to e-cigarettes, vape pens, Juul and other pods, hookahs, waterpipes, cigars and cigarillos (little cigars) to be a resource for both policymakers and the general public.”



Rand Lab Working to Identify How Humans Metabolize Methylmercury

University of Rochester researchers have been studying neurological effects in children of mothers exposed to methylmercury through fish consumption within the Seychelles Child Development Study since the 1980's.^{1,2} Building on this past work, Matt Rand, Ph.D, has been trying to understand how the body metabolizes and eliminates methylmercury that is a naturally occurring contaminant present in various amounts in dietary fish species. Rand is studying why different people have varied rates of eliminating methylmercury from their bodies – particularly whether genetic or other factors might be responsible. Rand's recent work has explored the potential role of the gut microbiome in rates of methylmercury elimination.

Rodent studies done by Ian Rowland and Tom Clarkson at University of Rochester Medical Center 30-40 years ago showed that when the gut microbiome was disrupted with antibiotics, there was an accumulation of methylmercury in body tissues that accompanied a slowing of its excretion. Rand recently studied rates of methylmercury elimination in a sample of 37 human volunteers from the Rochester area.³ He found that the rate of methylmercury elimination from the body, which on average showed a 44-day half-life, could vary more than 3-fold among different individuals. Initial findings from characterizing the abundance and diversity of the thousands of bacterial species that exist in different amounts in the gut microbiomes of these individuals indicate that the methylmercury metabolizing activity is harbored in just a few of the bacterial strains. Rand has future work planned to elaborate exactly what composition of the human gut microbiome is ultimately responsible for how we metabolize methylmercury and rid it from our bodies.



¹<https://www.urmc.rochester.edu/pediatrics/research/seychelles-child-development-study.aspx>

²<https://www.urmc.rochester.edu/MediaLibraries/URMCMedia/environmental-health-sciences-center/COEC/documents/Summer2015EHSC.pdf>

³Caito SW, Jackson BP, Punshon T, Scrimale T, Grier A, Gill SR, Love TM, Watson GE, van Wijngaarden E, Rand MD. "Editor's Highlight: Variation in Methylmercury Metabolism and Elimination Status in Humans Following Fish Consumption." *Toxicological sciences: an official journal of the Society of Toxicology*. 2018 Feb 1; 161 (2):443-453.

The EHSC Welcomes New Center Members

Marissa Sobolewski, PhD



Assistant Professor of Environmental Medicine Marissa Sobolewski, PhD earned her doctorate at the University of Michigan in Biological Anthropology studying evolution and the correlations between steroid hormones and social behavior in our closest living relatives, chimpanzees. Her research uncovered novel associations between testosterone and social behavior of male chimpanzees. For her postdoctoral fellowship, she came to the University of Rochester Medical School to work on how metals exposure disrupts the stress endocrine axis and how metals and environmental stressors interact to reprogram brain epigenetic profiles.

Sobolewski's lab focuses on mechanisms of sex-dependent neurotoxicity of developmental exposure to endocrine disrupting compounds (EDCs). The perinatal endocrine environment of a developing mammal differs depending on sex, and male sensitivity to developmental EDC exposure may result from sex-differentiated hormone profiles in development. Specifically, the male-specific testosterone surge before and after birth, known as the perinatal testosterone surge (PTS), is a key regulator of reproductive tract and central nervous system development.

Sobolewski's lab uses environmental stressors and EDCs to elucidate endocrine epigenetic mechanisms of behavioral development. Her lab aims to translate mechanistic research to understand the role the environment plays in the etiology of neurobehavioral disorders with sex-biased prevalence rates, such as Attention Deficit / Hyperactivity Disorder and Autism Spectrum Disorders.

Jacques Robert, PhD

Jacques Robert, PhD, professor of Microbiology and Immunology, studies the evolution of the immune system using the frog *Xenopus laevis* as animal model. Robert coordinates the *Xenopus* Research Resource, which provides materials, animals, and training for researchers across the globe. This is the largest *Xenopus laevis* research resource in the world, with many genetically modified animals that have undergone special testing that makes them particularly well suited for research on the immune system.

This model also provides many opportunities to study environmental influences on other aspects of development. Robert recently worked with Center Director Paige Lawrence, PhD to study the impacts of chemicals in hydrocracking fluid on the development of the immune system of exposed tadpoles.^{1,2}

In addition to his wide-ranging research interests, Robert has extensive experience in community engagement and science education. He has established educational outreach programs, presented his work at science museums, and hosted summer internships for high school students.



¹Robert J, McGuire CC, Kim F, Nagel SC, Price SJ, Lawrence BP, De Jesús Andino F. Water contaminants associated with unconventional oil and gas extraction cause immunotoxicity to amphibian tadpoles.; *Toxicological sciences* : An official journal of the Society of Toxicology. 2018 Jul 11.

²Boulé LA, Chapman TJ, Hillman SE, Kassotis CD, O'Dell C, Robert J, Georas SN, Nagel SC, Lawrence BP. Developmental Exposure to a Mixture of 23 Chemicals Associated With Unconventional Oil and Gas Operations Alters the Immune System of Mice.; *Toxicological sciences* : An official journal of the Society of Toxicology. 2018 May 01.

Matthew McGraw, MD

Matthew McGraw, MD recently joined the Pediatric Department's Pulmonology Division, where he plans to build on his past work in environmental health. Here in Rochester, he conducts research with Irfan Rahman, PhD on nitrogen mustard as a chemotherapeutic agent. His environmental health research interests also include diacetyl ("popcorn lung") and other flavorings in vaping fluids used in e-cigarettes and other devices.

McGraw grew up in Fairport, NY then did his undergraduate work at Bucknell University. He attended SUNY Upstate Medical School and the University of Virginia for Pediatric Residency before moving to the University of Colorado for his Pulmonary Fellowship where he worked on therapeutic treatments for sulfur mustard. With his return to Rochester, he looks forward to expanding his environmental health work and engaging with local groups around the health effects of vaping fluids.



Xin Li, PhD

Xin Li, PhD, Assistant Professor of Biochemistry and Biophysics and Urology, joined the University of Rochester Medical Center after completing his PhD at Cornell University and postdoctoral studies at the Howard Hughes Medical Institute/University of Massachusetts Medical School. Li's research is at the interface between reproductive biology and RNA biology, studying the function of small non-coding RNAs in male fertility and in epigenetic inheritance.

Environmental toxins not only affect the individual, but also can be passed to the next generation. Researchers are just beginning to understand the molecular mechanisms underlying this acquired inheritance and it has been found that small non-coding RNAs function as the information carriers in sperm. The decline of male fertility in the past 50 years is believed to be due to a combination of environmental and genetic factors.

The Li lab relies on genomic approaches to model human diseases. His lab has been supported by a K99/R00 from the National Institute of Child Health and Human Development (NICHD), Maximizing Investigators' Research Award (MIRA) from the National Institute of General Medical Sciences (NIGMS), United States Department of Agriculture (USDA), and private companies.

Li is looking forward to integrating future research with other center members in the Environmental Health Sciences Center to address the fundamental mechanisms of how the environment affects the fertility of the current generation and the well-being of the next generation.



Kirsi Järvinen-Seppo, MD, PhD

Dr. Järvinen-Seppo received her M.D. and Ph.D. degrees at the University of Helsinki, Finland. After defending her thesis entitled “Human Milk Immunology in Relation to Development of Cow’s Milk Allergy in the Breastfed,” she completed a post-doctoral research fellowship in the Jaffe Institute for Food Allergy at the Icahn School of Medicine at Mount Sinai, New York characterizing allergenic and antigenic epitopes on food allergens, followed by a residency in pediatrics and a fellowship in allergy and immunology at the Mount Sinai Hospital.

Throughout her past faculty appointments at the Mount Sinai School of Medicine and the Albany Medical College her laboratory investigate the role of breast milk in the development of neonatal oral tolerance to foods, funded through a Mentored Physician Scientist Career Development Award from the National Institute of Allergy and Infectious Diseases (NIAID). She is currently an Associate Professor of Pediatrics, Medicine, Microbiology and Immunology and the Chief of Pediatric Allergy and Immunology. She holds the Founders’ Distinguished Professorship in Pediatric Allergy, Golisano Children’s Hospital and is also the Director of the Center for Food Allergy, FARE Clinical Network Center of Excellence, which is a multidisciplinary program centered on providing care to families with food allergies.

Utilizing human cohorts, her research program is studying the role of early environmental exposures including human milk components in the establishment of microbiome and infant immune system, and how those impact tolerance and development of allergic diseases. She is a PI on an NIH-funded birth cohort in which Old Order Mennonites and Rochester families serve as model populations of different risk for allergic diseases. These studies will allow better understanding of the aspects of developmental immunology pertinent to future strategies for primary prevention of atopic diseases.



Center Members Present at Developmental Programming and Disease Workshop



On September 27, 2018, the department of Environmental Medicine and the UR Environmental Health Science Center held a workshop on Developmental Programming of Disease,. The workshop focused on current understanding of mechanisms that underlie early life programming, including glucocorticoids, germ cell imprinting, immune cell programming, the gut microbiome, and nutrition.

The morning session included research presentations by center members Edwin van Wijngaarden, PhD, Professor in Public Health Sciences, Martha Susiarjo, PhD, Assistant Professor in Environmental Medicine, and Margot Mayer- Pröschel, PhD, Associate Professor in Biomedical Genetics and Neurobiology & Anatomy, shared their work in research presentations. The afternoon session included a breakout group discussions addressing related issues including limitations of our current understanding, cumulative exposure/stressors, Intervention/prevention approaches and future research directions.

Korfmacher Invited as Environmental Justice Panelist to Albany Law School



Huffington Post reporter Yvette Cabrera, event organizer Jose Almonzar, and Katrina Smith Korfmacher

COEC director Katrina Smith Korfmacher participated in a panel on “Civil Rights, Science, and Environmental Justice” at the Albany Law School on October 26. Moderated by past Sierra Club president Aaron Mair, the panel included speakers on climate change, indigenous peoples and water resources, and childhood lead poisoning. Over 75 community members, advocates, law professionals, and students attended the event, which was hosted by the New York State bar Association’s Committee on Civil Rights and Section on Environmental and Energy Law.

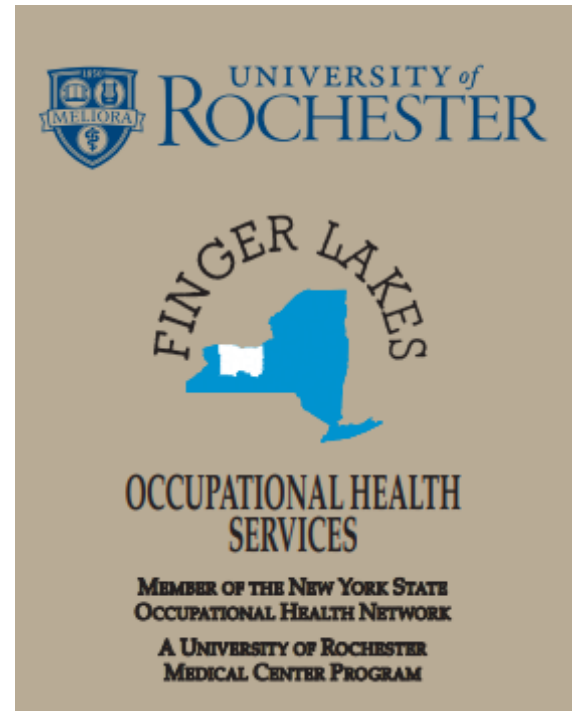
Lead Summit Brings Together Cleveland and Rochester Organizations



From November 1-2, a delegation of nearly thirty government agency staff, elected officials, community groups, and foundations from Cleveland visited Rochester to learn about the community's comprehensive lead poisoning prevention efforts. The visit was sponsored by the Mt. Sinai Health Foundation of Cleveland and co-hosted by the City of Rochester, Coalition to Prevent Lead Poisoning, and the EHSC COEC. Participants heard from a wide range of Rochester-area stakeholders about the community-based effort to develop and pass a 2005 local lead law, as well as the details of implementation, ongoing support, and collaboration.

Finger Lakes Occupational Health Services (FLOHS) awarded 5-year grant from New York State

The New York State Occupational Health Clinic Network was created in 1988 to respond to a serious and unmet need for clinical resources to address occupational diseases throughout the state. As the network clinic in the Finger Lakes Region since the inception of the program, Finger Lakes Occupational Health Services provides diagnosis, treatment and prevention of occupational disease under the guidance of an Advisory Board representing diverse worker interests. University of Rochester Medical Center's Department of Environmental Medicine Faculty Cristina Demian, MD, serves as Medical Director and Associate Professor Katrina Smith Korfmacher, PhD is the program's outreach specialist. Mark Utell, MD, Chair of the Division of Occupational and Environmental Medicine is the clinic's Occupational Lung Disease specialist. In July, FLOHS was awarded a five year grant from the New York State Department of Health, Bureau of Occupational Health and Injury Prevention to continue and build on these efforts to serve the occupational and environmental health needs of workers in our region.



Toxicology Graduate Program Welcomes New Students



Back Row- Left to Right: Thomas Lamb (St. Josephs College), Joe Lucas (Pennsylvania State University), Ian Krout (Marist College)

Front Row- Left to Right: Alex Strohm (Michigan State), Emily Quataro (Alabama), Alyssa Merrill (SUNY Fredonia)

For questions or comments, please contact:

Cait Fallone

Program Manager

Environmental Health Science Center

Community Outreach &

Engagement Core

(585) 275-3354

Cait_fallone@urmc.rochester.edu

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