



- The Center for Excellence in Environmental Research, Agriculture and Health •
- The Hebrew University of Jerusalem • September 2012 •



A message from the Director

Benny Chefetz

This newsletter is devoted to a brief introduction of our new research center – CEERAH, The Hebrew University Center of Excellence in Agriculture and Environmental Health.

CEERAH was established as new research center in April, 2012 after our revised proposal was approved by the EHF (Environment and Health Fund, Israel) and by the Hebrew University research authority. During the first 6 months of activities all researchers in CEERAH were busy establishing projects within the areas of: (i) xenobiotics in the agroecosystem, (ii) human exposure to xenobiotics, and (iii) effects of xenobiotics on human health. Information about each project is highlighted in this newsletter.

CEERAH's primary goal is to advance scientific understanding of the associations between modern agricultural practices and human health as well as identifying options for reducing risks. To meet that goal, researchers with expertise in epidemiology, biostatistics, public health, environmental chemistry, immunology, toxicology, reproductive physiology, developmental biology, economics and risk analysis are joining forces to foster an integrated approach to study issues related to agriculture, environment and public health.

In addition to on-going research, CEERAH promoted variety of activities: (i) new students have been recruited and started their Master, Ph.D. or postdoctoral studies; (ii) we hosted several visitors to enhance our strategic partnership with colleagues and institutes from abroad; (iii) together with the EHF we organized special symposia on "Agricultural, Environmental and Health aspects of Irrigation with Reclaimed Wastewater" at The 40th Annual Conference of the Israel Society of Ecology and Environmental Sciences; (iv) we are in a process to enhance our analytical capabilities by developing new protocols to quantify pesticides in biological matrices; and (v) we are in an advance process of developing our new website.

A brief description of the above mentioned activities is presented in this newsletter. I hope this newsletter and the following letters will keep you updated and informed with our ongoing activities.

Yours,

Benny Chefetz

Visiting Scholars

In March 2012, EHF hosted **Dr. Mark Nieuwenhuijsen** from the Center for Research in Environmental Epidemiology (CREAL) in Barcelona. Dr. Nieuwenhuijsen studied a wide variety of environmental exposures and their potential impact on health outcomes including reproductive health, respiratory disease and cancer. CEERAH hosted Dr. Nieuwenhuijsen in a visit to our plant experiment in Lachish experimental station. In addition, members of CEERAH attended a roundtable meeting with Dr. Nieuwenhuijsen on environmental exposures and pregnancy outcomes.

In August 2012, CEERAH hosted **Dr. Samuel Dorevitch** from the UIC (Chicago, USA). Dr. Dorevitch's research interests include environmental epidemiology; developing objective measures of health and exposure; waterborne illness; indicators of water quality; developing methods for measuring water exposure, among others.

We held an interesting meeting with Dr. Dorevitch at the Ministry of Health with Dr. Tamar Berman, Dr. Hagai Levine and Dr. Yehoshua Maor. We aim at establishing cooperation ties with Dr. Dorevitch's lab within the frame of CEERAH.

In September 2012, Dr. Chefetz hosted **Dr. Thorsten Reemtsma**, Head of the Department of Analytical Chemistry at Helmholtz Centre of Environmental Research (UFZ), Leipzig Germany. Dr. Reemtsma is the former leader of 'Residue Analysis' in the Department 'Chemicals Safety' of the Federal Institute for Risk Assessment, Berlin Germany. Drs. Reemtsma and Chefetz plan to formulate joint research proposal aiming to elucidate the metabolism of EDCs in plant and to evaluate the risk associated with exposure of EDCs to humans via plants.

Analytic Capabilities in the Center



CEERAH is currently aiming at enhancing its analytical capabilities by developing methods for measurement of xenobiotics in plant matrices (fruits, leaves and roots). For that we have developed extraction protocols for pharmaceutical compounds using our new accelerated solvent extractor (ASE) 350 (Dionex Corporation).

The new device has been installed at the Intradepartmental Unit in Rehovot campus and is available for the Center's members. Together with Dr. Orit Gal, head of the Intradepartmental Unit and Dr. Ben-Ari, head of the mass spectroscopy lab we are establishing protocols for measuring EDCs such as phthalates, bisphenol A (BPA) and organophosphate metabolites (DAP's) in biological samples (urine, plasma and other fluids) using GC-MS and LC/MS-MS. Students actively involved in the Center will be trained to use the instruments and will be involved in method development protocols.



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An update on our projects



The Lysimeter station in Lachish.

Project #1: Xenobiotics originating from reclaimed wastewater: Uptake by crops and exposure assessment. **PI, Benny Chefetz**

In this project we aim to elucidate the mechanisms controlling the uptake and translocation of organic pollutants by crops and to evaluate the exposure of the Israeli population to these chemicals via food consumption. To accomplish these goals, we have started plant uptake experiments with different plants having roots, leaves or fruits as edible organs using different soils and wastewater qualities. Experiments are being conducted in a controlled greenhouse and in lysimeter station. Tomer Malchi a M.Sc. student and Myah Goldstein, a PhD student have joined CEERAH and are working in this project as part of their thesis.

Project #2: Bioaccumulation of EDCs by dairy cows via consumption of crops irrigated with reclaimed wastewater **PI, Zvi Roth**

Low-quality reclaimed wastewater are used for irrigation of crops used for dairy cows feeding. This might result in EDC accumulation in their tissues and products. Humans, being at the top of the food chain, might thus be exposed to these chemicals by consuming meat and dairy products. In this project we aim to identify relationships between crop contamination and contamination of dairy food products (meat and milk). We have started using in vitro and in vivo animal model in order clarify the risk associated with EDCs exposure on both livestock and humans. Dorit Kalo is the PhD student conducting the experiments.



Cows as part of the food chain could potentially be contaminated with EDCs and PCs.

Project #3: Carbamazepine levels among healthy Israeli population

PIs, Ora Paltiel and Yehoshua Maor

The main goal of this project is to evaluate exposure of carbamazepine to people via consumption of vegetables irrigated with reclaimed wastewater. To accomplish this goal we will recruit volunteers who will be asked to eat over a 10 day period > standard minimal quantities per day of vegetables provided by farmers who grow their crops with reclaimed wastewater as irrigation water. We are currently conducting experiments with dairy cows from project #2 which will enable us to determine limits of detection and quantitation of carbamazepine in different biological matrices like plasma and urine. The analyses will enable us to proceed to measuring these levels among human volunteers. Yehoshua Maor is a postdoctoral fellow coordinating CEERAH and also a co-PI in this project.



Experiments to evaluate the uptake potential of carbamazepine by plants. What are the implications for environmental health?

Project #4: Exposure of Israeli children to pesticides via food consumption

PI, Orly Manor

This project addresses the public health implications of dietary exposures to agricultural pesticides among Israeli children. Data from a nutrition survey will be paired with data from pesticide monitoring programs of the Israeli Ministries of Health and Agriculture. The result will be a portfolio of concentrations of individual pesticide concentrations within food items and dietary patterns as a whole. Currently, statistical analysis on the data sets is underway. Recipes for calibration of individual food items within mixed dishes are being finalized and the platform for linking pesticide residue and dietary data has begun. Shirra Freeman is a postdoctoral fellow conducting the activities in this project.

Project #5: The exposure of pregnant women and their offspring to EDCs and associations with fetal growth and development of reproductive organs

PIs, Ronit Calderon and Tamar Berman

In this project we aim to evaluate intrauterine exposures to phthalates, bisphenol A (BPA), genistein, and organophosphates (OPs). We further aim to estimate the possible anti-androgenic or estrogenic-like effects of these exposures and to evaluate the association of intrauterine exposure to OPs with birth outcomes. Our study population includes pregnant women who will be followed from first trimester to delivery and their offspring. Exposure assessment will include urine samples in the first trimester and for a subset, amniotic fluid in the second trimester. During the first 48 postnatal hours, the study's neonatologists will examine the newborn, evaluate neonatal reflexes and features of the genitourinary tract (including the anogenital distance) Ela Ein-Mor has joined CEERAH as a PhD. Student in this project. Data collection has just begun.

No
picture
so far.

Project #6: Pesticide exposure and endocrine health outcomes in Palestinian and Israeli males

PIs, Hagai Levine and Jeremy D. Kark

In this project we aim to evaluate organophosphate exposure and its determinants among Israeli and Palestinian men and to determine the association with male hormones levels. To accomplish these goals we will use a population-based cross-sectional sample of Jerusalem residents, examined in 2004-2008. Urine samples taken from males aged 25-49 will be examined for 6 organophosphate metabolites levels in the collaborating lab and blood samples will be tested for hormone levels in Hadassah. We are currently in the process of signing a contract and sending the samples to the collaborating lab. We have recently published an article on trends in reproductive health in Israel which serve to strengthen and focus the need for the current project.

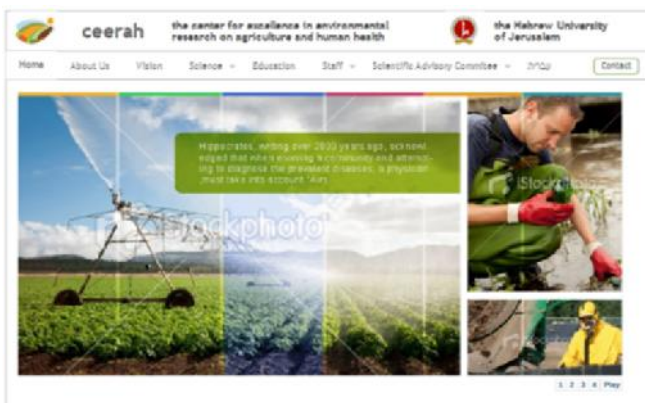


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Reaching out

Website

CEERAH aims at reaching out to the general public disseminating information about the Center through the creation of a new website. The site is currently in its final stages of development and will be online during this first year of operation. The website will also provide a platform for sharing scientific data among members and our scientific advisory committee as well as targeting specific populations such as students considering a career in environmental health.



Symposia

Dr. Chefetz has organized a special symposia on “Agricultural, Environmental and Health aspects of Irrigation with Reclaimed Wastewater” at The 40th Annual Conference of the Israel Society of Ecology and Environmental Sciences. The symposia planned for 17 Oct. 2012 will include two keynote lectures summarizing the current knowledge on agricultural and environmental aspects related to long-term irrigation with treated wastewater. In addition, eight presentation will be provided by Israeli researchers and students highlighting their current activities in the topic.

As part of our plans to enhance public awareness and disseminate research results and recommendations, Dr. Yehoshua Maor was invited by the MEDIF (French Speaking Israeli Doctors Association) to lecture on the environmental and epidemiological impact of recycled wastewater.

We will continue with such symposia as an integral part of the reaching out activities of the Center.

Students and Postdocs



Dr. **Yehoshua Maor** completed his Ph.D. under the supervision of Prof. Mechoulam at The Hebrew University of Jerusalem. His research focused on pharmacology applied to blood pressure and the involvement of the cannabinoid system. He has been an intern at the Beth Israel Deaconess Medical Center under the supervision of Dr. Groopman at Harvard Medical School.

In a shift to his academic career Yehoshua has been recruited to coordinate the activities of CEERAH and to contribute with his expertise in pharmacology to some of the research projects to be performed in the Center. He will be also aiding in the establishment of new courses promoted by CEERAH, like environmental pharmacology.



Dr. **Shirra Freeman** is a postdoctoral fellow in the Braun School of Public Health and Community Medicine. Together with Professor Orly Manor, she is investigating dietary sources of exposures to pesticides among Israeli children. Shirra's research interests include environmental health, risk assessment, decision science and the interface between science and policy.

She is also consultant to the IUCN and the FAO on the socioeconomic dimensions of aquaculture. Shirra was an EHF fellow at the Harvard School of Public Health where she undertook a risk-benefit analysis of fish consumption. She was Rieger Foundation Doctoral Fellowship and holds a Ph.D. from the University of Haifa and an M.Sc. in Economics from the University of London.



Myah Goldstein is currently a PhD student under the supervision of Prof. Benny Chefetz and Dr. Moshe Shenker at the department of Soil and Water Sciences, Faculty of Agriculture, Food and Environment of the Hebrew University. Myah has joined CEERAH and is working on project #1. Her research focuses on the uptake and distribution of pharmaceutical compounds and organic pollutants in plants.



Tomer Malchi is currently a Master student at the department of Soil and Water Sciences. He is currently working in the project #1 of CEERAH the uptake of different pharmaceutical compounds by root crops. The research is being conducted in a lysimeter setup that includes three types of soils and three type of irrigation water.

In addition to his project in CEERAH Tomer is a project manager for engineers without borders. He is researching and implementing a 80 person wastewater treatment system in east Jerusalem that includes a constructed wetlands and biogas production.



Eliana (Ela) Ein-Mor is a MA Graduate in Statistics by The Hebrew University. She has been working at Hadassah Mount Scopus as Biostatistician in fertility research and geriatric longitudinal study since 2003.

Ela joined CEERAH towards her PhD at the Braun School of Public Health the Hebrew University under the supervision of Dr. Ronti Calderon and works on project #5.

Data collection includes 1-2 maternal urine samples during pregnancy, exposure and background questioner, amniotic fluid sample, newborns urine and evaluation of neonatal reflexes and features of the genitourinary tract. Data collection is conducted at Hadassah Mount Scopus and has just begun this month.



Dorit Kalo is currently a PhD student under the supervision of Dr. Zvi Roth at the department of Animal Sciences, Faculty of Agriculture, Food and Environment of the Hebrew University. Dorit is currently working in the project #2 of CEERAH. Dorit main specialization is in in-vitro embryo production and her research is focuses on the effect of phthalates on oocyte.

developmental competence in a bovine model including characterization of intracellular and molecular mechanism.