



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



A message from the Director

Benny Chefetz

This newsletter is devoted to introducing our new research center – CEA EH, The Hebrew University Center of Excellence in Agriculture and Environmental Health.

CEA EH was established as new research center in April, 2012 following final approval of our revised proposal by the EHF (Environment and Health Fund, Israel) and the Hebrew University's research authority. During the first 6 months of activity all researchers in CEA EH were busy establishing projects within the areas of: (i) xenobiotics in the agro-ecosystem, (ii) human exposure to xenobiotics, and (iii) effects of xenobiotics on human health. Information about each project is highlighted in this newsletter.

CEA EH's primary goals are to advance scientific understanding of the associations between modern agricultural practices and human health and to identify options for reducing risks. To meet these goals, 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, CEA EH is promoting a variety of activities: (i) new students have been recruited and have started their Masters, Ph.D. or postdoctoral studies; (ii) we have hosted several visitors to enhance our strategic partnerships 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 of enhancing our analytical capabilities by developing new protocols to quantify pesticides in biological matrices; and (v) we are in an advanced stage in the development of our new website.

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

Benny Chefetz

Visiting Scholars

In March 2012, the EHF hosted **Dr. Mark Nieuwenhuijsen** from the Center for Research in Environmental Epidemiology (CREAL) in Barcelona. Dr. Nieuwenhuijsen has studied a wide variety of environmental exposures and their potential adverse impacts on health outcomes including reproductive health, respiratory disease and cancer. During this visit Dr. Nieuwenhuijsen visited CEA EH's field research at the Lachish experimental station. In addition, members of CEA EH attended a roundtable meeting with Dr. Nieuwenhuijsen on environmental exposures and pregnancy outcomes.

In August 2012, CEA EH 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. Dr. Dorevitch met with Dr. Tamar Berman, Dr. Hagai Levine and Dr. Yehoshua Maor at the Ministry of Health.

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 plants and to evaluate the risk associated with exposure of EDCs to humans via plants.

Analytic Capabilities in the Center

One of CEA EH current objectives is to enhance its analytical capabilities by developing methods for measuring xenobiotics in plant matrices (fruits, leaves and roots). To this end, we have developed extraction protocols for pharmaceutical compounds using the new accelerated solvent extractor (ASE 350) that has been installed at the Rehovot Campus' Intradepartmental Unit and that is available for the Center's members.



Together with Dr. Orit Gal, head of the Intradepartmental Unit and Dr. Julius 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 are be involved in method development.



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Project Updates



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 on different plants having edible roots, leaves or fruits using different soils and wastewater qualities. Experiments are being conducted in a controlled greenhouse and in a lysimeter station. Tomer Malchi, a M.Sc. student and Myah Goldstein, a PhD student have joined CEAEH and are working in this project as part of their theses.

Project #2: Bioaccumulation of EDCs by dairy cows via consumption of crops irrigated with reclaimed wastewater

PI, Zvi Roth

Low-quality reclaimed wastewater is used in irrigating crops used for feeding dairy cattle. The possibility of EDC's accumulating in tissues and products that are then consumed by humans, means that beef and dairy products may be a source of exposure to EDC's in humans. In this project our objective is 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 to clarify the risk associated with EDCs exposure on both livestock and humans. Dorit Kalo is the PhD student conducting the experiments.



Project #3: Carbamazepine levels among healthy Israeli population

PIs, Ora Paltiel and Yehoshua Maor

The main goal of this project is to evaluate people's exposure to carbamazepine via the consumption of vegetables irrigated with reclaimed wastewater. To accomplish this goal we will recruit volunteers who will, over a 10 day period, consumed standardized daily portions of vegetables provided by farmers who grow crops irrigated with reclaimed wastewater. We are currently conducting experiments with dairy cows from project #2. This will enable us to determine the limits of detection and quantitation of carbamazepine in different biological matrices (e.g., plasma and urine). The results will inform the measurement among human volunteers. Yehoshua Maor is a postdoctoral fellow coordinating CEAEH and also a co-PI in this project.



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

This project evaluates 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 and their offspring who will be followed from first trimester through delivery. 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 CEAEH as a PhD. student in this project. Data collection has just begun.



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 metabolite levels in the collaborating lab and blood samples will be tested for hormone levels at Hadassah. We are currently in the process of signing a contract and preparing the samples for shipment to Germany. We have recently published a paper on Trends in Reproductive Health in Israel which serves to strengthen and focus the need for the current project.





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Website

CEAEH new website will be one of our main platforms for disseminating information to the general public and research communities. The site is currently in its final stages of development and will be online during the Center's 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 symposium - 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 symposium planned for 17 October 2012 will include two keynote lectures summarizing the current knowledge in agricultural and environmental issues related to long-term irrigation with treated wastewater. In addition, eight presentations will be given by Israeli researchers and students highlighting their current research on this 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 Center's outreach activities.

Coming up

CEAEH is planning to host the 1st SAC (Scientific Advisory) meeting on May 20-26, 2013. The meeting will be held in Rehovot and Hadassah Campuses of the Hebrew University. Open conference is planned in the School of Public Health in Jerusalem on May 23, 2013.

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 the Harvard Medical School.

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



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, environmental economics, 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 Fellow 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 CEAEH 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 in the department of Soil and Water Sciences. He is currently working in project #1 focusing on 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 CEAEH 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 from The Hebrew University. She has been working at Hadassah Mount Scopus as Biostatistician in fertility research and geriatric longitudinal study since 2003.

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

Planned data collection includes 1-2 maternal urine samples taken at different stages during pregnancy, an exposure and background questionnaire, amniotic fluid sample, newborn urine samples and evaluation of neonatal reflexes and features of the genitourinary tract. Data collection is being 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 project #2 of CEAEH. Dorit's main specialization is in in-vitro embryo production and her research is focuses on the effect of phthalates on oocytes'

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