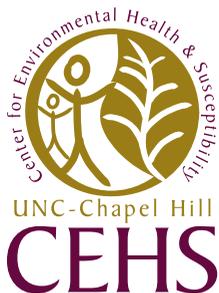


SENTINEL

The Center for Environmental Health and Susceptibility
at the University of North Carolina, Chapel Hill Spring 2004, Issue #3



UNC CEHS celebrates past, looks to future

DIRECTOR JAMES SWENBERG LOOKS BACK
AT THE CENTER'S FIRST THREE YEARS, AND
FORWARD TO EXCITING THINGS TO COME

THE CENTER FOR ENVIRONMENTAL HEALTH AND SUSCEPTIBILITY at the UNC-Chapel Hill School of Public Health is one of 22 centers funded by the National Institute of Environmental Health Sciences to:

- improve our understanding of the environmental and genetic determinants of disease in different populations;
- enhance interdisciplinary research in order to further our knowledge about how toxic chemicals affect humans, and;
- disseminate existing knowledge to help reduce the burden of environmentally related disease.

FOR MORE INFORMATION on the research taking place at the UNC-Chapel Hill CEHS, VISIT OUR WEBSITE at www.sph.unc.edu/cehs/

IT HAS BEEN A PRODUCTIVE three years since UNC-Chapel Hill was awarded funding from the National Institute of Environmental Health Sciences to start the Center for Environmental Health and Susceptibility (CEHS). In short order, our Center has become a magnet for investigators from across the Carolina campus. Our programs have promoted interaction and collaboration among researchers, expanded the vision of experts in diverse fields of environmental health, encouraged junior faculty to focus on environmental health, and enhanced the capabilities of an outstanding cadre of scientists to excel beyond the norm.

In these three years, CEHS investigators have secured more than \$40 million in research

grants from the National Institutes of Health and other sources, and published more than 300 original articles in peer-reviewed journals. These funded projects and publications cover a broad spectrum of research questions that address many of the important issues in environmental health today, from the basic biology of environmental diseases to population studies which have identified factors related to disease and development. CEHS scientists also have a strong presence in emerging areas of biomedical research such as genomics and proteomics.

To our original research cores in Genetic Susceptibility, Developmental Susceptibility, and Toxicokinetic Susceptibility, we recently added two ►►

CEHS scientists also have a strong presence in emerging areas of biomedical research such as genomics and proteomics.

additional research cores to focus on important new areas of discovery. The **Transomics Research Core** incorporates the excitement and superb institutional commitment in genomics, proteomics and metabolomics that have been brought to researchers at UNC-Chapel Hill. This core will encourage and expand collaborations by applying these contemporary technologies to environmental health and susceptibility issues.

The **Obesity Research Core** addresses one of the most urgent public health problems in the Country, addressing and enhancing collaborative research in obesity-environment interactions. The core will investigate issues such as environmental aspects of obesity-related diabetes and the effects of obesity and rapid weight loss on environmental toxins.

The CEHS Facility Cores will continue to provide a wide range of support to Center members that enhances scientific initiatives by providing expertise and specialized services at reduced cost.

One of the Center's most important activities has been our Pilot Project Program (PPP), which provides seed money to junior and senior faculty to enhance their ability to obtain outside funding in innovative, multidisciplinary areas of environmental health research. Center members have been successful in leveraging these awards to secure outside grant support and publish their results in peer-reviewed journals. Already, PPP grant recipients

have generated external funding *22 times greater* than the initial seed grants they received.

Additionally, our researchers have been awarded grants for projects as varied as studying the causes, consequences and risk factors for developing uterine fibroids and their impact on spontaneous abortion or preterm birth; examining genetic determinants of human and rodent responses to

and then sharing this information with people who need it. Through a variety of outreach activities — including this newsletter, teacher professional development and community workshops — the COEP staff has communicated cutting-edge science to lay audiences, strengthened ties with community partners and facilitated the involvement of Center scientists.



Jorge Izquierdo, Center Scientific Coordinator, left, and Dr. James Swenberg, Center Director, right, in front of the School of Public Health.

environmental toxicants; and developing a new biological approach to cancer susceptibility by describing genetic and environmental factors using transomic tools. In addition, CEHS members have also been actively involved in training and mentoring graduate students, postdoctoral fellows and junior faculty who will be the next leaders in the field of environmental health research.

Our Community Outreach and Education Program (COEP) has done an effective job translating basic science information into more understandable terms,

As we look to the future, we anticipate that the levels of collaboration at the CEHS will grow at an even faster rate. We are committed to continuing to build programs that are already in place, and to adding new ones that strengthen our ability to shed light on environmental health and susceptibility issues. UNC-Chapel Hill has invested heavily in new technology and faculty, and these investments have been integrated into the CEHS, providing new opportunities to further enhance our research capabilities. ■

Behind the Scenes: A Glimpse into the Lab of Toxicogeneticist Bill Kaufmann

How do variations in people's genes affect the way they react to environmental factors such as chemicals and radiation and lifestyle factors such as diet and smoking?

THAT'S THE QUESTION

scientists in the CEHS Genetic Susceptibility Research Core are trying to answer. Dr. William Kaufmann, UNC professor of pathology and laboratory medicine, is the Core's director. He leads a group of pathologists, biochemists, geneticists and epidemiologists working together to support and expand collaborative research on genetic susceptibility

graduate school at UNC-Chapel Hill and has been on the faculty since 1982.

His current area of research focuses on cell cycle checkpoint functions and DNA repair and he explains what he does this way: "healthy genes, under conditions of stress — like exposure to toxins in the environment — will slow the division of cells, providing time to repair any DNA damage that has occurred, and protecting us against the formation of cancer. But there are variations, or mutations, in genes that we either inherit or that we acquire in life. These variations reduce the genes' ability to slow division or



of all of the genes in humans. We're no longer looking at just one gene, or ten genes, or even a hundred or a thousand genes — we are studying 16,000 genes at a time to find the global patterns of cellular response to environmental toxins. Our goal is to determine the 'signatures' for different environmental stresses, so that, based on the pattern of the signature, we can tell exactly what kind of environmental damage a cell has been exposed to."

With this knowledge, when a mysterious case of toxic exposure arises, investigators will be able to look at the pattern and pinpoint what carcinogen is involved. Kaufmann and his team are looking at toxins that include radiation from nuclear reactor disasters and uranium mines, as well as other environmental carcinogens that cause damage to DNA.

On another project, Kaufmann is trying to define

continued on page 6 ▶▶

Our goal is to determine the 'signatures' for different environmental stresses ... so that we can tell exactly what kind of environmental damage a cell has been exposed to.

to environmental toxins — and ultimately, to explain who gets diseases, and why.

Kaufmann's own specialty is human carcinogenesis — the steps and stages in the development of cancer. It's a field he entered right out of college, when he worked as a research technician at the National Cancer Institute. Kaufmann came to

repair damage, thus increasing our risk for developing cancer. We're trying to identify what is happening that is causing those variations when cells are exposed to certain environmental toxins."

Kaufmann also directs the UNC Program in Toxicogenomics. "Genomics is a new area of science now that we know the structure and nucleotide sequence

UNC CEHS part of national health education project

EDUCATIONAL MATERIALS TO BE CREATED FOR LEAD POISONING PREVENTION, ASTHMA AND ALLERGY AWARENESS, AND CANCER



UNC-CHAPEL HILL IS ONE OF eight universities working on the Health Observances and Public Education (HOPE) Partnership funded by the National Center for Research Resources to develop educational materials for Asthma and Allergy Awareness Month, Cancer Control Month, and Lead Poisoning Prevention Week.

Over the next five years, the consortium of Community Outreach and Education Programs (COEPs) at eight NIEHS Environmental Health Centers will create materials to educate the public about these three major health issues. National and community organizations and government health agencies are also taking part in this ambitious project.

The COEPs will conduct focus groups with middle and high school students and teachers and the general public to determine what they already know about biomedical and health sciences research, and what more they want to know. Materials will be developed based on this feedback. The

COEPs will pilot test the materials with the target audiences and then refine them so they can be used during the designated awareness events.

The CEHS COEP at UNC-Chapel Hill is partnering with Vanderbilt University's COEP to develop lead poisoning prevention materials. Community partners, including the National Safety Council in Washington DC and various state Childhood



Chad Hallyburton, Youth Programs Manager of the NC Museum of Life and Science and community partner for the HOPE Partnership, with Youth Partners

Lead Poisoning Prevention Programs, are helping to determine topics and concerns to address, and will help implement the new programs when they're completed.

"Lead poisoning is a significant — and preventable — environmental health risk for

children," said Kathleen Gray, principal investigator for UNC-Chapel Hill's HOPE grant. "UNC was chosen as a leader on this project because our Environmental Resource Program has been involved in childhood lead poisoning prevention in North Carolina for many years, and Dr. Frances Lynn, COEP director, is known

for her expertise in this area."

"This is an exciting opportunity for UNC-Chapel Hill to participate in a national conversation and educa-



tional activity," said COEP research associate, Megan Hazelman who is also working on the project. She added "all of the COEPs have independently developed wonderful resources, and this is a chance to learn about each other's work and to make a great impact nationally." ■

UNC undergrad gets real-world research experience and assists community group

AS PART OF THE FOUNDING CEHS grant, the COEP offers internships for Carolina undergraduates to work with community groups. This year, Natenna Dobson, who will graduate this May with a degree in Environmental Studies, has been working as an intern with the North Carolina Conservation Network (NC ConNet) to gather the latest information on chemicals called “endocrine disruptors” and to learn if, and how, this information is being used in environmental decision making in North Carolina. She is being mentored by CEHS Director, James Swenberg, and COEP Associate Director, Kathleen Gray.

Endocrine disruptors are chemicals that affect hormone

regulation in the body, potentially affecting reproduction, puberty and other hormone-related functions. Studies have shown adverse impacts from these chemicals on the reproductive systems of animals; however, most of these are at much higher doses than humans are exposed

to. Since studies haven’t been done on humans, the impact on people is still unclear. After gathering the latest science on these chemicals, Natenna interviewed North Carolina policymakers to find out what

they know about endocrine disruptors, and how they are using this information in their work. “From my research, I’ve learned that the chemicals we add to the environment have both positive and negative effects. They may have benefits like preserving food or getting

“From my research, I’ve learned that the chemicals we add to the environment have both positive and negative effects.”

rid of insects, but at the same time, they may be responsible for issues like early onset of puberty, obesity and reproductive problems. Ultimately, society will have to decide whether we continue to enjoy the benefits of certain chemicals, or whether the risks of having unhealthy children, unhealthy reproductive systems or unhealthy development are too great.”

Natenna, who plans to work at an environmental non-profit before going to graduate school, can see herself continuing the research she’s begun. “At first, the internship was an opportunity to do environmental research, gain skills and apply my education to real-life experience. But now I plan to do further research on endocrine disorders, because I think this topic needs further evaluation.” ■



UNC-Chapel Hill senior and COEP intern Natenna Dobson discusses endocrine disruptors with Christine Miller of the NC Dept. of Environment and Natural Resources.

**Behind the Scenes: A Glimpse
into the Lab of
Toxicogeneticist Bill Kaufmann**
from page 4

the cellular changes that occur at different stages of the development of cancer. Cancer develops from precursor lesions, which are often the result of exposure to a carcinogen in the environment. Kaufmann's team is trying to understand the biology of these precursor lesions, which are not yet cancer but are no longer normal, and explain why they progress into cancer. He is also coordinating an interdisciplinary project to investigate the stages in the development of malignant melanoma. His work is supported by the National Cancer Institute and the National Institute of Environmental Health Sciences.

As a researcher, Kaufmann finds many benefits to being involved with the CEHS. "The Center provides seed funds for early-stage projects, which can increase your chances of getting major funding down the road. It also provides opportunities for interaction with people across disciplines that you might not otherwise run into, and through those interactions, new collaborations can arise."

Kaufmann's research is at the beginning of a pipeline of discovery that could someday lead to new ways to treat or prevent cancer. "Until you understand the natural history of the disease, where it comes from, and the steps in its development, you really can't devise effective intervention strategies." ■

SENTINEL

This newsletter is published annually by the Center for Environmental Health and Susceptibility at the University of North Carolina at Chapel Hill, with funding from the National Institute of Environmental Health Sciences (P30ESI0125).

James A. Swenberg
Center Director
919-966-6139
james_swenberg@unc.edu

Frances Lynn
COEP Director
919-966-3335
fran_lynn@unc.edu

SENTINEL

Laura Ertel, Writer
Regina McCoy-Hopper,
Design and Layout, CHAI Core,
funded by the Clinical Nutrition
Research Center and the
Nutrient Assessment Facility Core

CENTER FOR ENVIRONMENTAL
HEALTH AND SUSCEPTIBILITY
The University of North Carolina
at Chapel Hill
CB#7432
Chapel Hill, NC 27599-7432

Address Service Requested

Printed on recycled paper

Non-Profit Organization
U.S. Postage

PAID

Permit No. 177
Chapel Hill, NC