

# Center for Research on Occupational and Environmental Toxicology

## NEWSLETTER

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*The Chestnut Trees at Osny — by Camille Pissarro*

## CROET Awarded \$11M Superfund Basic Research Grant

Here in Oregon, we marvel at our spectacular scenery and picturesque waterways. But there are a few places in Oregon where we have been very hard on our wonderful environment. According to the Environmental Protection Agency, a short stretch of the Willamette River near downtown Portland is one of 12 places in Oregon that are hazardous enough to warrant the ignominious "Superfund" designation, which sends federal dollars for cleanup. We are sharing those dollars with about 1200 other Superfund sites in the U.S., outside of Oregon.

But Superfund does much more. It also supports research on mechanisms, health effects, and engineering cleanup methods for environmental and, by extension, occupational chemicals. And a consortium of scientists brought together by CROET has just landed one of 17 Superfund Basic Research Program grants given out every five years in a rigorous scientific competition. This five-year, \$11 million grant was awarded by the National Institute of Environmental Health Sciences (NIEHS) to the interdisciplinary team of investigators from CROET (lead institution), Oregon State University (OSU), and Battelle Pacific Northwest Division.

The research team will study a wide range of problems centered on the common theme of chemicals found at Superfund sites that can affect the developing and adult nervous system. This grant aims to reduce the risk of exposure to hazardous chemicals for workers and citizens of Oregon and beyond, in several ways. For example, the research will find new ways to detect chemical exposures in people, methods to speed breakdown of chemicals in groundwater, and new measures of brain development that will provide unique and sensitive measures of the effect of even very small chemical exposures on the brain.

The primary Superfund chemical of interest to our program is trichloroethylene, a commonly used degreaser and organic solvent that is present as a contaminant at many Superfund sites. Investigators will also study a group of related chlorinated solvents

(continued on page 2)

## Superfund (continued from page 1)

as well as several aromatic hydrocarbon compounds with significant neurotoxic potential. A description of the individual studies follows:

- exploit the unique property of a class of chemicals (aromatic hydrocarbons) to produce colored compounds following exposure as a "biomarker" to assess whether a person has been exposed to the chemicals (Spencer and Sabri of CROET).
- DNA studies to determine how common industrial chemicals including trichloroethylene and vinyl chloride affect the nervous system and its underlying genetic substrate (Kisby, Turker of CROET).
- impact of trichloroethylene on the developing brain and chemical-induced changes in brain plasticity or growth patterns (Wallace, Withers of CROET).
- field-based studies of the microbial transformation of trichloroethylene to identify optimal conditions for removing this chemical from groundwater at contaminated Superfund sites (Field of OSU).
- mass spectrometry studies to identify how halogenated solvents found at Superfund sites interact with biological molecules to damage the nervous system (Deinzer of OSU).
- studies of how certain classes of airborne chemicals found at Superfund sites (volatile halogenated and non-halogenated) travel through the body and what becomes of them (Thrall of Battelle Pacific Northwest Division).
- computer modeling to investigate how Superfund chemicals bind with specific molecules within the human body, resulting in specific toxic effects in the nervous system (Dixon of Battelle).

## Highlighting One Superfund Project

Humans have an extended period of development during which the brain must store an enormous amount of information. Thus, if the brain's capacity to modify its connections is damaged—even slightly—by exposure to toxic chemicals, an individual's cognitive abilities might be impaired for a lifetime. Because an estimated 3-4 million children live within 1 mile of a federally designated Superfund site, it is critical to determine if their water is indeed safe to drink. CROET neurobiologists Christopher Wallace and Ginger Withers will develop an innovative animal model for detecting subtle impairments of the brain's capacity to grow. When normal rats are housed in a stimulating physical environment, certain nerve cells in their brains grow so robustly that the increased growth can be measured with ease and precision. It is thought that these changes reflect incorporation of learned information into modified neural circuitry. Because the biology of the rat and the human brain is similar, this straightforward experimental approach could reveal links between low-dose exposure to toxicants and subtle neurological damage related to learning disabilities that would otherwise be extremely difficult to detect using conventional methods.

## C A L E N D A R

*Send calendar notices to [altshul@ohsu.edu](mailto:altshul@ohsu.edu) or  
FAX to (503) 494-4278*

**National Safety Council  
Orlando, Florida  
October 14-18, 2000**

Email: [customerservice@nsc.org](mailto:customerservice@nsc.org)  
<http://www.nsc.org>

**National Occupational Injury Research Symposium (NOIRS) 2000  
Sheraton Station Square Hotel, Pittsburgh, PA  
October 17-19, 2000**

<http://www.cdc.gov/niosh/noirs2000.html>

**Health and Safety in Western Agriculture: A Practical Approach  
Sacramento, California  
November 5-7, 2000**

Email: [djdold@ucdavis.edu](mailto:djdold@ucdavis.edu)  
[http://agcenter.ucdavis.edu/agcenter/Announce/  
Conf2000/WesternAgriculture.htm](http://agcenter.ucdavis.edu/agcenter/Announce/Conf2000/WesternAgriculture.htm)

**American Public Health Association  
Boston, Massachusetts  
November 12-16, 2000**

<http://www.apha.org/meetings/>

## O U T R E A C H

*CROET is providing exhibits at the following conferences:*

**Central Oregon Occupational Safety & Health Conference  
Bend, OR  
September 6 - 8, 2000**

[http://www.cbs.state.or.us/external/osh/educate/  
conferences/confer.htm](http://www.cbs.state.or.us/external/osh/educate/conferences/confer.htm)

**10th Annual Southern Oregon Occupational Safety & Health Conference  
Medford, OR  
October 11 - 13, 2000**

[http://www.cbs.state.or.us/external/osh/educate/  
conferences/confer.htm](http://www.cbs.state.or.us/external/osh/educate/conferences/confer.htm)

**10th Annual Oregon Pulp & Paper Worker Safety & Health Conference  
Jantzen Beach Doubletree, Portland, OR  
December 5 - 8, 2000**

[http://www.cbs.state.or.us/external/osh/educate/  
conferences/confer.htm](http://www.cbs.state.or.us/external/osh/educate/conferences/confer.htm)

**2001 Oregon Governor's Occupational Safety & Health Conference  
Oregon Convention Center, Portland, OR  
March 5 - 8, 2001**

[http://www.cbs.state.or.us/external/osh/educate/  
conferences/confer.htm](http://www.cbs.state.or.us/external/osh/educate/conferences/confer.htm)



# C R O E T W E B   U P D A T E

CROET's website has undergone a dramatic redesign, bringing more links to the top of the page to make navigation faster and easier.

A picture of the top two-thirds of the new home page design is shown below. A major focus of CROET's outreach has been the industry-specific resource pages, which contain links to occupational safety and health topics relevant to major industry sectors found in Oregon. Also featured are pages with links to information about Oregon's major occupational injuries and disorders, an area we

continue to build. The many links are checked and updated regularly, to maintain a high level of quality.

Recent news about the Center, upcoming seminars and occupational news items are found towards the bottom of the page, as are directions to the Center and general information about the Center and staff (not visible). We invite you to review the website at <http://www.croetweb.com> and comment on changes you would like to see.

OREGON HEALTH SCIENCES UNIVERSITY   OHSU HOME   SITE MAP   SEARCH   INTRANET

OHSU   ABOUT OHSU   HEALTH CARE SERVICES   ACADEMIC & STUDENTS  
RESEARCH PROGRAMS   REGIONAL OUTREACH   LIBRARY & INFO SERVICES

**croetWEB**   safety

croetHOME   outREACH   reSEARCH   faculty   croetNEWS   surveillance   croetTIC   siteMAP   siteSEARCH

**croetWEB**   **safety&healthINFORMATION**

Today's Date:   Thursday, August 17th, 2000

**Putting science to work for working Oregonians:**

We're scientists, educators, and information specialists--more than 65 people working at Oregon Health Sciences University in Portland, Oregon USA on occupational safety and health. We conduct applied research in the workplace and basic research at the cellular and molecular level. We work cooperatively with labor, industry, government, and the community.

→ [Contact CROET](#)  
→ [Center Highlights](#)  
→ [Toxicology Information Center](#)  
→ [Chemical Risk Information Service](#)

**Safety & Health info:**

- [Agriculture](#)
- [Artist \*\*NEW!\*\* \(3/10/00\)](#)
- [Construction](#)
- [Electroplating](#)
- [First Responders](#)
- [Health Professionals](#)
- [Janitors, Custodians](#)
- [Manufacturing](#)
- [Metalworking](#)
- [Painting, Coating](#)
- [Pulp & Paper; Wood Products](#)
- [Restaurant and Kitchen Safety](#)
- [Retail and Office Work](#)
- [Semiconductors](#)
- [Transportation](#)

**Topics:**

- [Biochemistry](#)
- [Environmental health](#)
- [Exposures \*\*NEW!\*\* \(7/17/00\)](#)
- [Epidemiology](#)
- [Occupational S&H](#)
- [Toxicology](#)
- [Pesticides](#)

**Key Occupational Injuries:**

- [Back injuries and Prevention](#)
- [Eye injuries and Prevention](#)
- [Repetitive Strain Injuries \(Carpal Tunnel\) \*\*NEW!\*\* \(2/15/00\)](#)
- [Hearing Injuries and Prevention \*\*NEW!\*\* \(3/10/00\)](#)

Want to know about chemicals? **Search MEDLINE** using this form.  
For example try: "**arsenic and toxicity**" :

PubMed   for

# GRANTS

Grants received by CROET faculty and staff since our last newsletter. The amounts listed are received over the duration of the grants, which ranges from 1 to 5 years. Most grants also provide “indirect” costs to OHSU that support the research.

Faculty	Funding Agency	Title	Direct Costs
Allen, C	Ono Pharmaceutical Co.	Calcium dynamics in neurons	150,000
Allen, R	NIH/NIDA	Regulation of Prepro-orphanin FQ (OFQ)-derived peptides	173,353
Anger, WK	Battelle	An investigation of potential behavioral effects associated with occupational exposure to styrene	39,550
Anger, WK	National Opinion Research Council	An evaluation of neurobehavioral health effects from chronic exposure to hydrogen sulfide; Dakota City and South Sioux City, Nebraska	121,695
Anger, WK	USAMRMC	Assessment of acute exposures in Air Force fuelers: Neurobehavioral measures	99,915
Banker, G	NSF via Cornell	Neurobiological applications of nanobiotechnology	669,287
Gold, B	Fujisawa	Testing of FK506-like compounds for nerve regeneration	10,000
Gold, B	Integra	Testing of compounds (FK506) for nerve regeneration	30,000
McCauley, C	NIH/NIOSH	Partnerships in surveillance & prevention	830,850
Patton, B	Muscular Dystrophy Assoc.	Laminins in congenital muscular dystrophy	187,288
Rohlman, D	Oregon Cancer Center	Assessment of neurobehavioral and psychological effects of chemotherapy	25,000
Rothlein, J	Oregon Dept. of Agriculture	Oregon Pesticide Reporting System: Analytical Review and Pilot	155,692
Shyng, SL	March of Dimes	Defects in K-ATP channel function as a molecular basis for insulin	164,325
Shyng, SL	MRF	Regulation of insulin secretion by DATP channels and membrane lipids	25,000
Spencer, P	Durham VA	An epidemiological investigation of the occurrence of ALS among veterans of the Gulf War (CSP #500)	161,403
Spencer, P	NIH/NIEHS	Neurotoxic Superfund chemicals and biomarkers	10,990,803
Spencer, P	Portland VA Medical Center	Portland Environmental Hazards Research Center C (supplement)	134,108
Storzbach, D	Thuris	Correlation of neurobehavioral performance and event-related potentials in diverse populations	13,125

# KUDOS

The grant funding listed above endorses the quality of CROET applications, most of which are peer-reviewed by independent scientific panels. However, it is difficult to evaluate the importance of the research by CROET scientists because their work is so complex. Occasionally, the scientific community offers judgments. We present below the first and last paragraphs of one such comment, published in the prestigious journal *Neuron*, which describes the relevance of the work from the Banker laboratory:

“A cell’s ability to distinguish anterior versus posterior, left versus right, and apical versus basolateral determines many aspects of its function, and lies at the heart of the development of an entire organism. One of the most interesting and poorly understood examples of cellular polarity is provided by the neuron, in which the dendritic and axonal compartments each require a different set of proteins to carry out their distinct functions. A significant advance in our understanding of this problem is reported in this issue of *Neuron* by Burack, Silverman, and Banker, who provide striking evidence for the directed microtubule-based transport of a particular class of cargo containing vesicles only into dendrites (Burack et al., 2000).

“...In any case, the work of Burack and colleagues paves the way for further study of the role of the motor proteins themselves in neuronal protein sorting and the elucidation of specific protein trafficking mechanisms for other proteins. With this dynamic, manipulable system in hand, the role of primary sequence determinants, MT motor identities, and specific posttransport mechanisms of sorting can now be attacked.”

(*Neuron*, Vol. 26, 281-282, May 2000. “Does Motor Protein Intelligence Contribute to Neuronal Polarity?”)



# Center for Research on Occupational and Environmental Toxicology

CROET, the Center for Research on Occupational and Environmental Toxicology at Oregon Health Sciences University, conducts research, provides consultations, and offers information on hazardous chemicals and their health effects. CROET includes more than 80 scientists and research staff exploring a range of questions relating to health and the prevention of injury and disease in the workforce of Oregon and beyond. CROET's Toxicology Information Center is open to the public and is staffed to answer Oregonians' questions about chemical and other occupational exposures. CROET's website also provides answers to questions about industry found in Oregon through links on a series of pages devoted to industry-specific topics.

## How to Contact Us

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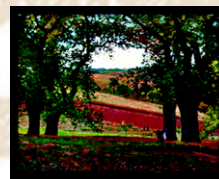
### VISITING SCIENTISTS

Masayuki Ikeda, PhD

Takayuki Yamji, PhD

Camille Pissarro's bucolic scene ("The Chestnut Trees at Osny") reminds us of the pre-industrial landscape, a scene Superfund scientists remember as they work to reverse the excesses of industrialization.

Source: University of North Carolina's mirror site for Web Museum, Paris



Cell phone by Sandra Grossmann



## CELL PHONE SAFETY: The Debate Goes On

You may find them annoying. You may find them convenient. You may find them essential. But, along with the estimated 200 million users of cell phones worldwide, you may soon want to find a way to protect yourself from them or from people using them.

Over the past three years, the debate on the safety of cell phones has heated up. We are all worried about the increased likelihood of accidents because the driver is paying more attention to the cell phone conversation than their driving. But there are other concerns, as well. The physiological effects of the radiofrequency (RF) radiation from cell phone transmission are creating concerns. When you hold a cell phone up to your ear, it heats up your head, just a little.

Over the past dozen years there have been several investigations of the health effects of RF radiation generated by power lines, radio antennas, and even home appliances. The conclusion of most research on these radiation sources is that they are not strong enough to produce thermal damage to the cells in the human body. But thermal damage may not be the only danger.

### Epidemiological Studies

To date, most of the statistical studies of EMF health effects have dealt with groups like radar operators, radio transmitter operators, and electrical workers. There have been some epidemiological studies of cell phone users, but few have reached the journals.

In a study of 11,000 Swedish cell phone users, Dr. Kjell Hansson Mild reported that headaches, fatigue, and burning sensations in the skin were more common among those who make extensive daily use of their phones.

### Laboratory Studies

In 1998, a German group reported that human subjects exposed to intermittent cell phone radiation experienced a 5 to 10 mmHg increase in blood pressure.

Dr. Henry Lai and his team at the University of Washington exposed lab rats to microwave radiation for periods up to an hour and at frequencies somewhat higher than commercial cell phones emit. They found that the rats experienced short term spatial memory loss.

A study at an Australian hospital showed that mice exposed to pulsed type cell phone radiation were twice as likely as controls to develop tumors.



### Overview

J.D. Moulder and colleagues from the University of Wisconsin have reviewed available evidence for a link between the use of cell phones and cancer (Radiation Research 151:513-531). In finding any connection to be implausible, they state "The existing evidence for a causal relationship between RF radiation from cell phones and cancer is found to be weak to nonexistent."

### Steps to Minimize Exposure

While there is no clear evidence of human health effects from cell phones, cautious users who want to minimize exposure can take three steps:

1. Find a cell phone with a low specific absorption rate (SAR is a measure of the radiation absorbed by body tissue in W/kg). A rating of various commercial phones is available on the web at the site of the National Physical Laboratory in the UK. <http://www.npl.co.uk/npl/cem/cemindex.htm>.
2. Avoid extended conversations over a cell phone. Use a hard wire phone for marathon calls (this could save you some money, too).
3. Use a phone with a separate antenna (more than 3 inches from the user's head) or a remote headphone or ear piece.

### Information About Cell Phones

CROET has created a new page accessible from its homepage on cell phones. Access it at <http://www.croetweb.com>.



Oregon Health Sciences University includes the Schools of Dentistry, Medicine and Nursing; OHSU Hospital; Doernbecher Children's Hospital; dozens of primary care and specialty clinics; three research institutes; and several outreach and public service units. OHSU is an equal opportunity, affirmative action institution.

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Oregon Health Sciences University  
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