University of Missouri

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MU conference will explore barriers to stronger chemical safety laws

CHANGE AGENT Fred vom Saal, Curators Professor of Biological Sciences, will bring a group of experts to MU to discuss barriers to federal regulation of endocrine-disrupting chemicals. Vom Saal, the world's foremost authority on plastics additive Bisphenol A , was awarded a $20,000 Mizzou Advantage for the conference, which will be held in September. Rob Hill photo

MIZZOU ADVANTAGE

Vom Saal: Current system uses ‘1950s’ science

In 1991, a group of scientists gathered at the Wingspread Conference Center in Racine, Wis., to discuss evidence that synthetic chemicals unleashed on the environment had significantly altered the embryonic development of fish and wildlife.

At the end of the three-day workshop, the scientists — experts in developmental and wildlife biology, endocrinology, toxicology, immunology and pharmacology — issued a warning: so-called endocrine disruptors also threatened a “large scale dysfunction” of human embryonic and intellectual development.

One of the 21 signatories to the “Wingspread Consensus Statement” was an unknown developmental biologist at the University of Missouri named Frederick vom Saal. Today, vom Saal is the world’s foremost expert on Bisphenol A, a ubiquitious compound — and a known endocrine disruptor — used to make plastic.

Since vom Saal sounded the first warnings about BPA in 1997, hundreds of studies have linked exposure to the chemical to increased risk of breast and prostate cancer, diabetes, cardiovascular disease, obesity and reproductive disorders. A favorite of environmental reporters, vom Saal has been quoted countless times, appeared on dozens of television broadcasts and testified before legislative bodies across the country. His groundbreaking work led to the decision in seven states to limit or ban the sale of BPA-containing products and to a recent declaration by the government of Canada that BPA is toxic to human health and the environment.

Last month, vom Saal was awarded a $20,000 Mizzou Advantage grant to mark the 20th anniversary of the Wingspread consensus by bringing together another group of experts, this time on the MU campus. The conference, scheduled for September 2011, will explore the question of why, despite overwhelming scientific evidence that many synthetic chemicals are hazardous to human health, government regulators have been slow to respond.

Recently, *Mizzou Weekly* talked with vom Saal about the conference and the need for reform of the chemical regulatory system in the United States.

Mizzou Weekly: What's the connection between the Wingspread workshop in 1991 and the MU conference?

Frederick vom Saal: The premise at the original meeting was this new concept of chemicals that act like hormones, like estrogen. If you had told that group in 1991 that 20 years later there would be thousands of publications and legislation being introduced all over the world about this, and that the regulatory system was completely unresponsive, nobody would have believed it.

The meeting at Mizzou will bring in a group of people focused on the laws governing the decision-making process at the Food and Drug Administration and the Environmental Protection Agency and other agencies. What we're trying to do is create an agenda that will look out over the next decade and say, 'What are the steps that need to be taken to arrive at a point where the regulatory system is actually using the science.' At the same time, we need to be working on how to dismantle the current system, otherwise no matter how much information comes out, there's still going to be this war.

MW: What's wrong with the current system?

FVS: We have a set of testing procedures that reflect the state of the science in 1950. They were approved decades ago. The agencies rely on commercial labs that are incapable of doing 21st century science — they don't have the appropriate personnel to do it.

To give an example, the EPA has spent $100 million since 1996 on commercial labs trying to develop new assays. In April, one of the major labs was asked to run a type of assay that is run in thousands of labs around the world, a procedure called radioimmunoassay. The head of the lab said, 'We tried to run this and the performance standard is 4 percent variation from one assay to another and we got 25 and 35 percent variability.' In other words, complete garbage.

The perversion is that the government and these labs say that any experiment they do is, by definition, valid, even though they are producing data that is completely different than anything anyone else has seen. One hundred percent of those studies don't find any effects of Bisphenol A, at any dose, and yet they are declared valid.

MW: You've criticized regulators for being beholden to the chemical industry. Do you have an example of that influence?

FVS: In 2008, the FDA released a document in which it declared BPA completely safe. The agency's own science review board stomped on them — said the report was appalling, unscientific, completely unacceptable and needs to be thrown out.

Reporters found correspondence from the FDA asking the American Chemistry Council to provide sections that can be put in the report that assures the public that BPA is safe. A new administration came in, and in January 2010 the FDA announced it was concerned about the chemical — the first time a regulatory agency actually reversed it's position; the FDA is not known for doing that — but that they also said they had no authority to regulate BPA.

MW: Why not?

FVS: This is why we need reform. When the Toxic Substances Control Act was passed [in 1976], it grandfathered in more than 60,000 chemicals, one of them being BPA. Those 60,000 are not regulated. They are generally regarded as safe under the law.

MW: What does that mean?

FVS: What risk do you want when your baby drinks out of a baby bottle? That risk should be zero — there should be no risk.

But chemicals are approved as safe in the U.S. in the absence of information. There is no safety testing. After a product is on the market and everybody is exposed to it and you find out it's associated with harm, you have to essentially prove it's killing people before anything is done.

MW: I think many people would be surprised to hear that.

FVS: It's not by accident. People very cleverly set up a system that wouldn't work. If you're in one of those businesses making millions of dollars, you don't want a strong regulatory system.

Virtually every single former commissioner of the FDA has said our food safety system is broken beyond repair; that it's scattered across so many different agencies that don't communicate with each other, there is no coordination or rationale for the separation of authority.

MW: Given the problems, how do explain the response to the research on BPA?

FVS: BPA has become the bellweather showing the severe cracks in the system. That's the purpose of this meeting in September.

We know of 1,000 chemicals with endocrine-disrupting activity. The National Institutes of Health have $30 million invested in BPA research. The regulatory system will have to accept this data. Once they do, the flood gates will open, because they will have to admit they got it wrong.

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Yoga: Ancient discipline offers relief from modern-day stresses

WELLNESS

Practice improves health of mind and body

For some, the idea of yoga might conjure images of young and unusually flexible people folding themselves into human origami.

But yoga has more to do with breathing — something everyone can do — than extreme postures, says Lynn Rossy, health psychologist for Healthy for Life, the University of Missouri System's employee wellness program.

"If you're alive, you can do yoga, even if it's just sitting or standing and breathing deeply," says Rossy, who teaches yoga as part of Healthy for Life programs on stress reduction and mindful eating.

While yoga emerged thousands of years ago from South Asian religious practices, in 21st-century America yoga is an increasingly popular way to improve mental and physical health. Yoga techniques have found their way into physical therapy and the training routines of some NBA and NFL athletes. Even in a time when many businesses are struggling, new yoga studios are appearing across the country.

Research suggests that yoga can help people with arthritis, high blood pressure, depression, asthma and other conditions. But people who practice yoga say the main reason people do it is it makes them feel good.

"It took me 50 years to discover an exercise I like," says Diane Oerly, who began yoga several years ago through Rossy's Mindfulness-Based Stress Reduction class. "If I miss doing yoga for awhile, my body kind of talks to me. My foot will hurt or something and I get motivated to keep up with my yoga."

Oerly, who works for MU as a grant writer in information technology, said she was impressed by the scientific research supporting the benefits of yoga in maintaining or improving mental and physical health.

"My body doesn't hurt like it used to," she says. "A lot of times, if I had done something strenuous like painting the house, my body would be sore and achy. But if I do yoga, I can get through things like shoveling the driveway or raking leaves. If I stretch out, get my muscles relaxed, my body relaxed, I don't suffer like I did before."

Rossy says there is nothing "mystical or magical" about yoga. It can lower the body's level of cortisol, a hormone released under stress as part of the "fight or flight" response. Over time, the effects of elevated cortisol levels can contribute to a host of health problems throughout the body.

"We run around way too fast, way too busy, and our breathing tends to become more and more shallow," Rossy says. "That's bad for the body and for the brain. When you get more oxygen into the body, it begins to function better."

A yoga session typically starts with the practitioner taking slow, conscious breaths. The movements and postures help loosen tense muscles while gradually building strength and flexibility. While some advanced postures can be challenging and perhaps hazardous for beginners, Rossy teaches a gentler style of yoga.

"It's not about putting your leg behind your head. It's about bringing a slight to moderate sensation of stretch to the muscles of the body. And, ultimately, it's about becoming present, which helps your mind to relax."

Yoga's burgeoning popularity has turned it into a multibillion-dollar industry, bringing in revenue from classes, books, videos, and yoga mats and other accessories. But you can benefit from yoga without spending a lot of money, Rossy says. You don't need special shoes, or any shoes at all; it's customary to practice yoga barefoot.

The Healthy for Life website has downloadable video files, including several emphasizing yoga poses that can be performed sitting in a chair, at **umsystem.edu/wellnessmedia (http://www.umsystem.edu/ums/curators/wellness/video.shtml)**.

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Farmer's 'trash tree' is research team's disease fighter

INTERDISCIPLINARY RESEARCH

Eastern Red Cedar can fight "superbug"

A "trash tree" with little economic value and the ability to destroy farmland could be the key to fighting a deadly bacterium.

A team of scientists at the University of Missouri has found an antibiotic in the Eastern Red Cedar tree that is effective against methicillin-resistant Staphylococcus aureus, or MRSA, a "superbug" that is resistant to most antibiotics.

Researchers in agroforestry, biochemistry and veterinary pathobiology recently shared their research results with colleagues at the International Conference on Gram-Positive Pathogens in Omaha. Their next step is to discover exactly how the compound works, determine if it has any toxic effects and evaluate other potential disease-fighting compounds isolated from the tree.

If they are successful, physicians will have a new tool to fight deadly staph infections and Missouri farmers will have a new market for a tree found around the state.

The Eastern Red Cedar (ERC) is one of the most widely distributed American tree species. There are about 500 million of them in Missouri, and their range extends from Kansas to the east coast. Birds spread ERC seeds widely, and it is invasive on farm, forest and pasture land.

In 2007, Chung-Ho Lin, a research assistant professor in the MU Center for Agroforestry, began studying possible commercial use for ERC. Lin's specialty is finding novel uses for trees, especially how trees and perennial grasses can safely soak up and break down dangerous agrochemicals and munitions waste in soil.

"I was told to find an entrepreneurial use for this 'trash tree' so land owners could put their energy into profiting from them instead of cutting them down," Lin said. "I thought it was a fun challenge."

Lin aimed his initial investigation at building on existing research showing anti-bacterial potential of ERC-derived compounds and rumors of its effectiveness as a traditional herbal remedy for acne. Then he developed a series of purification processes to isolate the bioactive compounds.

When Lin's research began to show results in ERC's anti-microbial characteristics of the compounds he purified, he shared the data with friends in the College of Veterinary Medicine's Department of Pathobiology and MU's Department of Biochemistry. Intrigued, Brian Thompson, department of biochemistry, and George Stewart, professor and department chair of veterinary pathobiology, among others, formed an interdisciplinary team to take Lin's initial findings and identify and isolate the most promising phytochemicals — biologically active organic chemicals — from ERC tissues.

"It was exciting to tackle the research from three widely different disciplines," Thompson said. "We each brought a very different perspective to the research."

Their tests showed that chemical compounds derived from ERC needles and bark were effective as a topical acne treatment. They also found out that the ERC compounds were a strong anti-microbial agent against a wide range of human bacterial pathogens, including tetanus, botulism, strep throat, Listeria and Salmonella germs, cholera and anthrax.

Interestingly, it took a relatively small concentration of one ERC compound – just 5 micrograms per milliliter – to be effective against MSRA, the superbug infection that plagues many hospitals.

MRSA is an evolving bacterium that is resistant to most medications. The infection is usually isolated to the skin, but it can spread to vital organs causing toxic shock syndrome and pneumonia, especially in people with weakened immune systems. The incidence of disease caused by MRSA bacteria is increasing worldwide. In 2005, more than 94,000 people developed life-threatening MRSA infections in the United States, according to a Centers for Disease Control report, and nearly 19,000 people died during hospital stays related to these infections.

So far, the MU team has successfully isolated 17 bioactive compounds from the fruit and leaves of the Eastern Red Cedar trees with a few being more effective than others. Stewart cautions that the MU research is still in too early of a stage to speculate how effective an ERC-derived treatment for MRSA would be.

“We still have to determine how this is working on a molecular level and then assure that it poses no toxicity threats before we consider anything resembling clinical trials,” Stewart said. “We acknowledge how exciting a potentially new topical or oral treatment for MRSA would be, but we are at least a year away from anything product worthy.”

As if a potential treatment for MRSA was not enough, some of the compounds also initially tested positively as a method to inhibit melanin production in certain mouse-derived melanoma cells. In the test tube, the ERC compound inhibited the cancer cell’s ability to divide, leading to them eventually rupture and die.

Stewart said that any clinical testing could be years in the future and would require the small team to expand and recruit experienced clinical trials experts.

While this occurs, Lin and his agroforestry colleagues will continue to look at ways to help Missouri land owners utilize their ERC trees as a new Missouri cash crop — his original challenge.

“I’m hopeful that I am fulfilling my mission to develop a new use for the red cedar tree,” Lin said. “I’m excited about this project. It’s really been fun.”

— *Randy Mertens*

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Presidential search hits the road

Curators for the University of Missouri have begun a series of forums to hear public comment on its search for the next president of the UM System.

The Columbia forum is March 14 at 3:30 p.m. in Reynolds Alumni Center, Columns 208.

Warren Erdman, chairman of the search advisory committee, said curators are “eager to hear Missourians’ thoughts on the qualities and characteristics they would like to see in the next university president.”

Here’s the rest of the schedule:

- St. Louis: Monday, March 7, 11 a.m.-12:30 p.m. at the University of Missouri-St. Louis Millennium Student Center, Century Room
- Kansas City: Tuesday, March 8, 11 a.m.-12:30 p.m. at the University of Missouri-Kansas City
- St. Joseph: Tuesday, March 8, 3-4:30 p.m. at Missouri Western University
- Rolla: Tuesday, March 15, 11 a.m.-12:30 p.m. at Missouri University of Science and Technology
- Springfield: Tuesday, March 15, 4-5:30 p.m. at the Discovery Center Auditorium.

The St. Louis and Rolla forums will be recorded and posted to the UM Presidential Search Web site at umsystem.edu/ums/president/search/ (http://www.umsystem.edu/ums/president/search/) (http://www.umsystem.edu/ums/president/search/)following the event. Live tweeting will be available from these locations by following @UMprezsearch.

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Storm exercise scheduled

The annual statewide severe weather exercise will be held at March 8 at 1:30 p.m.

Facilities managers should notify all occupants of campus buildings of the exercise and implement existing evacuation plans, including the following steps:

- move to interior corridors away from doors and windows, preferably in a basement or lower floors;
- avoid auditoriums, gymnasiums, or other areas having a wide, free-span roof;
- if outdoors, lie flat in the nearest depression such as a ditch or ravine. If there is time, move away from the path of the tornado at a right angle.

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New master plan ready

MU Campus Master Planner Linda Eastley will present the university's 29th master plan March 10 at 1:30 p.m. in Reynolds Alumni Center, Columns D&E.

This year's plan focuses on stewardship of resources and sustainability. The presentation will also include Mizzou's first Climate Action Plan.

Copies of the 2011 Master Plan and Climate Action Plan will be inserted in the March 10 issue of *Mizzou Weekly*.

For more information visit **cf.missouri.edu/masterplan/ (http://www.cf.missouri.edu/masterplan/)**.

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