Study: Human Exposure to BPA 'Grossly Underestimated'

By GAYATHRI VAIDYANATHAN of Greenwire

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Americans are likely to be exposed at higher levels than previously thought to bisphenol A, a compound that mimics hormones important to human development and is found in more than 90 percent of people in the United States, according to new research.

U.S. EPA says it is OK for humans to take in up to 50 micrograms of BPA per kilogram of body weight each day. The new study, published in the journal *Environmental Health Perspectives*, suggests that we are exposed to at least eight times that amount every day.

"Our data raise grave concern that regulatory agencies have grossly underestimated current human exposure levels," states the study.

The study also gives the first experimental support that some BPA is likely cleared at similar rates in mice, monkeys and humans, making it possible to extrapolate health studies in mice to humans.

Despite decades of research, questions about BPA have lingered and recently become politicized. Sen. Dianne Feinstein (D-Calif.) hopes to add an amendment to the "FDA Food Safety Modernization Act," currently under consideration in the Senate, banning the chemical from children's food and drink packaging. Republicans and industry representatives have been averse, saying that research has not shown conclusively that the chemical is harmful.

Hormones are essential during development and can determine, among other things, a child's gender. BPA, since it mimics estrogen, is an "endocrine disrupter," according to Thomas Zoeller, a biology professor at the University of Massachusetts, Amherst. And amazingly, BPA has the ability to bind to not one, but three receptors -- the estrogen, the male hormone and the thyroid hormone receptors, Zoeller said.

Controversy over method
Some scientists question whether the ability of BPA to bind receptors translates to a health effect. Detractors say that most of the chemical does not circulate in blood long enough to have health effects. All scientists agree that BPA resembles estrogen, and indeed, it was first synthesized as a man-made estrogen substitute before being used widely in the linings of canned goods and polycarbonate plastics.

Within the scientific world, the controversy hinges on the seemingly obscure question: Does the liver detox the chemical completely enough to secrete most of it out in urine, or does BPA get into human blood where it can mimic important hormones?

Feeding human volunteers a fixed dose of BPA and sampling their blood to check for the chemical would answer some of these questions, according to Zoeller. But such an experiment throws up ethical issues. The only human study of this nature was conducted in 2002 by the German researcher Wolfgang Völkel at the University of Würzburg.

Völkel found the liver removes more than 99 percent of BPA from the blood, and humans excrete it within six hours. He did find some BPA in the blood of his volunteers but found this level to be insignificant.

It is at this point that science breaks down into controversy. Some researchers say the method Völkel used to measure BPA in the blood was not sensitive enough and that he likely overestimated the ability of the chemical to pass through without causing harm.

The new study, led by Julia Taylor, a biologist at the University of Missouri, uses a more sensitive test for measuring the compound. She fed mice and monkeys a fixed amount of BPA daily. She took blood samples and found that the animals had "biologically active" amounts of the estrogen-like chemical, according to the study.

The study suggests that BPA is not completely removed by the liver and does circulate in the blood and in amounts that are cause for concern, according to Taylor.

"For those of us who work with BPA, no one has actually directly compared mice and monkeys before, and monkeys and humans before," Taylor said. "For those of us who work with it in an academic sense at least, this is confirmation of what we believe."

This study suggests that all the possible ways in which humans are exposed to BPA are not yet known, Taylor said. It also makes it possible to compare studies of BPA in mice and extrapolate it to monkeys and humans since they all clear BPA at similar rates, she said.

"These data should make us reconsider some previously held hypotheses about BPA, such as how quickly it is cleared from the body and the differences in metabolism between species," said Linda Birnbaum, director of the National Institute of Environmental Health Sciences. "The paper emphasizes the need to better understand all the potential sources of human exposure."

Feedback
While some scientists found Taylor's method elegant, others such as industry-associated scientists Julie Goodman and Lorenz Rhomberg, both principals at Gradient, were not convinced. Rhomberg pointed out that Taylor had not measured blood samples in humans herself.

He also said the human blood values that she used come from studies where the samples were contaminated.

Taylor countered that she did not feel it ethically correct to conduct experiments on humans, and Völkel had in fact removed any background noise due to contamination from his results.

Gary Ginsberg, professor at the University of Connecticut and the Yale School of Medicine, said that the study was a good first step that addressed some of the controversy surrounding BPA degradation.

"It is a good exposition of data in primates that shows pharmacokinetics in administered and controlled situations," Ginsberg said. He said that more studies and an even more refined method of measuring BPA in blood would be better.

Zoeller at the University of Massachusetts, Amherst, said that this study provides some evidence that the liver allows some BPA to get into blood and that our exposure to the chemical is greater than previously thought.

"The body evolved to handle stuff that gets into our system -- the liver is designed to detoxify," he said. "There are a range of molecules that are natural, and some are incredible toxins. But when we start to make molecules that are not known to nature, we need to think a little more carefully about how they are going to interact with biological systems."
Study renews calls for BPA regulation

Monday, September 20, 2010

COLUMBIA, Mo., Sept. 20 (UPI) -- Researchers say women, female monkeys and female mice have major similarities in how they metabolize the estrogen-like chemical bisphenol A.

Scientists at the University of Missouri say their studies on mice have led them to renew their call for governmental regulation of the chemical found in many everyday products, a university release said Monday.

"This study provides convincing evidence that BPA is dangerous to our health at current levels of human exposure," Frederick vom Saal, UM professor of biological sciences, said. "The new results clearly demonstrate that rodent data on the health effects of BPA are relevant to predictions regarding the health effects of human exposure to BPA."

More than 8 billion pounds of BPA are manufactured each year and the compound can be found in many consumer products, including hard plastic items such as baby bottles and food-storage containers, the plastic lining of food and beverage cans, thermal paper used for receipts and dental sealants.

"For years, BPA manufacturers have argued that BPA is safe and have denied the validity of more than 200 studies that showed adverse health effects in animals due to exposure to very low doses of BPA," Julia Taylor, lead author and UM associate research professor, said. "We know that BPA leaches out of products that contain it, and that it acts like estrogen in the body."

A number of states including Connecticut, Massachusetts, Washington, New York and Oregon have passed bills to reduce exposure to BPA. Similar legislation is pending in the U.S. Congress.
A University of Missouri researcher has won one of this year's 10 Heinz Awards, which are each worth $100,000, for his research on the link between health problems and common chemicals used in every day consumer products.

Building upon his career in reproductive biology, Frederick vom Saal, a professor of biological sciences, discovered unexpected health problems caused from exposure to common chemicals such as bisphenol A (BPA), a widely used ingredient in plastic, said Teresa Heinz, chairman of the Heinz Family Foundation. Read a Frontline interview with vom Saal here.

His studies have shown that manmade chemicals, including plastics, can mimic hormones at low doses. Research suggests the plastic used in water and baby bottles, eyeglass lenses and the linings of aluminum increases risk for breast and prostate cancer, prostate enlargement and early puberty. Read a profile of vom Saal in the Riverfront Times here.

Vom Saal's research has prompted some regulatory agencies to take action and inspired consumers to demand alternatives to materials that science reveals may be harmful, Heinz said.

The Heinz Awards annually recognize individuals creating and implementing workable solutions to the problems the world faces through invention, research and education. This year the awards honor individuals who are addressing global change caused by the impact of human activities and natural processes on the environment.
The Heinz Family Foundation began as a charitable trust established by the late U.S. Sen. John Heinz. His widow, Teresa Heinz, established the Heinz Awards in 1993 in honor of her late husband.

Nominations for the Heinz Awards are submitted by invited experts, who serve anonymously. Award recipients are selected by the board of directors for the Heinz Awards upon recommendation by a panel of jurors.
America, once the most highly educated nation in the world, has fallen off the podium to fourth place.

The Obama administration’s response is to call for college-degree-holding Americans to jump to 60 percent by 2025.

The degree of difficulty in reaching that goal is shown by the current percentage: around 38 percent.

Missouri is measured at 37 percent and Kansas at 40.5.

“A very ambitious goal for all states,” said Paul Wagner, deputy commissioner of higher education in Missouri.

A report today by the Lumina Foundation breaks down by state the working adults ages 25-64 with two or four-year college educations.

At the rate Missouri turned out college grads over the last decade, they would only make up 45 percent of the population by 2025, Lumina found.

Kansas would fare better reaching what Lumina calls “Our Big Goal” at its current rate, supposedly 51 percent.

The report suggests reaching out to adults who’ve accumulated some college but never finished.

Tom Burke, president at Kansas City Kansas Community College, says adults who left school just shy of a college degree have been filling seats in community colleges like his at a high rate for the past two years.

The college this month saw a 5.8 percent increase in full-time students over last year at the same time and a nearly 15 percent increase in credit hours being taken.
“At this rate we might see that 60 percent by 2015,” Burke said jokingly.

Cory Koedel, a University of Missouri assistant professor of economics, warned against “quantity over quality.”

As a result, he said, “When they go to get a job they are worth less in the labor market. The push should not only be to set a quantity standard but to also set a quality standard.”
Panel Leans in Favor of Engineered Salmon

By ANDREW POLLACK

ROCKVILLE, Md. — Members of a federal advisory committee on Monday seemed to conclude that genetically engineered super-salmon would be safe to eat and for the environment, but they also found gaps in the studies used to support that conclusion.

The committee met here to advise the Food and Drug Administration on whether to approve what would be the first genetically engineered animal to enter the American food supply.

The Atlantic salmon, which would be raised on farms, contain an extra growth hormone gene that allows them to grow to marketable size about twice as fast as conventional fish.

Committee members, who were not asked to vote on whether the fish should be approved, did not point out anything about the fish that would seem dangerous, despite one study suggesting a possible increase in the potential to cause allergic reactions. They said the chance the fish would escape into the wild was low.

“They didn’t see any glaring holes” in the data, Gregory A. Jaffe of the Center for Science in the Public Interest, who was the consumer representative on the committee, said after the meeting ended.

Still some panel members did say the studies the F.D.A. relied on to reach its own conclusion that the salmon would be safe were flawed, often using only a few dozen fish or even fewer.

“I do get heartburn when we’re going to allow post-market surveillance to finalize our safety evaluation,” said one committee member, Michael D. Apley, a pharmacology expert at Kansas State University.

The criticisms could add to the time needed to approve the salmon. It could also provide grist for consumer and environmental groups, many of which testified on Monday that the salmon should not be approved.

Approval of the salmon could pave the way for other such biotech animals to enter the food supply, like a pig developed in Canada that has more environmentally friendly manure.
The results could also influence other countries. Eric Hallerman, a fisheries expert at Virginia Tech, told the committee that fast-growing versions had already been developed for 18 different types of fish in various countries.

The salmon contain a growth hormone gene from the Chinook salmon and a genetic switch from the ocean pout that turns on an antifreeze gene. That allows the salmon to make growth hormone in cold weather, whereas salmon usually produce it only in warm weather.

Ronald L. Stotish, the chief executive of AquaBounty Technologies, the company that developed the salmon, told the committee that its AquAdvantage salmon would help the world meet rising demand for seafood without further devastating natural fisheries. He said it would be economical to grow the fish in inland tanks in the United States, saving the cost of flying in the fish from Chile or Norway, from which the United States now gets most of its Atlantic salmon, he said.

For now, though, the company’s eggs are being hatched at a company facility in Prince Edward Island, Canada. And the fish would be grown to size in only limited quantities at a company facility in Panama.

The company said that fish would not escape because they are grown inland in facilities with containment mechanisms. If any did escape, it said, the rivers outside the Canadian and Panama facilities would be too salty or warm for the fish to survive. And the fish would all be female and almost all would be sterile, so they would not interbreed with wild salmon.

But some committee members, as well as some environmental groups, said the government’s environmental assessment should evaluate what would happen if the salmon were grown widely in many facilities.

"The F.D.A. must consider issues related to realistic production scenarios," said Anna Zivian, a senior manager at the group Ocean Conservancy.

One test showed a possible increase in the potential to cause allergic reactions that was almost statistically significant even though only six fish were used in each group in the study.

But several committee members said the meaning of that test’s results were open to question since it was not clear what amount of increase was meaningful.

**Kevin Wells, an assistant professor at the University of Missouri and a committee member, said he doubted the fish would cause extra allergies.**

"The salmon contains nothing that isn’t in the human diet," he said.

The fish are being regulated under the process used to approve veterinary drugs. The F.D.A. held a half-day session on Sunday to give the committee, made up mostly of veterinarians, a primer on genetic engineering.
Approval, if it comes, is likely to take at least several months. The F.D.A. said it would prepare an environmental assessment that would be open to comment for 30 days. If the agency decides that there could be a significant environmental impact — something that does not appear likely — it will have to do a full environmental impact statement, which could take months or years.

The F.D.A. will have a public hearing on Tuesday on whether the salmon, if approved, should be labeled.
COLUMBIA MISSOURIAN

MU Student Health Center aims to reduce stress

By Walker Moskop
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COLUMBIA -- Tests, papers, procrastination and late-night Taco Bell runs can take a toll on the health of college students.

**To combat such notorious causes of stress, the MU Student Health Center is strengthening its emphasis on mental health this year, said Dr. Susan Even, director of the center.**

“Mental health issues have been a primary contributor to student health problems,” she said. “We have really looked at how we can expand our stress management strategies.”

Even said the center recently added a psychologist to the mental health staff and is slowly introducing depression screenings to students who come in for routine medical visits.

In addition to several stress-management classes it offers, the center added a new program, Heart Rate Variability biofeedback, where a student is hooked up to a computer that shows how thoughts and emotions affect the heart and nervous system. According to the center's website, the purpose of biofeedback is to help a student learn how to “achieve nervous system balance” and “intentionally shift to a positive emotional state.”

The center also offers yoga and stress-reduction courses, as well as Stressbusters, a program where student volunteers give free five-minute backrubs and provide health information to other students.

With the H1N1 pandemic behind it, the center has actually seen a decrease in student appointments this year, despite record enrollment, Even said.
“In general, we’re prepared to address the kinds of things we typically see in students,” she said.

She cites athletic injuries, allergies, respiratory infections and adjusting to a new environment as common reasons students come to the center but said a large number of the physical symptoms students complain of are stress-related.

In the past, students’ needs often exceed the staff’s ability to see them, Even said. She is confident that the center is now better equipped to support students.

The center is working with other MU health and medical organizations to adopt a more integrated approach to provide better support to students, Even said.

“We want to be tuned into all other units that have health as part of their mission,” she said. “We want to be sure we all work together.”
Soon after coming to Columbia as the University of Missouri's athletic director some 12 years ago, Mike Alden ribbed Ray Beck and Bill Watkins, the former and current city manager, about a minor but symbolic disconnect between the mutual interests of MU athletics and the local government.

"Whose bright idea was it, Alden asked, to choose blue and white as the colors for the city buses tooling around town? "You guys laugh," Alden said after hearing chuckles around the room, "and those guys kind of did the same thing. But they're basically the colors of our arch rival, KU."

Alden said he's not advocating that the city spend the money to repaint all of the buses black and gold, but he's using it as an example of a marketing opportunity that was missed.

MU and community leaders, he said, should always be looking for ways to promote the teams because what's good for the Tigers is good for the Tiger town.

"We are not the most important thing that happens at the university by any stretch of the imagination," Alden said of the athletic program. "But, frankly, we are probably the strongest advertising vehicle that this university has, bar none."

The strength of the athletic department, as well the popularity of the teams at MU, has grown significantly since Alden's arrival.

Alden has overseen $163 million worth of improvements to the athletic facilities, and the annual operational budget has climbed from less than $14 million to $65 million. The amount of money coming to his department from MU's operating fund has dropped from $2.2 million to $1.7 million, and Alden predicted that amount will be zero in two years.

"MU was one of only 14 programs in the country that actually broke even or turned a profit," he said. "That's tall cotton we're with — Alabama, Ohio State, Florida, Texas..."

Last year, Alden said, more than one million people "came through the turnstiles in that complex we call the MU sports park," including people who bought tickets to the university's 20 sports teams as well as concerts and unaffiliated events such as the Show-Me State games.

"That's a significant number of people who touch what we're trying to do in athletics at the institution but really in Columbia and mid-Missouri," Alden said. "It always gives us an opportunity to sell the university, to sell Columbia."

In turn, Julie Ausmus, the sports development fund director at the Columbia Convention and Visitors Bureau, pointed out that events hosted by the city help expose visitors to MU and help with recruitment.
Alden said that during homecoming weekend of football season, there are 30,000 people downtown for the parade, many of whom also shop and go into the cafes and restaurants.

More than six million people might watch a nationally televised football game, Alden said. "It's a huge advertising impact for our community."

But forum participants pointed out that no one is calculating even a rough estimate of that economic impact.

The Visitors Bureau tried to come up with an estimate of the economic impact of last year's home football game against Nebraska and guessed $2 million.

But Kristi Ray, vice president of the Chamber of Commerce, said she believes that's low, considering that Nebraska uses an impact figure of $6 million for one of its home games.

Alden said the last time MU studied the financial impact of its athletic program was 14 years ago.

Carrie Gartner, director of the downtown Special Business District, suggested that MU and the city work together to sponsor another study.

Although they're not directly related, MU has had record enrollment for several straight years, and the athletic program has been more successful than ever in terms of wins, postseason competition and other measurements.

Mike Anderson and Robin Pingeton, the new head coach of the women's basketball team, said that though it's their job to put together exciting, successful performances by their teams, the community can help by attending more games.

"You thought we had some highlights last year," Anderson said. "You're going to see a lot more from this team this year.... My challenge to you guys and everybody in Columbia and the state of Missouri: I want the Mizzou Arena filled up."

Pingeton (pronounced pinj-ton) was recruited from Illinois State, where her team drew fewer than 1,000 fans to a home game when she started and about 7,000 in her last season.

"We have to win games and grow our attendance," Pingeton said. "Everybody wants to support a winning program, but we need your patience. It doesn't happen overnight. In the mean time ... we need you guys to jump on board."

Anderson and other forum participants said they'd like to see a lower number of "no-shows," people who bought season tickets but leave the seats empty, particularly in the early games of a team schedule before conference play begins.

Tim Hickman, the senior associate athletic director, said a ticketing system using bar codes is under development and will make it easier for MU to resell unwanted tickets.

In the current system, if a season ticket holder decides to stay home in St. Louis, someone would have to get that physical ticket to get into the game. With the bar-code system, he said, the fan could let MU know he or she is not attending, and the university can cancel the ticket electronically and issue a new one assigned to the seat.