

Webinar Highlights

EDCs & Reproductive Health: Effects of chemical mixtures on ovarian function

Up to 15% of women of reproductive age are infertile, with ovarian disorders as a leading cause. These disorders include primary ovarian insufficiency, polycystic ovary syndrome (PCOS), anovulation, and aneuploidy.

The underlying mechanisms of ovarian dysfunctions remain largely unknown, but studies have shown links to exposure to environmental endocrine disrupting chemicals (EDCs). In this webinar, **Dr. Shuo Xiao** introduced his lab research that focuses on integrating *in vivo*, *in vitro*, and *in silico* models to study the impacts of real-world EDC mixtures on female ovarian function, reproductive outcomes, and the molecular mechanisms involved.

Featured Speaker: Dr. Shuo Xiao, Associate Professor from the Department of Pharmacology and Toxicology at Rutgers University School of Pharmacy and Environmental and Occupational Health Sciences Institute (EOHSI), speaking on February 12, 2026.

This fact sheet has been created by CHE based on information presented in an EDC Strategies Partnership webinar. The webinar was co-sponsored by the Healthy Environment and Endocrine Disruptor Strategies ([HEEDS](#)) Mentoring Working Group as part of the Young EDC Scientists Showcase (YESS) webinar series. For the full set of resources provided by the webinar presenters, see the [webinar page](#), where you'll also find associated Slides & Resources.

The Problem

EDCs are chemicals that interfere with the hormone-related functions of the endocrine and reproductive systems. They can alter hormonal signals that control and guide much of our growth and development, the way our organs function, and our ability to fight disease. Common sources of EDCs include plastics and plasticizers, items treated with flame retardants, personal care products, food packaging, industrial chemicals, pesticides, wildfire smoke, and contaminated air and water.

Most prior research on the impact of EDCs on reproductive health focuses on exposure to a single chemical. However, in the real world people are exposed to complex EDC mixtures. Xiao's

lab uses a variety of methods to study EDC mixtures and the effects they have on women's reproductive health. In his webinar, Xiao described some of the lab's studies.

[One study](#) looked at how PFAS, including the chemical perfluorononanoic acid (PFNA), could adversely impact female ovary function. PFNA is an understudied PFAS that has been reported to reach similar or higher concentration levels of other, more well-studied PFAS, such as PFOA and PFOS. The study found evidence that PFNA can inhibit follicle development. Follicles exposed to the PFAS exhibited delayed follicle growth and less hormonal secretion. This could result in delaying ovulation and negatively impacting fertility.

Another focus of study is cyanobacterial harmful algal blooms. Climate change together with eutrophication are making harmful algal blooms more common. These algal blooms produce many toxins, including one called microcystin-LR (MC-LR). One of Xiao's studies found that MC-LR can inhibit the enzyme protein phosphatase 1 (PP1) in the ovary. This enzyme plays an important role in follicle development. The [study concluded](#) that MC-LR may heighten the probability of irregular menstrual cycles and infertility related to ovulatory disorders.

To investigate the effects of real-world mixtures, Xiao's lab analyzed samples from three rivers in New Jersey. They then recreated the mixture found and gave it to mice in their drinking water. They also looked at the effects of the mixtures in vitro. In the mice, the mixtures interfered with estrous cycles. In humans, these impacts could lead to delayed or blocked ovulation. The study's in vitro model showed similar effects to the in vivo model.

In looking for a possible molecular mechanism to explain these results, they examined 25,000 genes. They found that EDC mixtures can change the expression of many genes, including several that play roles in hormone reception.

Recommendations

Currently, there is very little understanding of how the various EDCs in a mixture interact to contribute to the overall effects of the mixture. This is an area of ongoing and future research that the lab is investigating.

Xiao closed his presentation by stressing that EDCs can be toxic to female reproductive health, and that EDC mixtures can be more harmful than the individual chemicals in the mixtures. More research using new study methods will be necessary before we have a full understanding of the dangers from these mixtures.

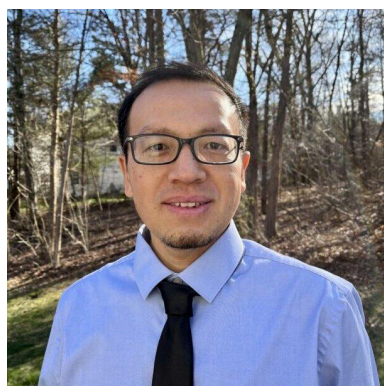
Xiao expressed hope that research such as this, along with risk assessment, would be used to guide policies to protect reproductive health.

Measures that individuals can take to reduce exposure include avoiding plastic (especially in the microwave) and avoiding contaminated lakes during algal bloom season. Xiao also stressed the importance of health education and communication.

To Find Out More

- Watch the February 12, 2026 webinar: [EDCs & Reproductive Health: Effects of chemical mixtures on ovarian function](#)
- Read Xiao's presentation slides: [EDCs & Reproductive Health: Effects of chemical mixtures on ovarian function](#)

About the Speaker



Dr. Shuo Xiao is an Associate Professor from the Department of Pharmacology and Toxicology at Rutgers University School of Pharmacy and Environmental and Occupational Health Sciences Institute (EOHSI). He earned his medical degree from Peking University, followed by PhD in Female Reproductive Biology and Toxicology under Dr. Xiaoqin Ye's supervision from the University of Georgia, and postdoctoral training in Dr. Teresa Woodruff's lab from Northwestern University. Dr. Xiao's research focuses on women's reproductive health, including (1) ovarian impacts of environmental contaminants and clinical drugs; (2) non-hormonal female contraception and ovarian protectant development, and (3) engineering female reproduction system-on-chip. These projects are funded by NIH, DOD, NSF, and Gates Foundation. Dr. Xiao has published 80 peer-reviewed papers, including papers in *Nature Communications*, *PNAS*, *Environmental Health Perspectives*, *Biology of Reproduction*, and *Toxicological Sciences*. Dr. Xiao now serves as the President of Middle Atlantic Reproduction & Teratology Association (MARTA), Immediate Past President of American Association of Chinese in Toxicology (AACT), Associate Editor of *Biology of Reproduction* (BOR) and *Toxicological Sciences*, and Chair of Basic Science Committee of Oncofertility Consortium. Dr. Xiao has received several major awards to recognize his research in women's reproductive health, such as the SSR New Investigator Award in 2024 and SOT Achievement Award in 2025.