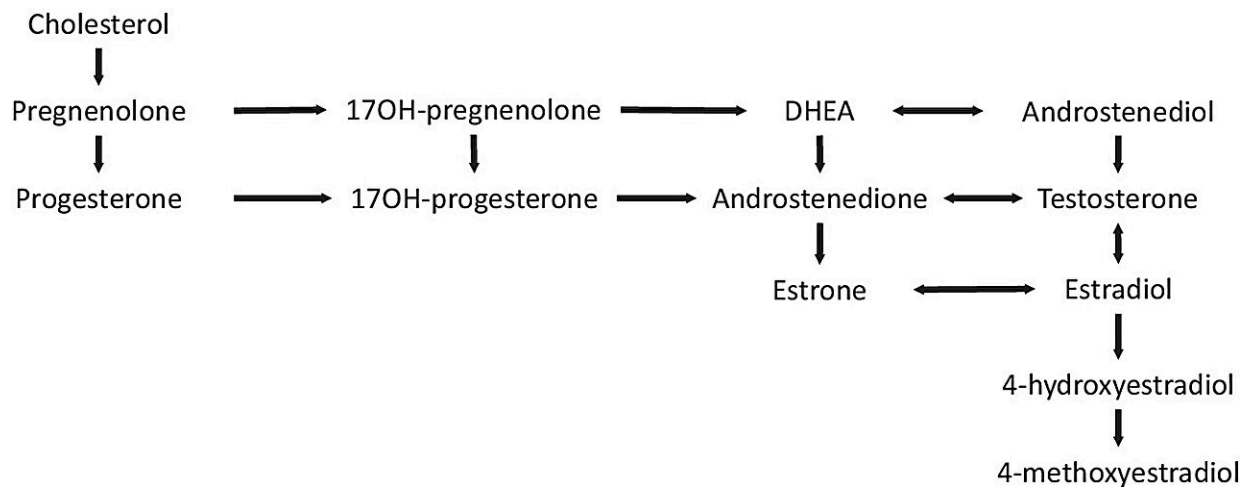


Research shows PFAS exposure may delay girls' puberty

September 29 2023, by Bill Bangert



Estrogen biosynthesis pathway (circulating hormones and at tissue level). Note: DHEA, dehydroepiandrosterone; OH, hydroxy. Credit: *Environmental Health Perspectives* (2023). DOI: 10.1289/EHP11811

Research from the University of Cincinnati shows that exposure to PFAS may delay the onset of puberty in girls. The research was published in the journal *Environmental Health Perspectives*.

This study is the first longitudinal research that included the component of the role hormones play in the delay, according to Susan Pinney, Ph.D., of the Department of Environmental and Public Health Sciences in the UC College of Medicine and corresponding author of the study.

She says the delay of puberty in girls can lead to negative long-term health outcomes, including a higher incidence of breast cancer, renal disease and thyroid disease.

"Puberty is a window of susceptibility," Pinney says. "Environmental exposures during puberty, not just to PFAS, but anything, have more of a potential for a long-term health effect. What these have done is extended the window of susceptibility, and it makes them more vulnerable for a longer period of time."

The published research describes the findings from studying a total of 823 girls who were 6 to 8 years old when they were enrolled in the study—379 were in the Greater Cincinnati area, the other 444 were in the San Francisco Bay Area. Researchers wanted to start the girls in the study before they hit the beginning of breast development. Then they followed them with exams every six to 12 months to see when they experienced the first signs of breast development and pubic hair.

The results found that 85% of the girls in the two cohorts had measurable levels of PFAS. Pinney says this PFAS research is unique because the hormone component was included and they discovered evidence of decreased hormones. The hormones that were decreased with PFAS exposure were consistent with findings of the delay of the [onset of puberty](#).

"The study found that in girls with PFAS exposure puberty is delayed five or six months on average but there will be some girls where it's delayed a lot more and others that it wasn't delayed at all," Pinney says. "We are especially concerned about the girls at the top end of the spectrum where it's delayed more."

The study also found that over 99% of the girls in the two cohorts had measurable levels of PFOA, one of the most important of the PFAS.

Pinney points to several factors playing a role in PFAS exposure in Greater Cincinnati. The Ohio River is the main source of drinking water in the area and a DuPont plant near Parkersburg, West Virginia, released PFAS into the river for decades which flowed downstream to major water intakes on both sides of the river near eastern Hamilton County. PFAS were also present in firefighting foam and there is a firefighting training ground near those same water intakes.

Pinney, who has studied this topic for years in collaboration with the now-retired Frank Biro, MD, of Cincinnati Children's Hospital and the Department of Pediatrics at the UC College of Medicine, says this and other studies raise the question of, considering the known dangers of PFAS, how did we get to this point? She points to the fact that the United States doesn't follow the "[precautionary principle](#)" which is the principle that the introduction of a new product or process whose ultimate effects are disputed or unknown should be resisted.

"The evidence of PFAS being dangerous goes all the way back to the 1980s when chemists were doing studies, noticed that PFAS had the same [chemical structure](#) as other [dangerous chemicals](#) and they reported on it," Pinney says. "It's taken a very long time for us to recognize it as a human toxin. Meanwhile, all of these toxins got into our environment, and it's going to take a long time before they leave."

Pinney says one of the reasons is that PFAS do not degrade. Studies are being done to explore methods of breaking up the chemicals.

"It seems to take a long time to convince regulators about the health effects of PFAS," she says. "We as scientists need to be more forceful with regulators and say, 'Hey guys, you read the same science we read.'"

"The whole thing has been a learning experience for me. Scientists are frustrated with the slowness of movement to change regulatory

guidelines. Not only do we need to publish our research findings, but also do our best to inform the general population and the health care community. Efforts toward environmental cleanup have begun but it is very costly."

More information: Susan M. Pinney et al, Exposure to Perfluoroalkyl Substances and Associations with Pubertal Onset and Serum Reproductive Hormones in a Longitudinal Study of Young Girls in Greater Cincinnati and the San Francisco Bay Area, *Environmental Health Perspectives* (2023). [DOI: 10.1289/EHP11811](https://doi.org/10.1289/EHP11811)

Provided by University of Cincinnati

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