Alternatives to PFASs: perspectives on the science

The NIEHS journal Environmental Health Perspectives (EHP) published an editorial May 5 by Linda Birnbaum, Ph.D., director of NIEHS and the National Toxicology Program, and Philippe Grandjean, M.D., D.M.Sc., of the Harvard School of Public Health and the University of Southern Denmark. The editorial addressed two briefs published the same day in EHP. The first, known as the Madrid Statement, called for cooperation in limiting the production and use of a class of compounds known as polyfluoroalkyl and perfluoroalkyl substances, or PFASs. The second is a counterpoint to the Madrid Statement, from the FluoroCouncil.

Grandjean is adjunct professor of environmental health in the Harvard School of Public Health and professor of environmental medicine at the University of Southern Denmark. (Photo courtesy of Harvard)

The following is an excerpt from the Birnbaum and Grandjean editorial.

"Poly- and perfluoroalkyl acids (PFASs) are ubiquitous in our lives. These chemicals are used as surfactants and as water and oil repellents in a variety of consumer products such as cosmetics, food packaging, furnishings, and clothing. Since their initial marketing more than 60 years ago, extensive research has demonstrated that the long-chain PFASs are highly persistent, bioaccumulative, and toxic (Buck et al. 2011). As a result, they are being phased out in many countries. However, controversy has emerged regarding the safety of the most common alternatives, the short-chain PFASs.

"The [Madrid] statement defines a roadmap for scientists, governments, product manufacturers, purchasing organizations, and consumers to work together to limit the production and use of PFASs globally and to develop safer alternatives.

"In a response to the Madrid Statement in this issue of EHP, the FluoroCouncil, which represents the world's leading fluorotechnology companies, agrees that it 'could support many of these policy recommendations if they were limited to long-chain PFASs' (Bowman 2015). The FluoroCouncil supports the call to action from the scientific and professional community to limit the production and environmental release of long-chain PFASs but states that 'the short-chain PFAS substances studied to date are not expected to harm human health or the environment,' as they 'are eliminated more rapidly from the body and are less toxic than long-chain substances' (Bowman 2015).

Birnbaum, who took the helm at NIEHS in January 2009, is the first woman and first toxicologist to lead the institute. (Photo courtesy of Steve McCaw)

"Although there is agreement regarding the shorter human half-lives of short-chain PFASs, … recent publications … expressed concerns that fluorinated replacements are similar to the PFASs they replaced in terms of their chemical structure, environmental persistence, and hazardous potential for both the environment and humans. Given the fact that research raised concern about the long-chain PFASs for many years before action was taken and that global contamination and toxicity have been documented in the general population (Grandjean and Clapp 2014), potential risks of the short-chain PFASs should be taken into account when choosing replacements for the longer-chain compounds.

"It has been difficult to find substitutes that match the function and performance level of PFASs. … Significant innovation is thus required to find functional nonfluorinated alternatives to PFASs. The U.S. Environmental Protection Agency recently recognized such innovation by awarding its 2014 Designing Greener Chemicals Award to a halogen-free firefighting foam.

"Research is needed to understand the potential for adverse health effects from exposure to the short-chain PFASs, especially regarding low-dose endocrine disruption and immunotoxicity. In parallel, research is needed to find safe alternatives for all current uses of PFASs. The question is, should these chemicals continue to be used in consumer products in the meantime, given their persistence in the environment? And, in the absence of indisputably safe alternatives, are consumers willing to give up certain product functionalities, such as stain resistance, to protect themselves against potential health risks? These conundrums cannot be resolved by science alone but need to be considered in an open discussion informed by the scientific evidence.

Citations:

Birnbaum L, Grandjean P. 2015. Alternatives to PFASs: perspectives on the science. Environ Health Perspect 123(5):A104-A105.

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, Office of Communications and Public Liaison.
(bruskec@niehs.nih.gov)

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