

March 16, 2023

To whom it may concern:

I am Linda S. Birnbaum, Scientist Emeritus and Former Director of the National Institute of Environmental Health Sciences and the National Toxicology Program. I am also a Scholar in Residence in the Nicholas School of the Environment of Duke University. I am an elected member of the National Academy of Medicine and a Fellow of AAAS, adjunct professor at Yale University, University of North Carolina, Chapel Hill, and Duke University, former President of the Society of Toxicology and Chair of the Division of Toxicology of the American Society of Pharmacology and Therapeutics, recipient of more than 100 awards, and author of more than 1000 publications. Prior to my becoming NIEHS Director, I was in charge of US EPA's largest health research division.

PFAS, per- and polyfluoroalkyl substances, are a class of more than 12,000 synthetic chemicals. Many are intentionally produced, others are byproducts of production, use, or environmental or biological transformation. Every PFAS is environmentally persistent, and many are biologically persistent as well. This has led to the entire class being known as "forever" chemicals. A small number of these chemicals have any test data on health or ecological effects. But all that have been tested, display a similar spectrum of adverse effects. It will never be possible to test all 12,000. Health effects occur in almost all organs and tissues of experimental animals, and many have been seen in people as well, including, cancers, immune suppression and autoimmunity, reproductive and developmental effects, liver and kidney problems, bone and neurological issues, and increased obesity and type 2 diabetes, among others.

PFAS precursors are themselves PFAS. PFAS products are also PFAS. Common PFAS such as PFOA and PFOS can be produced as transformation products from other PFAS, such as the fluorotelomers. Their substitutes, such as GenX and ADONA, have adverse effects in mechanistic and animal studies. While many PFAS are useful, not all are necessary. If not necessary, there is NO reason to allow their production. If essential, but there are safe alternatives, the alternatives should be used. The only PFAS whose intentional production should be allowed to continue are those which are essential and there is NO safe alternative or solution at this point.

Since all PFAS are forever, and all studied have shown to have adverse effects, the entire class should be eliminated from intentional production.

Do not hesitate to contact me if I can provide additional information. I should mention that I first published on this class of chemicals in the late 1980s!

Sincerely,

Linda S. Birnbaum, Ph.D.

Scientist Emeritus and Former Director, NIEHS and NTP

Scholar in Residence, Duke University

919-280-2884

Birnbaum.tox@outlook.com