

turn genes on and off. The details of the mechanisms are still under study but the phenomenon, however it is caused, is real.¹⁸ This phenomenon is especially troubling for safety testing of chemicals because sometimes adverse effects do not appear until the second generation after fetal exposure to the first generation.

Recent studies demonstrate that plastics in medical equipment can undermine chemotherapy for breast cancer, including increasing the risk of relapse and death.¹⁹

Recommendations:

As I stated early in this testimony, the plastic problem is wicked. There are no silver bullets. But there are important steps to take beginning now that can reduce the threat that plastics represent for our health and environment.

Re-think: Many applications of single use plastics are not essential. Packaging can be reduced and eliminated. Re-use and re-fill systems can be implemented that dramatically reduce the need for single use packaging. Serious efforts should be made to identify the essential uses of plastics vs. non-essential. Decisions on what is essential should be made by parties with no conflicts of interest.

Reform: The regulatory system needs to be reformed by (1) incorporating 21st century biomedical science in its assessments of safety and (2) eliminating conflicts of interest that currently pervade the system. See Attachment 1 and Infographic 4 (next page).

Redesign: There are essential uses of plastic, especially in medicine. But chemists should be given the challenge of creating safer materials to use when the services of the material are required. We know enough now from all the research that's been conducted on endocrine disruption to help chemists avoid EDC characteristics in the design of new materials.²⁰

The US should study the approach upon which the European Union is now embarked: The Chemical Strategy for Sustainability.²¹ It embraces modern biomedical science, based upon endocrinological principles to avoid EDC hazards. It is structured around the issue of essential use. And its implementation will involve major commitments to funding sustainable chemistry.

¹⁸ Molecular mechanisms of transgenerational epigenetic inheritance. <https://www.nature.com/articles/s41576-021-00438-5>

¹⁹ DEHP mediates drug resistance by directly targeting AhR in human breast cancer. <https://doi.org/10.1016/j.biopha.2021.112400>

²⁰ Designing endocrine disruption out of the next generation of chemicals. <https://pubs.rsc.org/en/content/articlelanding/2013/gc/c2gc35055f#!divAbstract>

²¹ Green Deal: European Commission adopts new Chemicals Strategy towards a toxic-free environment. https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1839