



American Neurological Association Focuses on Link Between Environmental Toxins and Neurodegenerative Diseases

Three statistics to consider:

- Worldwide, rates of Parkinson's disease have increased 155% since 1990. Parkinson's is the fastest growing neurodegenerative disease globally.
- The number of people with Amyotrophic Lateral Sclerosis (ALS, aka Lou Gehrig's Disease) is expected to increase by 69% between 2015 and 2040
- Researchers predict that the number of people with Alzheimer's Disease will double every 20 years, reaching 78 million by 2030 and 139 million by 2050

It's enough to make scientists wonder what is driving these increases beyond any known contributing factor such as genetics. That question was front and center at the Presidential Symposium at the American Neurological Association's 2022 Annual Meeting in October 2022. At the gathering of top neuroscientists from around the United States, presenters focused on the link between environmental toxins and all neurodegenerative disorders, citing years of research and studies.

As Symposium Chair Dr. Frances E. Jensen explains, "The Symposium will discuss the astronomical rise in Parkinson's disease, for example, that can't fully be explained by genetics or the aging population. Environmental exposures are lurking in the background, and they're rising. We've really overlooked some of the contaminants in our environment. This is a wake-up call." Jensen is the president of the American Neurological Association and chair of the Department of Neurology at the University of Pennsylvania's Perelman School of Medicine.

The links between environmental toxins and conditions like cardiac disease, asthma and cancer have been well documented but fewer studies have looked at their impact on the human brain. Within the United States chemicals that are banned in much of the world are still commonly used in agriculture, cleaning supplies construction, household goods, pharmaceuticals, and cosmetics.

Even when the Environmental Protection Agency (EPA) sets limits on levels of certain substances, they are still only a handful of the estimated 80,000 toxic chemicals humans encounter as part of everyday life. Given their sheer magnitude and the lack of regulatory mandate, it's not surprising that few studies have been conducted on how the multiple toxins interact with each other and their cumulative impacts on the nervous system.

Rick Woychick, Ph.D., was one of the Symposium's co-moderators. "It's not just about pesticides," says Woychick, director of the National Institute of Environmental Health Sciences. "PFAS chemicals are ubiquitous in the environment, as are nanoplastics. And there are trillions of dollars' worth of demand for nanomaterials, but it's sobering how little we know about their toxicology."



Workshop presenters also discussed the disproportionate neurological impact of environmental toxins on low-income populations and communities of color. The groups tend to be exposed to higher levels of toxic chemicals through unsafe housing and housing discrimination, poor working conditions and living in areas with higher rates of industrial pollution. Often, they lack the resources to hire lawyers or take the steps necessary to hold polluters accountable, regardless of how negative the impacts are on their community's health.

A 2021 review of the intersection between toxicology, federal law and environmental justice found that toxicants 'can act not only individually and cumulatively but also collectively and even synergistically, and that they affect disadvantaged communities inordinately.' The report pointed to concerns that attempting to rein in polluters through regulation was a doomed effort and what regulators often proposed instead were watered-down policies that required tests of chemical formulas for only the ingredients manufacturers claimed were active. The resulting loopholes have left ample room for industrial corporations to avoid making any substantial changes in their practice.

Even with regulation working in their favor, some companies have taken steps to reduce their risk of being sued. A recent article in The Guardian described how Swiss chemical company Syngenta actively worked behind the scenes to influence the U.S. EPA. Syngenta has been manufacturing paraquat, a pesticide linked to increased risk of Parkinson's Disease, since the 1970s.

Today Syngenta and its successor Chevron are the subject of lawsuits from thousands who maintain that they developed Parkinson's disease because of chronic exposure to paraquat. As part of the lawsuit, over 50 years of documents have been made public, including evidence that the company's scientists were aware as far back as the 1960s that paraquat could accumulate in the brain and cause adverse effects. The company withheld that information from regulators.

Further records demonstrate that scientists were also aware that exposure to the product could trigger tremors and other symptoms similar to Parkinson's by impairing the central nervous system. One internal memo from 1985 cited a study that found an 'extraordinarily high correlation' between Parkinson's and exposure to pesticides, including paraquat. The same memo pointed out the similarity between the impacts of paraquat exposure and the effects of MTPT, a byproduct of synthetic heroin 'which produces almost instant Parkinson's by killing dopaminergic neurons in the brain.' Rather than alerting the public, the company launched a campaign to influence regulatory strategy.

The lawsuits against Syngenta and Chevron are ongoing and their outcome is yet to be determined but given the increased focus of America's top neurologists on the known links between neurodegenerative disease and environmental toxins, the outlook for chronic polluters is dim.



Sources:

"Secret Files Suggest Chemical Giant Feared Weedkiller's Link to Parkinson's Disease" by Carey Gillam and Aliva Uteuova, The Guardian, October 20, 2022

"Mixture toxicity, cumulative risk, and environmental justice in United States federal policy, 1980–2016" by Robert Hunt Sprinkle and Devon C. Payne-Sturges, Environmental Health, 2021

"An Environmental Wake-Up Call for Neurology" by American Neurological Association, October 17, 2022

"Exposure to environmental toxins may be root of rise in neurological disorders" by Nina Lakhani, The Guardian, October 23, 2022