Closing the Data Gap On Unregulated Chemical

People are exposed to chemicals in the products they use every day. MRIGlobal scientist Kristin Aillon is on the front lines of ensuring those chemicals are safe.

Consumer and commercial products often are packed with chemicals.

Some have no negative effect on public health. Others may be toxic to users or the environment. The problem is that thousands of these chemicals have undergone little or no toxicological testing. They are not regulated by the U.S. Food and Drug Administration or the Environmental Protection Agency, and no one knows for sure how they may affect the people who inhale them or pour, spray or slather them on.

The National Toxicology Program (NTP), a federally funded agency that is part of the National Institute of Environmental Health Sciences, manages the examination of unregulated chemicals. The NTP works closely with the scientific community to fill in data gaps for substances that need more study and to shape Congressional policy addressing the use of chemicals determined to be damaging.

Support for Scientific Advancement

MRIGlobal analytical chemists support NTP to help the agency advance its scientific knowledge. Kristin Aillon, a researcher in the Product Development and Repository Management division, is MRIGlobal's principal investigator on behalf of the NTP. Aillon oversees a staff of 20 that may have as many as 30 projects underway at any given time.

When the NTP authorizes a study, MRIGlobal acquires the chemical product in quantities from milligrams to carloads. Aillon and her team characterize the product, confirm its identity and check for impurities to make sure the procured chemical contains no other ingredients that might return inaccurate results. Aillon then works with the NTP to design research concepts that will allow the selected chemical's toxicity to be accurately and consistently examined.

From its repository of some 6,000 non-regulated chemicals – the largest such library among NTP contractors – MRIGlobal ships small amounts to academic institutions, private entities and other labs worldwide who conduct independent tests. Projects may involve individual chemicals or chemical classes, such as BPA and BPA-similar substances. MRIGlobal works with suppliers who provide high-purity samples and maintains these samples in its in-house repository to ensure that every designated lab receives the relevant chemical without variation, thereby reducing disparities in results.

The chemical shipping process is an art in itself. MRIGlobal handles all distribution of chemicals in the repository for NTP research studies, including those being conducted under the direction of the Toxicology in the 21st Century (Tox21) Consortium, a federal, inter-agency collaboration among the NTP, EPA, FDA and National Center for Advancing Translational Sciences. Tox21 is designed to reduce the time and costs of testing, gather data on a large number of compounds using *in vitro* (cell-based) approaches and contribute to reducing the use of animals in toxicity testing.

For Tox21 projects, MRIGlobal may send out thousands of chemicals at a time in 98-well plates. The team must ensure that each chemical is in its unique well across multiple plates, confirm that chemicals are safe for transport, decide how they will be shipped, understand domestic and international shipping regulations to avert delivery delays, prevent leakage or breakage and maintain accurate records of chemical concentrations, scheduling and recipients, and other details.

NTP selects the labs who will receive chemicals from MRIGlobal based on assays those facilities have that are relevant for each study's goals. Each lab receiving chemicals conducts research using its own specialty, with results delivered to the NTP.

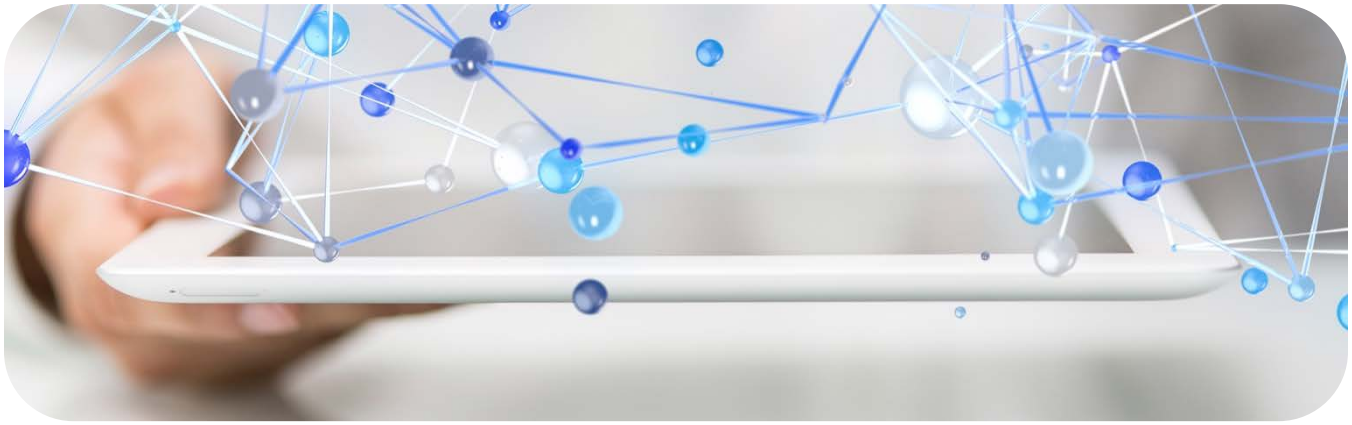
Moving Research Forward

Over its four-decades-long relationship with NTP, MRIGlobal has researched the environmental and human health effects of chemicals in flame retardants, plasticizers, soaps, dietary supplements, sunscreen, food products such as butter and cheese colorings, and other products.

Recently, the company completed management of a 91-chemical developmental neurotoxicity study that began in 2013. Aillon and her team made replicates of the 91 chemicals on plates and distributed them to domestic and international researchers, who entered their data into a publicly visible database that shows results of research on each chemical.

The pioneering database, which was recently presented at the Society of Toxicology annual meeting, is the first step toward fulfilling an NTP goal to make data publicly available as a collaborative tool for scientists. The expectation is that more conversation and data sharing between facilities will allow researchers to identify trends and reach conclusions more quickly. Databases such as the one MRIGlobal helped create also have potential to reduce testing on animals, an initiative that is increasingly gaining support in the research community.

Every citizen is exposed every day to chemicals in consumer and occupational products. Those chemicals may be harmless – or they may cause cancer, predispose people to disease or alter genetics. Unless attention is given to them, there isn't a way to know what the effect might be. By providing analytical chemistry support, MRIGlobal helps the NTP secure and have confidence in its chemical research data, ultimately benefiting public health.



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