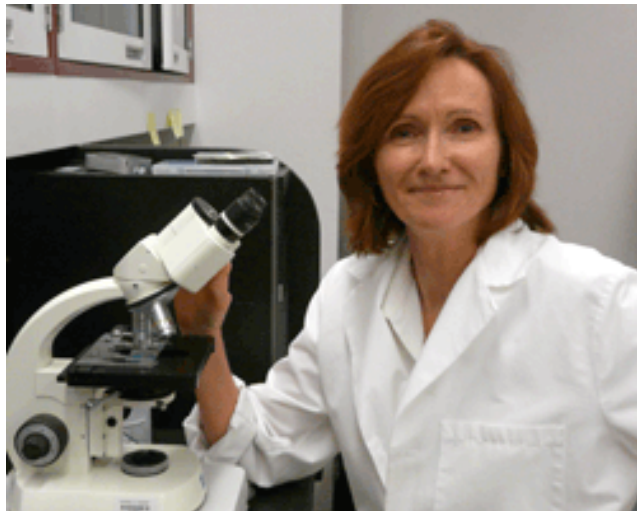


## Advancing Immunotoxicity Research at ACHRI

Immune responses typically protect the body from infectious diseases. When the immune response instead targets its own tissues, autoimmune diseases such as lupus, scleroderma, alopecia, and autoimmune hepatitis can occur. Various interacting factors are required for disease development. Among the goals of Dr. Kathleen Gilbert and her team at ACHRI's Immunotoxicology Center is to understand how exposure to common environmental toxicants causes autoimmune disease. Dr. Gilbert has studied immunotoxicity at ACHRI and UAMS for a decade. Among her recent successes is a three-year R01 award of \$997,000 from NIH to investigate how chronic low-level exposure to the common environmental pollutant trichloroethylene (TCE) affects immune cells and promotes autoimmunity.



At the Immunotoxicology Center at ACHRI, Dr. Kathleen Gilbert and her colleagues are investigating how chronic low-level exposure to TCE affects immune cells and promotes autoimmunity.

"Genetics certainly plays a role in autoimmunity," says Dr. Gilbert, "however, there is evidence that the environmental influence, such as exposure to toxicants, is equally important." TCE is an industrial solvent accidentally introduced into water supplies decades ago through improper disposal. It is still present in many sources of groundwater, some of which are used for drinking water in the US. Studies have shown that TCE can be detected in 8% to 13% of the general population, both adults and children. In children, the immune system is particularly sensitive to the effects of toxicant exposure, and consequences may not be detected until later in life.

Typically, unsafe levels of a toxicant are determined by whether a concentration causes cancer. "At lower levels which are not carcinogenic," Dr. Gilbert explains, "the chemicals can still impact human health by promoting autoimmune disease." Evaluating immunotoxicity of pollutants will help identify at what levels they are associated with autoimmune diseases. Their NIH study could suggest revised allowable limits of TCE in water supplies. The study will also provide important mechanistic information by determining how TCE affects the immune system. Using study samples and mathematical modeling, the team aims to identify biomarkers to determine TCE exposure and associated autoimmune diseases. These important discoveries will aid in establishing the groundwork for developing a treatment to neutralize TCE's involvement in autoimmune disease and possibly reverse autoimmune disease effects.

Dr. Gilbert established the Immunotoxicology Center with funds from the Arkansas Biosciences Institute (ABI), the major research component of the Tobacco Settlement Proceeds Act of 2000. Other faculty-level researchers at the center are immunotoxicologist Dr. Sarah Blossom and biostatistician Dr. Horacio Gómez-Acevedo. Additional studies at the center include an ABI-funded evaluation the susceptibility of children's immune system to alteration by toxicants. Funded by an Arizona state court settlement against a manufacturer, Dr. Gilbert is working with collaborators at Arkansas State University to determine the effectiveness of genetically engineered and natural plants to remediate TCE by removing it from water and soil and

converting it to a safe compound. Dr. Gilbert adds, "I greatly appreciate the support of ACHRI's directors [Dr. Wesley Burks and Dr. Richard Jacobs] for my research; they have provided the equipment and infrastructure needed for the work."



Established in 1989, Arkansas Children's Hospital Research Institute provides an on-site research environment for faculty of the University of Arkansas for Medical Sciences working on the Arkansas Children's Hospital campus. Over 120 pediatric researchers with expertise and experience that span the breadth of medical disciplines comprise ACHRI's roster of investigators who work to fulfill its mission to improve children's health, development, and well-being through high quality research. For more information, visit <http://achri.archildrens.org>.