

Study: Infant inhalation of ultrafine air pollution linked to adult lung disease

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Stephania Cormier, PhD, Associate Professor of Pharmacology at LSU Health Sciences Center New Orleans, has shown for the first time that early exposure to environmentally persistent free radicals (present in airborne ultrafine particulate matter) affects long-term lung function. She recently presented her latest research data at the 11th International Congress on Combustion By-Products and Their Health Effects at the Environmental Protection Agency Conference Center in Research Triangle Park, N.C.

Dr. Cormier, a 2006 National Institute of Environmental Health Sciences Outstanding New Environmental Scientist awardee, is conducting research to determine how [inhalation](#) exposure to environmental factors such as allergens, pollutants, and respiratory viruses during infancy leads to pulmonary [inflammatory diseases](#), such as [chronic obstructive pulmonary disease](#) (COPD) and [asthma](#) later in life.

Using protein profiling techniques, Dr. Cormier's lab was able to determine that early exposure to these ultrafine pollutants caused genes to produce a number of proteins, including one associated with COPD and steroid-resistant asthma, and also caused proteins to misfold, rendering them dysfunctional. These genetic defects are linked to structural changes in the lung, airflow limitations, and permanent changes in immune responses.

"It is no surprise that elevations in airborne particulate matter (PM) are associated with increased hospital admissions for respiratory symptoms

including asthma exacerbations," notes Dr. Cormier. "What has come as a surprise is that early exposure to elevated levels of PM elicits long-term effects on lung function and [lung development](#) in children."

These results could be especially important because the US Environmental Protection Agency does not currently regulate ultrafine PM emissions.

According to the National Institutes of Health, more than 12 million Americans are currently diagnosed with COPD and another 12 million probably have it and don't know it. Asthma is now the most common chronic disorder of childhood, affecting an estimated 6.2 million US children under the age of 18.

"Glucocorticoid (steroid) treatment is the foundation of asthma treatment; however, while the majority of patients with asthma respond to glucocorticoid treatment there are a number of patients who do not," says Dr. Cormier. "In cells, a protein called cofilin-1 appears to inhibit glucocorticoid function. We are currently testing whether cofilin-1 also does this in the body. If it does, then it is possible to envision the development of therapeutics aimed at inhibiting cofilin-1 for use in steroid-resistant asthmatics."

Source: Louisiana State University Health Sciences Center

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