

Exposure to violence, gene changes linked to asthma in Puerto Rican children

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Puerto Rican children who have asthma are more likely to be exposed to violence and to have changes in a gene that is associated with stress, according to a new study led by researchers at Children's Hospital of Pittsburgh of UPMC and the University of Pittsburgh School of Medicine. The study, which is the first to examine the links between asthma, stress and gene variation, was recently published in the *American Journal of Respiratory and Critical Care Medicine*.

Asthma rates are known to be higher among Puerto Rican children both living in the island and in the U.S., said senior investigator Juan C. Celedón, M.D., Dr. P.H., chief, Division of Pediatric Pulmonology, Allergy and Immunology, Children's Hospital, and Niels K. Jerne Professor, Department of Pediatrics, Pitt School of Medicine. He and his colleagues have been studying these high-risk children to better understand their elevated asthma rates. In a previous project in Puerto Ricans, they found that psychosocial stress in a parent increased [asthma symptoms](#) in their children.

"Recently, there was a University of California study that showed traumatic life experiences affect a certain gene product involved in [cellular stress responses](#) in adults and was linked to a higher risk of post-traumatic stress disorder or PTSD," Dr. Celedón said. "We wanted to see whether similar [gene alterations](#) could be found among Puerto Rican children with asthma."

His team recruited children ages 6 to 14 years who had four Puerto Rican grandparents from randomly selected San Juan households; 271 had physician-diagnosed asthma and wheeze in the prior year and 266 did not have asthma or a history of wheezing. Blood samples were drawn for [DNA analysis](#), all parents completed a questionnaire and children 9 years and older answered another standard questionnaire about exposure to violence.

They looked for evidence of a biochemical process called methylation of the promoter, or "on-off" switch, of a gene called ADCYAP1R1, which the California study linked to PTSD. They found that increased methylation was associated with higher odds of having asthma and with exposure to violence, and that increasing exposure to violence was linked with a greater risk of asthma. They showed that a certain variation, or polymorphism, in the ADCYAP1R1 gene in study participants was also associated with asthma, but not with methylation.

"It appears there is a subgroup of people who may be more susceptible to asthma because of exposure to violence, and we need to understand how that happens," Dr. Celedón said. "Most asthma studies have focused on environmental factors such as air pollution. This is one of the first to look at the impact of stress on epigenetics, which can cause differences in gene expression."

Provided by University of Pittsburgh Medical Center

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