Airborne Fungi Linked To Asthma Epidemic In Puerto Rico

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A survey of airborne fungi and fungal spores found in Eastern Puerto Rico suggests that certain species may be a major cause of the high incidence of childhood asthma in this part of the world. A new article suggests this information could be used to alleviate human factors that lead to high levels of such fungi.

Worldwide asthma incidence has been on the increase since the latter part of the twentieth century. It is a chronic breathing disorder with both genetic and environmental factors influencing symptoms and no single known cause. According to the US Center for Disease Control, Puerto Rico has a higher overall prevalence of lifetime (19.6%) and current (11.6%) asthma than other parts of the Americas. Incidence among the under-eighteens is particularly high in the eastern part of the island.

Research suggests that interactions between genetic susceptibility and environmental triggers may be responsible for raised incidence in particular regions.

Alberto Rivera Rentas, now working at the National Institute of General Medical Sciences, at the National Institute of Health, in Bethesda, Maryland, working with Christian Velez of the Universidad Metropolitana of San Juan and Antonio Gonzalez of the Universidad del Turabo, in Gurabo, Puerto Rico, have now isolated and identified microbial fungi, which they suggest are linked to asthma.

They point out that allergens and pollution are undoubtedly important factors in the development of asthma, although they alone cannot be the sole cause of its increasing, widespread prevalence. In considering Puerto Rico, they suggest that no studies have so far investigated the particularly high incidence of the disorder there in an integrated way.

The team sampled air from eleven communities in the municipality of Caguas. From these samples they identified a total of 514 different fungi and correlated the general family groups, the fungal genus, with precise location. Using the Geographic Information Systems they could address factors of geology, geography, vegetation abundance, atmospheric conditions and human activities such as industry and vehicle traffic that might influence fungal distribution.

Airborne fungi are a potential health hazard to everyone. They can impact human health in four main ways: infecting people, acting as allergens, they can be toxic and carcinogenic, or they can cause inflammatory reactions.

Rivera Rentas and colleagues found that two particular fungal groups - Cladosporium and Mycelia sterilia were more common than others. When they classified the sampled regions they saw that four of the six locations sampled having the highest number of fungal colonies as urban. These developed areas have moderate to high vehicular traffic. The work provides evidence of asthma-related fungi in the area, although this alone does not account for the observed high asthma prevalence.

"This work revealed the presence of fungal allergens that can be potential asthma triggers and establishes a rationale for future research in this area," the researchers conclude.

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