

Cigarette smoke causes harmful changes in the lungs even at the lowest levels

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Casual smokers may think that smoking a few cigarettes a week is "no big deal." But according to new research from physician-scientists at NewYork-Presbyterian Hospital/Weill Cornell Medical Center, having an infrequent smoke, or being exposed to secondhand smoke, may be doing more harm than people may think. The findings may further support public smoking bans, say the authors.

According to a new study published today in the [American Journal of Respiratory and Critical Care Medicine](#), being exposed to even low-levels of cigarette smoke may put people at risk for future lung disease, such as lung cancer and [chronic obstructive pulmonary disease](#) (COPD).

Epidemiological studies have long shown that [secondhand smoke](#) is dangerous, but there have never been conclusive biological tests demonstrating what it does to the body at a gene function level, until now.

"Even at the lowest detectable levels of exposure, we found direct effects on the functioning of genes within the cells lining the airways," says Dr. Ronald Crystal, senior author of the study and chief of the division of pulmonary and critical care medicine at NewYork-Presbyterian/Weill Cornell and chair of the department of [genetic medicine](#) at Weill Cornell Medical College in New York City.

Dr. Crystal explains that genes, commonly activated in the cells of heavy smokers, are also turned on or off in those with very low-level exposure.

"The genetic effect is much lower than those who are regular smokers, but this does not mean that there are no health consequences," says Dr. Crystal. "Certain genes within the cells lining the airways are very sensitive to tobacco smoke, and changes in the function of these genes are the first evidence of 'biological disease' in the lungs or individuals."

To make their findings, Dr. Crystal and his collaborators tested 121 people from three different categories: "nonsmokers," "active smokers" and "low exposure smokers." The researchers tested urine levels of nicotine and cotinine -- markers of cigarette [smoking](#) within the body -- to determine each participant's category.

The research team then scanned each person's entire genome to determine which genes were either activated or deactivated in cells lining the airways. They found that there was no level of nicotine or cotinine that did not also correlate with genetic abnormalities.

"This means that no level of smoking, or exposure to secondhand smoke, is safe," says Dr. Crystal. He goes on to say that these genetic changes are like a "canary in a coal mine," warning of potential life-threatening disease, "but the canary is chirping for low-level exposure patients, and screaming for active smokers."

Dr. Crystal says that this is further evidence supporting the banning of smoking in public places, where non-smokers, and employees of businesses that allow smoking, are put at risk for future lung disease.

Provided by New York- Presbyterian Hospital

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