

Does the air you breathe alter your DNA?

Breathing nasty urban pollution does more than clog up your lungs — it actually messes with your genes. This disturbing news comes from a paper published last month, and could change the way we think about pollution.

The study's author, University of British Columbia researcher Chris Carlsten, put volunteers in a walled-in smog aquarium, exposed them to levels of air pollution similar to those found in the world's most polluted cities, and then looked for changes at the level of the human genome. (Science!)

Carlsten's homemade pollution is technically just diesel exhaust — none of the nasty particulate matter that makes coal-burning countries' smog especially deadly — but it's plenty potent all the same, full of the kinds of volatile polycarbonates that we usually try to avoid. Study participants steep in them for two hours, riding a stationary bike for some of the time, but mostly just sitting and reading, using the internet, or twiddling their thumbs.

Two hours isn't that long, especially when you consider that some people spend their lives in similar levels of pollution. "It's a controlled human exposure," Carlsten says, and participants are well-informed of the calculated risks involved. It's not unlike spending two hours in Beijing on a bad day — unpleasant, perhaps, but ultimately safe.

Carlsten's study found that the DNA methylation patterns — the layer of methyl molecules over DNA, that act as light switches turning genes on or off — are changed after the volunteers get the smog treatment.

The factors that determine how your genome is actually translated into your flesh-and-blood are together known as your "epigenome." Scientists are just beginning to realize how much of our biology is determined by changes in our epigenetics — we may even inherit some epigenetic qualities from our parents, along with the genetic basics like eye color and that funny-shaped nose. Over the past few years, studies have looked at the epigenetic effects of diet, of chronic stress, of sleep, and found again and again that our genes are not destiny; our environment still has a remarkable power to change us at a fundamental level.

Read full, original article: [Air pollution actually messes with your genes](#)