

New heated tobacco device causes same damage to lung cells as e-cigs and smoking

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Dunhill Early Morning Pipe Tobacco, 1990's Murray. Credit: Sjschen/Wikipedia

A new study that directly compares new heated tobacco devices with vaping and traditional cigarettes shows that all three are toxic to human lung cells.

The study published in *ERJ Open Research* suggests that the new [device](#),

which heats solid tobacco instead of an e-liquid, is no less toxic to the cells than ordinary cigarette smoke.

Researchers say the study adds to evidence that these newer electronic nicotine delivery devices may not be a safer substitute for cigarette smoking.

The study was led by Dr. Pawan Sharma, a researcher at the University of Technology Sydney and the Woolcock Institute of Medical Research, Sydney, Australia.

He said: "Smoking is the leading cause of preventable death, and with the introduction of e-cigarettes in the last decade, the trend of nicotine uptake is not going to slow down in the near future. If the current trend continues, tobacco use will cause more than eight million deaths annually by 2030 around the world.

"The latest addition in this emerging trend is the planned and vigorous introduction of heated tobacco devices. They are commonly called next generation or heat-not-burn products. We know very little about the health effects of these new devices, so we designed this research to compare them with cigarette smoking and vaping."

Researchers tested the effects of all three nicotine sources on two types of cells taken from the human airways: epithelial cells and smooth muscle cells. In healthy lungs, [epithelial cells](#) act as the first line of defence to any foreign particles entering the airway while smooth muscle cells maintain the structure of the airway. However, smoking can lead to difficulty in breathing primarily by hampering the normal functions of these cells.

Dr. Sharma and his team exposed the cells to different concentrations of cigarette smoke, e-cigarette vapour and vapour from a heated tobacco

device, and measured whether this was damaging to cells and whether it affected the cells' normal functions.

The researchers found that cigarette smoke and heated tobacco vapour were highly toxic to the cells both at lower and higher concentrations while e-cigarette vapour demonstrated toxicity mainly at higher concentrations. Researchers say that these concentrations represent the levels of nicotine found in chronic smokers.

Dr. Sukhwinder Sohal, a researcher at the University of Tasmania, Launceston, Australia, and leading author on the study, said: "We observed different levels of cellular toxicity with all forms of exposures in human lung cells. What came out clearly was that the newer products were in no way less toxic to cells than conventional cigarettes or e-cigarette vaping."

Dr. Sharma added: "Our results suggest that all three are toxic to the cells of our lungs and that these new heated tobacco devices are as harmful as smoking [traditional cigarettes](#)."

"It took us nearly five decades to understand the damaging effects of cigarette smoke and we don't yet know the long-term impact of using e-cigarettes. These devices that heat solid tobacco are relatively new and it will be decades before we will fully understand their effects on human health.

"What we do know is that damage to these two types of lung [cells](#) can destroy lung tissue leading to fatal diseases such as chronic obstructive pulmonary disease, lung cancer and pneumonia, and can increase the risk of developing asthma, so we should not assume that these devices are a safer option."

Dr. Sharma hopes his results will stimulate more research on heated

tobacco devices and he plans to continue this work by studying the effects of nicotine devices on more sophisticated models of [lung tissue](#) and in mice.

Professor Charlotta Pisinger is Chair of the European Respiratory Society's Tobacco Control Committee and was not involved in the research. She said: "These new heated tobacco devices are marketed as producing 95% lower levels of toxic compounds because the tobacco is heated, not burned. However, the first independent studies have shown that combustion is taking place and toxic and carcinogenic compounds are released, some in lower levels than in conventional [cigarette smoke](#), others in higher levels. A review of the tobacco industry's own data on these devices has shown that, in rats, there is evidence of lung inflammation, and there is no evidence of improvement in [lung](#) inflammation and function in smokers who switch to heated tobacco.

"The introduction and vigorous marketing of new devices is very tempting to smokers who want to stop smoking and mistakenly believe they can switch to another harmless [tobacco](#) product. It is also opening another avenue for attracting young people to use and become addicted to nicotine. This study adds to evidence that these new devices are not the safe substitute to cigarette smoking they are promoted to be."

More information: Sukhwinder Singh Sohal et al, IQOS exposure impairs human airway cell homeostasis: direct comparison with traditional cigarette and e-cigarette, *ERJ Open Research* (2019). [DOI: 10.1183/23120541.00159-2018](https://doi.org/10.1183/23120541.00159-2018)

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