

'Cautious scepticism' needed on e-cig safety

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Vaporised e-liquid fluid has a similar effect on the lungs as those seen in regular cigarette smokers, new research shows

Study results published in *BMJ Journal Thorax* show e-liquid that has been vapourised through use of an e-cigarette boosts the production of inflammatory chemicals, and disables key protective cells in the lungs that keep the air spaces clear of potentially harmful particles.

Researchers from the University of Birmingham found that e-cigarette vapour impairs the activity of alveolar macrophages which are key to the immune response within the airways.

The small, experimental study was funded by the British Lung Foundation.

Most of the current body of research has focused on the chemical composition of e-cigarette liquid before it is vaped, the authors say.

To find out how vaping might change this liquid, and what impact this might have, the researchers devised a mechanical procedure to mimic vaping and produce condensate from the vapour.

They extracted alveolar macrophages from lung tissue samples provided by eight non-smokers who had never had asthma or chronic obstructive pulmonary disease.

A third of the cells were exposed to plain e-cigarette fluid, a third to different strengths of the artificially vaped condensate with and without nicotine, and a third to nothing for 24 hours.

The results showed that the condensate was significantly more harmful to the cells than e-cigarette fluid and that these effects worsened as the dose increased.

After 24 hours of exposure the total number of viable cells exposed to the vaped condensate was significantly reduced compared to the untreated cells, and condensate containing nicotine exaggerated this effect.

Exposure to the condensate increased cell death and boosted production of oxygen free radicals 50-fold and significantly increased the production of inflammatory chemicals—more so with condensate containing nicotine.

Further, the ability of cells exposed to vaped condensate to engulf bacteria was significantly impaired, although treatment with an antioxidant restored this function and helped lessen some of the other harmful effects.

The researchers concluded that the vaping process itself can damage vital immune system cells, at least under laboratory conditions.

“Cigarette smoking is associated with the cause of almost every lung disease – lung cancer, asthma, COPD and fibrosis,” said Professor David Thickett, of the University of Birmingham’s Institute of Inflammation and Ageing and lead author of the study.

“It has been suggested electronic cigarettes are safer than traditional cigarettes, and this narrative is increasingly supported by tobacco companies that have established research institutes devoted to generating supportive data.

“E-cigarette users have been given advice based on relatively little information. We hope that by disseminating this data as widely as possible the public can at least make an informed choice; the public must be aware these devices are not harmless.

“We hope this information will be taken on board by advisory bodies when considering their public advice strategy.

“We also hope this highlights the need for dedicated funding and research to determine the long term effects of e-cigarette usage.”

In an accompanying podcast, Prof Thickett says that many e-cigarette companies have been bought up by the tobacco giants, “and there’s certainly an agenda to portray e-cigarettes as safe.”

While e-cigarettes are safer than traditional cigarettes, they may still be harmful in the long term, he says, as the current body of research is in its infancy and not able to answer that question yet.

“In terms of cancer causing molecules in cigarette smoke, as opposed to cigarette vapour, there are certainly reduced numbers of carcinogens. They are safer in terms of cancer risk, but if you vape for 20 or 30 years and this can cause COPD, then that’s something we need to know about,” he says.

“I don’t believe e-cigarettes are more harmful than ordinary cigarettes.

“But we should have a cautious scepticism that they are as safe as we are being led to believe.”

In Australia, the ban on nicotine in vaping liquids remains, though other liquids may be used in e-cigarettes.