New evidence bolsters theory e-cigarettes may increase stroke risk

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There is new evidence that bolsters a possible link between e-cigarette use and increased risk of stroke, according to researchers from the University of Colorado Boulder. Their study, conducted in humans, showed that circulating endothelial cell-derived microvesicles (tiny, bubble-like particles released into the bloodstream during inflammation) from e-cigarette users have adverse effects on key factors responsible for regulating brain blood flow. Changes in these factors contribute to the "promotion, development and progression" of ischemic stroke.

These strokes are the most common type of stroke and are caused by a blockage cutting off the blood supply to the brain. The study is published in the *Journal of Applied Physiology* and has been chosen as an APSselect article for August.

E-cigarette use is associated with a higher occurrence of stroke at a younger age. In this study, researchers examined 27 healthy young adults ages 19–25. The cohort was subdivided into 10 nonsmokers, 10 e-cigarette users and seven tobacco cigarette smokers. Researchers zeroed in on the possible effects of endothelial cell-derived microvesicles isolated from e-cigarette users on central factors associated with the regulation of brain blood flow and increased susceptibility to stroke.

The mechanisms underlying e-cigarette-induced stroke remain unclear. Yet, interest in endothelial cell-derived microvesicles as a cause has intensified. Researchers suspect these microvesicles play a key role in stroke because their release into the bloodstream increases during e-cigarette use.

"Studying the characteristics of circulating endothelial cell-derived microvesicles from e-cigarette users will help us learn more about how these products affect the brain and contribute to the risk of stroke," said Vinicius P. Garcia, Ph.D., lead author of the study. "These results also lend support to the notion that e-cigarettes are not a healthier alternative

to combustible tobacco cigarettes."

More information: Anneloes G. Munneke et al, Myocardial perfusion and flow reserve in the asynchronous heart: mechanistic insight from a computational model, *Journal of Applied Physiology* (2023). DOI: 10.1152/japplphysiol.00181.2023

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