

'Not just a flavoring:' Menthol and nicotine, combined, desensitize airway receptors



Cigarette smoke damages DNA within minutes after inhalation. Credit: iStock

Menthol acts in combination with nicotine to desensitize receptors in lungs' airways that are responsible for nicotine's irritation, say neuroscientists at Georgetown University Medical Center (GUMC).

"We know that a menthol cough drop soothes a scratchy, [sore throat](#). The question we looked at is if and how it works when the irritant is nicotine," says a study author, Kenneth Kellar, PhD, a professor of [pharmacology](#) at GUMC.

The findings, which represent work by Georgetown University investigators in GUMC's Department of Pharmacology & Physiology, will be presented by Hoai Ton, PhD, a post-doctoral researcher, on Sunday, Nov. 16 at Neuroscience 2014, the Society for Neuroscience's annual meeting in Washington.

"This study supports the notion that menthol is not just a flavoring, but has a pharmacologic effect," Kellar says.

The U.S. Food and Drug Administration (FDA) is considering restrictions on [menthol cigarettes](#) because it has determined that menthol in cigarettes is likely associated with increased initiation and progression to regular cigarette smoking, increased dependence, and reduced success in smoking cessation, especially among African American menthol smokers. But FDA's review of the available research and evidence relating to menthol cigarettes, issued in July 2013, also concluded, "From the available studies, the weight of evidence supports the conclusion that menthol in cigarettes is not associated with an increase in disease risk to the user compared to non-menthol cigarette smokers."

At the same time, the use of menthol cigarettes is especially high among African-American smokers, and research has shown a higher rate of [lung cancer](#) in African American smokers compared to other smokers.

"The issue may be that menthol in the presence of nicotine may reduce the irritation enough that a smoker can inhale more deeply, bringing not just nicotine but toxic smoke products farther into the lungs," says co-investigator Gerald Ahern, PhD, an associate professor of pharmacology at GUMC. "While beyond the scope of this study, it is possible that such deeper inhalation of menthol cigarettes, to the extent it occurs, increases the already substantial health harms from smoking."

The researchers say their study provides a better understanding of how menthol affects the function of the $\alpha 3\beta 4$ receptor, one of the most prevalent nicotinic acetylcholine receptors expressed in the peripheral nervous system. These receptors are expressed in airway sensory nerves as well as other neurons.

"These receptors are also found in the brain, but we don't know yet what effect menthol has on those [receptors](#), or whether they contribute, in any way, to [nicotine](#) addiction," Kellar says.

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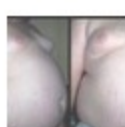

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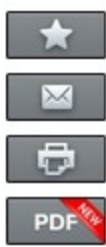
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