

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

May 11 2015



Credit: Vera Kratochvil/public domain

Menthol acts in combination with nicotine to desensitize the type of nicotinic receptors found in lungs and airways that are responsible for nicotine's irritation, say Georgetown University Medical Center (GUMC) researchers.

They say their findings, published online today in *Molecular*

Pharmacology, suggests menthol is not just a flavoring, but has an important pharmacologic effect.

"In addition to desensitizing the [receptors](#) in the lung and airways, menthol appears to slow or prevent the recovery of sensitivity after the first insult, likely placing the receptors in a desensitized state," says senior author Gerard Ahern, PhD, an associate professor of pharmacology at GUMC.

Ahern and his colleague 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](#)," says study co-author, Kenneth Kellar, PhD, a professor of pharmacology at GUMC.

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 in teens, and 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 Ahern. "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."

Provided by Georgetown University Medical Center

Citation: 'Not just a flavoring:' Menthol and nicotine, combined, desensitize airway receptors (2015, May 11) retrieved 20 April 2024 from <https://medicalxpress.com/news/2015-05-flavoring-menthol-nicotine-combined-desensitize.html>

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