

Aldehydes dominant carcinogen in tobacco smoke

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(HealthDay)—Aldehydes are the major carcinogens in tobacco smoke,

according to a study published online June 18 in the *Proceedings of the National Academy of Sciences*.

Mao-wen Weng, Ph.D., from New York University in New York City, and colleagues evaluated DNA adducts induced by the three major [tobacco smoke](#) carcinogens: benzo(a)pyrene (BP), 4-(methylnitrosamine)-1-(3-pyridyl)-1-butanoe (NNK), and aldehydes in humans and mice.

The researchers found that in mice, tobacco smoke induces abundant aldehyde-induced γ -hydroxy-propano-deoxyguanosine (γ -OH-PdG) and α -methyl- γ -OH-PdG adducts in the lung and bladder, but not in the heart and liver. Tobacco smoke does not induce the BP- and NNK-DNA adducts in the lung, heart, liver, and bladder. Additionally, DNA repair activity and the abundance of repair proteins, XPC and OGG1/2, in lung tissues are reduced by tobacco smoke. A diet with polyphenols greatly reduces the TS effects. In tobacco smokers' buccal cells and the normal lung tissues of tobacco-smoking lung cancer patients, but not in [lung tissues](#) of nonsmokers, γ -OH-PdG and α -methyl- γ -OH-PdG are the major adducts formed. BP and NNK can induce benzo(a)pyrene diol epoxide-dG and O^6 -methyl-dG adducts in human lung and bladder epithelial cells, but these inductions can be inhibited by acrolein, which also reduces DNA repair activity and repair proteins.

"We found that [aldehydes](#) in tobacco smoke are the major driving forces in inducing DNA damage and inhibiting DNA repair, the two major forces that cause cancer," a coauthor said in a statement.

More information: Mao-wen Weng et al. Aldehydes are the predominant forces inducing DNA damage and inhibiting DNA repair in tobacco smoke carcinogenesis, *Proceedings of the National Academy of Sciences* (2018). [DOI: 10.1073/pnas.1804869115](https://doi.org/10.1073/pnas.1804869115)

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