

New evidence that smokeless tobacco damages DNA and key enzymes

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Smokeless tobacco appears to damage DNA and key enzymes in the body.

Far from having adverse effects limited to the mouth, smokeless tobacco affects the normal function of a key family of enzymes found in almost every organ in the body, according to the first report on the topic in ACS' monthly journal *Chemical Research in Toxicology*. The enzymes play important roles in production of hormones, including the sex hormones estrogen and testosterone; production of cholesterol and vitamin D; and help the body breakdown prescription drugs and potentially toxic substances. Smokeless tobacco also damages genetic material in the liver, kidney and lungs.

Krishan Khanduja and colleagues note widespread recognition of smokeless tobacco's harmful effects on the mouth, which include an increased risk of gum disease and oral cancer. The potential carcinogens

and other chemicals in chewing tobacco and other smokeless products are absorbed into the blood and travel throughout the body. However, scientists have little information on smokeless tobacco's effects on other parts of the body. To fill that knowledge gap, the scientists evaluated changes in enzymes and [genetic material](#) in laboratory rats using extracts of [smokeless tobacco](#).

In addition to damage to the genetic material DNA, they found that smokeless tobacco extracts alter the function of the so-called CYP-450 family of enzymes. "These products are used around the world but are most common in Northern Africa, Southeast Asia, and the Mediterranean region," the report says. "Most of the users seem to be unaware of the harmful health effects and, therefore, use smokeless tobacco to 'treat' toothaches, headaches, and stomachaches. This false impression only promotes tobacco use among youth. The use of smokeless tobacco and its new products is increasing not only among men but also among children, teenagers, women, and immigrants of South Asian origin and medical and dental students."

More information: "Involvement of Various Molecular Events in Cellular Injury Induced by Smokeless Tobacco", *Chemical Research in Toxicology*.

Provided by American Chemical Society

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