

DNA damage in roofers due to PAH exposure -- possible cancer link

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Roofers and road construction workers who use hot asphalt are exposed to high levels of polycyclic aromatic hydrocarbons (PAHs). A University of Colorado Cancer Center study published this week in the *British Medical Journal Open* shows that roofers have higher PAH blood-levels after a shift than before and that these high levels of PAHs are linked with increased rates of DNA damage, and potentially with higher cancer risk.

"We've known for some time that roofers and road workers have higher cancer rates than the general population, but we also know roofers have a higher rates of smoking, [alcohol](#) use and higher [UV exposure](#) than the general population, and so it's been difficult to pinpoint the cause of higher cancer rates – is it due to higher PAHs or is it due to lifestyle and other risk factors?" says Berrin Serdar, MD, PhD, investigator at the CU Cancer Center and assistant professor in the Department of Environmental and Occupational Health at the Colorado School of Public Health.

Her study, completed with colleagues at the University of Miami, studied 19 roofers from four work sites in Miami-Dade County. Participants' urine samples, provided before and after a 6-hour shift, showed that after acute exposure to hot asphalt, PAH biomarkers were elevated. Overall, biomarkers of PAH exposure and oxidative [DNA damage](#) (8-OHdG) were highest among workers who didn't use protective gloves and workers who also reported work related skin burns, pointing to the role of PAH absorption through skin.

"PAHs are a complex mixture of chemicals some of which are known human carcinogens. They are produced by incomplete combustion of organic materials and exist in tobacco smoke, engine exhaust, or can come from environmental sources like forest fires, but the highest exposure is among occupational groups, for example coke oven workers or workers who use hot asphalt," Serdar says.

"We can't say with certainty that exposure to hot asphalt causes roofers' increased cancer rate," Serdar says, "but that possibility is becoming increasingly likely. Hot asphalt leads to PAH exposure, leads to higher PAH biomarkers, leads to increased DNA damage – we hope to further explore the final link between DNA damage due to [PAH](#) exposure and higher [cancer rates](#) in this population."

Serdar and colleagues at the CU Cancer Center have initiated a wider study of roofers in the Denver metropolitan area. This study will simultaneously investigate air, blood, and urine levels of PAHs and their link to DNA damage in samples collected over a workweek.

Provided by University of Colorado Denver

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