

In utero exposure to diesel exhaust could be linked to adult heart failure

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According to a study published online in *The FASEB Journal*, involving mice, gestational exposure to airborne particles derived from diesel exhaust can modify DNA in utero and alter the expression of genes that potentially increase susceptibility to adult heart failure. Although an association between gestational exposure to diesel exhaust and heart failure susceptibility had previously been reported, this is the first study that identifies specific DNA methylation (a chemical modification of DNA that changes its action) and gene expression effects in the heart that result from gestational exposure.

"Our study adds to the large body of evidence that [air pollution exposure](#) has significant harmful effects on the cardiovascular system, and extends these findings to show the effects of this [exposure](#) on the developing heart—effects that can last for decades," said Michael T. Chin, M.D., Ph.D., associate professor of medicine at the University of Washington School of Medicine's Center for Cardiovascular Biology in Seattle. "By demonstrating this potential public and global health problem, we hope that our study prompts leaders to develop thoughtful environmental regulatory policies that promote the health and well-being of future generations."

Chin and colleagues used four groups of mice. The first group was exposed gestationally to filtered air and then underwent sham surgery. The second group was exposed gestationally to [diesel](#) exhaust particles and then underwent sham surgery. The third group was exposed gestationally to filtered air and then underwent transverse aortic

constriction (TAC) surgery. The fourth group was exposed gestationally to diesel exhaust particles and then underwent TAC surgery. The researchers compared heart gene expression in all four groups and identified three candidate genes that were expressed differently in the diesel-exposed TAC surgery group, which developed the worst [heart failure](#). These target genes in the heart are the first to be identified that likely play an important role in mediating adult sensitivity to heart failure. The researchers subsequently investigated whether these [genes](#) become chemically modified after diesel particulate exposure and found that one of them (miR133a-2) was methylated differently.

"From just an experience vantage we all assume diesel and other petroleum combustion products are bad for us. Here is evidence of possibly how bad. " said Thoru Pederson, Ph.D., Editor-in-Chief of *The FASEB Journal*.

More information: Jamie M. Goodson et al. In utero exposure to diesel exhaust particulates is associated with an altered cardiac transcriptional response to transverse aortic constriction and altered DNA methylation, *The FASEB Journal* (2017). [DOI: 10.1096/fj.201700032R](https://doi.org/10.1096/fj.201700032R)

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