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# Secondhand smoke results in graft rejection

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A new study published in the *American Journal of Transplantation* reveals that cigarette smoke exposure, in a cause-effect manner, results in graft rejection that would have been prevented by certain drug treatments.

Led by Zhenhua Dai, MD, PhD, of the University of Texas Health Science Center, researchers used mouse transplant models to investigate the impact of second hand smoke (SHS) on transplant survival and its mechanism of action.

Seven to eight mice per group were exposed to SHS and treated with or without immunoregulatory agents. They were exposed to SHS 4 weeks before they were transplanted with islets under the kidney capsule. SHS was terminated once islet allografts were rejected. Recipient mice were untreated or exposed to SHS. The analysis of graft survival was performed using log-rank tests.

Results showed that SHS indeed harms long-term allograft survival. SHS suppressed expression of an enzyme in the grafts produced by innate immune cells. SHS hindered long-term islet allograft survival induced by CD154 costimulatory blockade via suppressing IDO expression and activity, while overexpression of IDO by islets restored their long-term survival.

These findings for the first time revealed an immunological mechanism underlying allograft rejection precipitated by the exposure to cigarette smoke.

"Many people are not aware of the gradual failure of transplanted organs or grafts that is caused by cigarette smoking, although they do know that smoking can cause cancer as well as respiratory diseases," Dai notes. "Our findings will definitely promote the public awareness of the smoking problem with transplanted patients, which in turn could save their lives by either quitting smoking or avoiding exposure to second hand smoke after transplantation."

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