

ACHIEVEMENTS

Soybeans Combat Marijuana-Induced Cardiovascular Disease

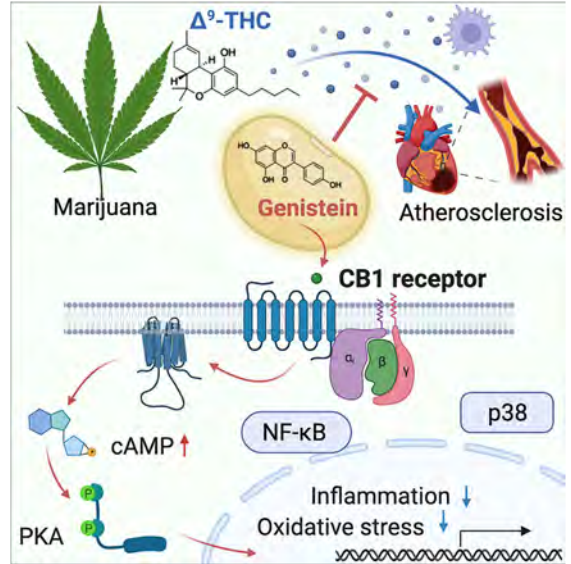
Marijuana is the most widely used illicit drug in the world, and its legal status is increasingly being relaxed for recreational use. Epidemiological studies have shown that marijuana use is linked to an increased risk of coronary artery disease. Patients who take medications containing delta-9-tetrahydrocannabinol (THC), the main ingredient in marijuana that causes the sensation of being high, may experience cardiovascular side effects, such as changes in heart rate and blood pressure.

A team of researchers from NTU, NTU Hospital, Academia Sinica, Stanford University, University of California, and University of Colorado discovered a compound in soybeans called genistein that helps block damage caused by THC in marijuana to the lining of blood vessels in the cardiovascular system. This discovery offers insights into the mechanisms of marijuana-induced damage and the possibility of using this new substance to prevent cardiovascular side effects. The groundbreaking research has been reported by many medical websites and was published in the journal *Cell*.

To examine the pathological effects of THC on the vasculature, researchers exposed THC to pluripotent stem cell-derived endothelial cells (hiPSC-ECs) from healthy individuals. Once THC binds with CB1, known as the cannabinoid receptor 1, it leads to oxidative stress and inflammation, both conditions linked with the development of heart disease.

Through laboratory tests, the researchers found that vascular endothelial cells were more sensitive to THC than cardiac cells. Also, they found an antioxidant compound in soybeans called genistein. Genistein can block THC access and eliminate its effects on endothelial cells without inhibiting THC's ability to stimulate appetite, dull pain, and tamp down nausea — characteristics vital to medicinal marijuana users. This finding is crucial because genistein blocks harmful cardiovascular effects of marijuana while preserving its clinically useful effects.

"I began this project when I was a postdoctoral researcher at Stanford University. After returning to my own laboratory at NTU, I spent another three years to complete the project," said Dr. Tzu-Tang Wei, the study's lead author and assistant professor of pharmacology in the College of Medicine at NTU. "I genuinely appreciate the support of NTU and the Ministry of Science and Technology for this study. We will continue to study mechanisms of marijuana in different body systems." said Wei.



The team proved that the cooperative action of two different classes of tethers, golgin Imh1 and GARP complex, plays an essential role in recycling the transport of SNAREs under ER stress. The image shows how ER stress induces the MAP kinase Slt2/ERK2-dependent golgin Imh1 phosphorylation to suppress the defects of the GARP complex in SNAREs recycling transport.



NTU research group led by Dr. Wei.



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National Taiwan University

+886-2-3366-2577

No.1, Sec. 4, Roosevelt Road Taipei, 10617 Taiwan

ntuhighlights.ntu.edu.tw



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