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Understanding the role of genes in smoking addiction, nicotine withdrawal

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Thomas Gould hopes to better understand how genes influence nicotine-withdrawal symptoms in order to develop more effective smoking cessation programs.

Gould, the Jean Phillips Shibley Professor and head of the Department of Biobehavioral Health, recently received a five-year grant from the National Institutes of Health's (NIH) National Institute on Drug Abuse to examine changes in gene expression during nicotine withdrawal by studying the impact nicotine has on mice.

Despite ever-increasing awareness of the negative health effects of smoking, and despite people's best efforts to quit, smoking is still a problem in the United States, Gould said.

For smokers and users of other tobacco products, withdrawal from nicotine can cause changes in emotion and cognition, but not every smoker experiences the same symptoms.

"Eighteen to 20 percent of Americans are smokers," Gould said. "Of smokers, about 60 to 70 percent want to quit. However, less than 5 percent are successful at quitting after one year."

While there isn't one explanation for why it is so difficult to quit smoking or why some people are successful and others are not, understanding genetics may be one piece of the puzzle, Gould said.

"I realized in addition to studying the effects of nicotine, it was also critical to understand genetic factors that tweak the effects of nicotine on learning and brain function," Gould said.

Through this work, Gould aims to determine what genes make someone more susceptible to behavioral changes and how genes involved in forming memory are altered during nicotine withdrawal. This could lead to personalized treatment based on genetic background.

Gould is a past president of the Society For Research On Nicotine and Tobacco and has been studying nicotine for nearly two decades.

Provided by Pennsylvania State University