

# Genes may determine which smoking cessation treatment works best

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Kicking the habit may soon become easier for the nation's 45 million smokers. For the first time, researchers have identified patterns of genes that appear to influence how well individuals respond to specific smoking cessation treatments.

Scientists at Duke University Medical Center, the National Institute of Drug Abuse, University of Pennsylvania and Brown University scanned the entire human genome in a comprehensive search for genes that could determine treatment outcome. They identified several genetic variations that seem to indicate the likelihood of success or failure of nicotine replacement therapy (NRT) and bupropion (Zyban).

Their findings appear in the June issue of *Archives of General Psychiatry*.

“This takes us a big step forward in being able to tailor treatment to individual smokers to provide the therapies that are most likely to benefit them,” explains Jed Rose, Ph.D., director of Duke's Center for Nicotine and Smoking Cessation Research and one of the study's authors. “In a few years, a simple blood test may provide physicians with enough information to recommend one treatment over another.”

In previous studies, the researchers performed the first genome-wide scan of more than 520,000 genetic markers taken from blood samples of smokers entered in a quit-smoking trial. When they compared the genes of smokers who had successfully kicked the habit to those who failed to

quit, they found clusters of positive results in gene variants present more frequently in the successful quitters. The current findings “confirmed that most of the genetic markers we previously identified remain significant predictors of who will have the most likelihood of success,” says Rose.

George Uhl, MD, PhD, chief of the molecular neurobiology research branch at the National Institute on Drug Abuse and lead author of the study, says their work marks significant inroads in the study of smoking cessation. “It helps us understand why some people are able to quit smoking more easily than others.”

The latest findings, he added, “provide potential clues to match individuals with treatments”

Both NRT and Zyban have proven effective at helping people abstain from smoking, but use different pharmacological mechanisms to achieve that abstinence.

In the current study, Dr Uhl’s laboratory analyzed the DNA of 550 smokers entered into quit-smoking studies in which they were randomly assigned to either placebo, NRT or bupropion. The studies took place at Duke, University of Pennsylvania or Brown University. They assessed quit-smoking success several weeks later and found 41 gene variants specific to smokers who successfully stopped smoking using NRT, and 26 bupropion-specific genes. “Everybody has some version of these genes, but different people have distinct variants,” Rose said.

The researchers stress that the presence of these genetic variants alone is not enough to completely predict specific treatment success or failure. Rose also cautioned that not enough is known, yet, about what role the genes play. “It may be that each gene is adding its own influence. We still don’t know if each gene interacts with each other or if each gene is

casting its vote and we're simply counting up all the votes.”

In their next phase of research, currently ongoing, the researchers are working on confirming these initial findings. In the near future, they plan to expand their studies to include varenicline (Chantix) and other smoking cessation treatments. “We also plan to look at genetic predictors of behavioral therapies to see who they will work best in,” Rose said.

Source: Duke University

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