

Addiction can be measured by epigenetics

The case for the familial inheritance of alcoholism and other addictive diseases is so strong that many children of alcoholics chose never to take a drink for fear of developing the disease. The family history hypothesis has been proven through many genetic studies, some of which [Ben Locwin has written about here at the GLP](#).

Now adding to our genetic understanding of addiction is a growing number of studies showing that drug and alcohol abuse affect epigenetic changes in our brains. So addiction isn't just a pattern of genes causing risk, but also a pattern of risk that change the way our genes are regulated.

In two new studies, neuroscientists showed that both heavy cocaine and alcohol use change the chemical signatures around specific genes that are protective against addiction. [In the alcohol study in particular, once these protective genetic systems were differently regulated, they did never come back online at full strength, and alcoholism developed](#). "This mechanism may be one possible explanation as to why 10 percent of the population develop alcohol use disorders and this study may be helpful for the development of future medications to treat this devastating disease," the University of California- San Francisco researchers said.

In the cocaine study, researchers found that repeated, heavy cocaine use changed the shape of DNA in the brain's reward center. These shape changes make different genes available to expressed in RNA and then into protein. Interestingly the genes most affected by these changes were ones also implicated in schizophrenia and autism.

Even if these findings can't be used directly to develop drug targets to help stop addiction, they may help develop fairly simple tests that could help identify addiction in its earliest stages, when these irreparable changes are just starting.

And, there are some promising, if early ideas, of using gene therapy to help prevent addiction in people with risky genes. For example, [Diana Martinez at Columbia University Medical Center will use gene therapy, in mice, to attempt to increase their D-2 dopamine receptors](#). People with greater numbers of these receptors are more likely to successfully overcome addiction and remain drug free.

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Additional Resources:

- [Addiction: How our genes program our preferences and habits](#), Genetic Literacy Project
- [The Epigenetics of Drug Abuse](#), Scientist
- [Cannabis Genome Project will discover medical mysteries of marijuana](#), Genetic Literacy Project