

# Nicotine vaccine prevents nicotine from reaching the brain

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A vaccine using synthetic nanoparticles could be the world's first successful nicotine vaccine. Image credit: Wikimedia Commons

If smoking a cigarette no longer delivers pleasure, will smokers quit? It's the idea behind a nicotine vaccine being created by MIT and Harvard researchers, in which an injection of synthetic nanoparticles prompts the immune system to create antibodies. The antibodies bind to incoming nicotine molecules so that they're too large to cross the blood-brain barrier. If the brain doesn't know you're smoking, you don't experience the normal smoking kick.

The Boston-based start-up company Selecta Biosciences has tested the SEL-068 vaccine in the lab and is beginning safety tests in humans,

making SEL-068 the first synthetic nanoparticle vaccine to be tested in human clinical trials. If successful, the vaccine would be the first synthetically engineered nanoparticle vaccine, distinct from conventionally manufactured biological vaccines.

Although nicotine is not a virus, the nanoparticles target the chemical as if it were by initiating an immune response. Selecta is using the same strategy to design other synthetic vaccines for non-virus ailments including malaria, cancer, diabetes, and transplant rejection. Once a person receives the nicotine vaccine, the effects should last for several years.

While other smoking aids such as the patch and gum interfere with nicotine cravings by delivering small amounts of nicotine, the vaccine does not try to reduce cravings. Instead, it makes smokers unable to alleviate their cravings by smoking. However, the company notes that smoking several cigarettes in a row could overwhelm the immune system so that a few nicotine molecules could reach the brain and deliver a mild effect.

People spend more than \$2 billion per year on smoking aids and drugs, although these strategies are ineffective for many people and can have severe side effects.

Selecta expects to have results from its early trials in humans this summer, and if the nanoparticles are well-tolerated in humans, will continue with further testing.

**More information:** [selectabio.com](http://selectabio.com)  
via: [Technology Review](#)

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