New targeted drug helps smokers stub it out

EurekAlert

Researchers working in a research project within the Academy of Finland's Research Programme on Substance Use and Addictions have been developing a targeted drug that could aid in smoking reduction therapy. The new drug slows down the metabolism of nicotine, which would help smokers to cut down their smoking.

Nicotine is absorbed rapidly through the lining of the mouth but most readily through the lungs, from where it quickly passes through the body and into the brain. Once the nicotine reaches the liver, it is metabolised by an enzyme called CYP2A6. Preliminary studies by the Canadian partner of the research project have shown that inhibitors of the nicotine-metabolising CYP2A6 enzyme can help smokers curb the need to smoke. Unfortunately, current CYP2A6 inhibitors are not viable options for anti-smoking therapy, as they involve too many adverse effects.

"We're working on developing a CYP2A6 inhibitor, a targeted drug that would only be effective in specific parts of the body. Thankfully, we have a very clear picture of the structure of CYP2A6, and we'll be able to use computer-aided modelling methods to design molecules that will bind specifically to the target without disturbing other functions in the body. We've now finished our four-year project and have discovered several molecules of an until-now-unknown structure. Along the way, we've gained new insights into how the molecules bind to the active centre of the CYP2A6 enzyme. However, it'll take a good while and money before these molecules can be developed into a targeted drug," says Hannu Raunio, the principal investigator of the research project and Professor of Pharmacology at the University of Eastern Finland.

Traditional anti-smoking therapy has long been focused on smoking cessation. At present, there are a wide variety of treatments available to help smokers quit. Nicotine, buproprion and varenicline are among the most common drugs used in the treatment of smoking addiction. The idea behind pharmaceutical nicotine products is to relieve and prevent withdrawal symptoms so as to pave the way for smoking cessation. However, such forms of treatment are often unsuccessful, which has led to suggestions that new methods are needed, methods that would help in smoking reduction. It is this type of targeted drug that Raunio's project is developing.

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