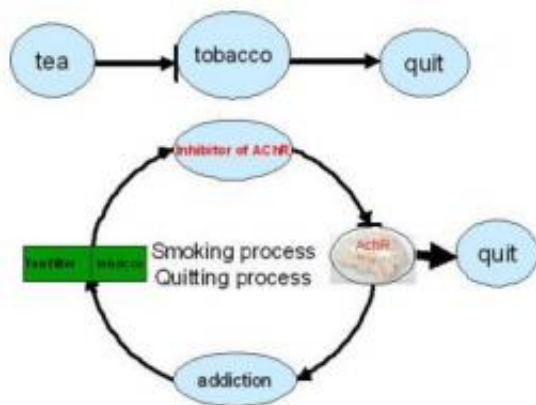


# A new effective strategy for treating tobacco addiction was developed by Chinese researchers

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As different from traditional tobacco cessation methods, the novel tea filter treatment uses the smoking process to help quit smoking. It therefore may be accepted by smokers with less psychological obstacles and side effects. When a smoker is smoking using the tea filter, the inhibitors of the nicotine receptor in the tea filter are absorbed through the respiratory system and travel to the brain where they exert cessation effects. This appears as a circulatory process moving towards smoking cessation, which continues until the smoker quits smoking.

Credit: Science in China Press

The tobacco addiction epidemic is a major public health problem worldwide. Professor Zhao Baolu and his group from the State Key Laboratory of Brain and Cognitive Science, Institute of Biophysics, Chinese Academy of Sciences set out to tackle this problem. After 20

years of innovative research, they have developed a novel tea filter to treat cigarette addiction and have discovered the molecular mechanism behind the smoking cessation effect. They identified theanine as the active ingredient in the tea filter that inhibits nicotine addiction. Their work entitled "The cessation and detoxification effect of tea filters on cigarette smoke" was published in the X. edition *Science of China* in 2010.

Cigarette smoking has been linked to many life threatening diseases including heart disease, cancer and [chronic obstructive pulmonary disease](#). There are about 1.25 billion smokers in the world and five million die every year because of smoking-related diseases, exceeding many other diseases combined. It is estimated that the global cost for smoking-related diseases is about \$200 billion each year, resulting in one of the world's largest human public health problems. Many methods have been developed for [smoking cessation](#) by researchers and clinicians. Despite all efforts, currently available smoking cessation methods produce only modest success rates with frequent relapse. Due to the addictive nature of nicotine, quitting smoking remains an extremely difficult task. Therefore, the need for developing new smoking cessation strategies with better efficacy and fewer side effects is urgent.

Human tests using a newly developed tea filter were conducted at the Addiction Branch of Beijing Military Region General Hospital. A total of more than 100 male smokers participated in this study. The results from the first trial showed that the participants' average daily cigarette consumption decreased by about 43% and 56.5% after using the tea filters for 1 and 2 months, respectively. The results from the second trial showed that the participants' average daily cigarette consumption decreased by about 48%, 83% and 91% after using the tea filters for 1, 2 and 3 months, respectively. The average daily cigarettes consumed by the participants decreased from about 24.5 per day to about 3 per day at the end of 3 months of treatment. In addition, most participants

indicated that sputum and their smoking-related symptoms were reduced compared with the control group. Physical examinations of the participants did not reveal any apparent side effects.

The mechanism of action (MOA) studies indicated that theanine in the filter exerted an inhibitory effect similar to the nicotine acetylcholine receptor (nAChR) inhibitor. In addition, theanine could significantly inhibit the nicotine-induced increased expression of nAChR and the increase of the neurotransmitter dopamine (DA) released in mouse brains. The toxicological studies showed that the tea filters could significantly reduce the carcinogenic materials such as tar, free radicals, nitrosamine, benzo[a]pyrene, benzo[a]anthracene, chrysene and total polycyclic aromatic hydrocarbons (PAHs) generated in cigarette smoking. Animal studies also revealed that tea filters could significantly reduce the acute toxicity, mutagenicity, lung damage and carboxyhemoglobin (COHb) levels in the blood caused by cigarette smoking.

Different cigarette filters have been developed with the purpose of reducing harmful chemicals such as tar and nicotine in tobacco smoke. However, a smoker may smoke more cigarettes using these filters, inhale more deeply or decrease the time between puffs to compensate for the desired nicotine intake, leading to exposure to equal or greater doses of the toxic and cancer-causing substances present in [cigarette smoke](#). Therefore, smoking using these filters is not an alternative for lowering the risk of smoking-related diseases. Smoking cessation methods, such as nicotine replacement therapy, nAChR partial agonists and antagonists, have been shown to help some smokers quit, but they also have high relapse rates and are perceived as being inconvenient. They are not easily accepted by the smokers psychologically, affecting the efficacy of their smoking cessation.

The novel tea filter treatment might avoid the pitfalls mentioned above

and effectively promote smoking abstinence. Because it uses the smoking process to help quit smoking, it is easily accepted by smokers, with less psychological obstacles and side effects. When a smoker is smoking using the tea filter, the inhibitors of the nicotine receptor in the tea filter are absorbed through the respiratory system and travel to the brain where they exert cessation effects. This smoking cessation process appears as a spiral process. The smokers get progressively less dependent on nicotine in each smoking cycle, and eventually exit the cycle and quit smoking (as shown in the Figure).

Implementation and promotion of this work will change individuals' smoking statuses and global smoking statistics, and challenge the concept of smoking addiction. It will make a great contribution towards reducing smoking-related diseases, public health burdens and pollution.

The development and discovery of this tea filter was a collaborative effort involving many researchers, medical doctors and clinicians from different institutes, universities and hospitals. This research project was partially supported by a grant from the National Natural Science Foundation of China and a 973 grant from the Department of Science and Technology of China. It is an important breakthrough in the recent history of tobacco cessation research. The researchers suggested that their work needs to be practiced and examined in a larger population and the mechanisms behind the nicotine cessation effects of tea and theanine should be further studied. These efforts will have significant impact on the control of cigarette smoking and the reduction of smoking-related diseases globally.

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