Smoking may protect against Parkinson's disease—but it's more likely to kill you

June 21 2016, by Thomas Caspari, Bangor University

Credit: AI-generated image (disclaimer)

There is a little art gallery in my high street which is run by a lovely lady who unfortunately suffers from Parkinson's disease. Deep inside her brain, nerve cells are dying. This results in a steep decline in the neurotransmitter dopamine. As a smoker you may be familiar with dopamine as its release by nicotine causes a strong feeling of reward.

Other drugs such as methamphetamine, made famous as crystal meth in the TV series Breaking Bad, also trigger an increase in this neurotransmitter.

My art friend, and an estimated 127,000 other people in the UK, have low levels of dopamine which cause the well known debilitating movement defects of Parkinson's, such as muscle twitching and slowness of movement (bradykinesia). The late Muhammad Ali – himself a Parkinson's sufferer – helped to raise awareness for these life-changing conditions.

Strikingly, half of all smokers are protected from Parkinson's disease after taking into account their reduced life expectancy. The protection increases with the number of cigarette packs consumed per year. Studies with identical twins have borne out this "dose-response" relationship and suggested that the protective effect has nothing to do with differences in genes or environment.

A similar protective effect does not extend to crystal meth, as this drug kills the dopamine producing neurons thereby promoting Parkinson's disease.

A daily puff?

Nicotine has been shown to relieve the symptoms of Parkinson's disease, to reduce the significant side effects of its treatment and to protect dopamine neurons from dying. Since nicotine stimulates the release of dopamine, it can partly compensate for the low levels of the neurotransmitter in the substantia nigra of the brains of people with Parkinson's – a part of the brain responsible for movement and reward. Nicotine also decreases the involuntary muscle movements known as dyskinesia which are caused by the treatment of the disorder with the dopamine precursor L-dopa. (As an artist, my friend finds dyskinesia

particularly frustrating.)

Also, nicotine protects damaged neurons from death by increasing the amounts of survival proteins and by blocking inflammation of the affected brain area. Based on this evidence, Ali may have benefited from a daily cigarette – although it would not have provided a cure.

In more than 95% of Parkinson's patients, large amounts of inactive alpha-synuclein protein accumulate inside the dying brain cells. These deposits are known as Lewy bodies. Alpha-synuclein exists in two forms: an active form, which is involved in the release of dopamine, and an inactive form that can form Lewy bodies. Nicotine may prevent cell death by increasing the amount of active alpha-synuclein as it encourages neurons to release dopamine. This would block the formation of Lewy bodies thereby keeping nerve cells alive.

Should you buy nicotine patches?

Small scale clinical trials testing nicotine patches have failed, so far, to provide conclusive evidence of improvements in cognitive and motor function. Unlike smoking, a patch results in the constant release of nicotine that could deactivate nicotine receptors in the brain. It is well known that the continuous presence of an activator such as nicotine switches off its receptor which in turn causes changes in other receptors in the same cell.

Cigarette smoke also contains thousands of chemicals and it could well be that nicotine needs some of them to do its protective work. One of them, a naptho-quinone, protects against neuronal cell death and may help nicotine to prevent Parkinson's disease.

While your brain may stay active, the rest of your body is unlikely to approve of a smoking therapy against Parkinson's disease as cigarette

smoke harms most organs, causing about 96,000 premature deaths a year in the UK.

My artist friend incorporated the disease in her art which may be a very good way to deal with the situation until we reach a better understanding of the therapeutic benefits of cigarette smoke and, in particular, nicotine .

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