

# Studying nicotine's potential to treat Parkinson's



## Project information

Lead researcher	Dr Stephanie Cragg
Location	University of Oxford
Cost	£142,451 over two years
Start date	To be confirmed
Type of project	Project Grant
Project code	G-1103

## Project background

Despite being introduced over 40 years ago, levodopa is still the most common drug treatment for Parkinson's. It can dramatically improve many of the more serious symptoms by boosting the amounts of the chemical dopamine in an area of the brain that is responsible for controlling voluntary movement. However, as time goes on, many people find that levodopa starts to lose its beneficial effect and this gives rise to side effects, such as uncontrolled involuntary movements called dyskinesias. So finding other treatments to enhance or replace levodopa is a vital goal for Parkinson's research.

Dr Cragg and her team are interested in nicotine and other nicotine-like substances as potential treatments for Parkinson's for two reasons:

- **Nicotine changes the way dopamine is used by nerve cells in the brain region affected by Parkinson's.** Dr Cragg's team have found that in a typical healthy brain nicotine can boost the amount of dopamine that these nerve cells use to communicate. But we don't yet know whether it will have the same effect in the Parkinson's brain.

- **Many research studies have shown that smokers are less likely to develop Parkinson's.** So in addition to relieving the symptoms, nicotine could potentially protect the dopamine-producing nerve cells from further damage. This could halt the progress of Parkinson's.

Dopamine-producing nerve cells have several different types of nicotine 'receptor'. These are responsible for mediating the action of nicotine on nerve cells. But we don't know enough about the role of the receptors in the control of dopamine. In another ongoing Parkinson's UK-funded project (*Can nicotine treat Parkinson's?* Project code: G-0803), Dr Cragg and her team have already shown that nicotine receptors play a crucial role in controlling the amount of dopamine that is released from nerve cells. They have also found that the nicotine receptors that control dopamine release from nerve cells that are affected in people with Parkinson's are different from those in the nerve cells of people without Parkinson's.

### What the researchers are doing

In this study, Dr Cragg and her team will study one particular receptor type called alpha5 type. Preliminary evidence suggests that it is involved in dopamine release. So what they now need to do is work out how it works. Dr Cragg will collaborate with researchers from the Pasteur Institute in Paris who have developed mice that lack the alpha5 type gene. Dr Cragg will use the animal model to look at the role of the alpha5 receptor by comparing dopamine release in mice that either have or don't have the alpha5 gene. They also plan to determine whether the alpha5 receptor functions are restricted to those nerve cells affected in Parkinson's.

### How the research will help people with Parkinson's

The knowledge gained from this project will help identify which nicotine receptors can boost dopamine function in the brain. Once we have this information it may be possible to design new drug treatments that only work on those specific receptors so offer improved therapies for people with Parkinson's.

## For more information, please talk to the Research Team

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