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Smoking's up-side: Nicotine protects the brain from Parkinson's disease

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If you've ever wondered if smoking offered society any benefit, a new research report published in The *FASEB Journal*offers a surprising answer. Nicotine protects us from Parkinson's disease, and the discovery of how nicotine does this may lead to entirely new types of treatments for the disease.

"This study raises the hope for a possible neuroprotective treatment of patients at an early step of the disease or even before at a stage where the disease has not been diagnosed according to motor criteria," said Patrick P. Michel, co-author of the study from the Institut du Cerveau et de la Moelle Épinière, Hôpital de la Salpêtrière, in Paris, France.

To make this discovery, scientists used mice genetically engineered without a specific nicotine receptor (the alpha-7 subtype) and mice with a functional receptor. Using tissue from mouse embryos, researchers prepared brain cultures using conditions that favor the slowly progressing loss of dopamine neurons, a hallmark of the disease. The scientists found that nicotine had the potential to rescue dopamine neurons in cultures from normal mice, but not in cultures from mice without the nicotine receptor. These findings suggest that it may be feasible to develop novel therapies for Parkinson's disease that target nicotine receptors, particularly the alpha-7 nicotine receptor.

"If you're a smoker, don't get too excited," said Gerald Weissmann, M.D., Editor-in-Chief of The FASEB Journal. "Even if smoking protects you from Parkinson's, you might not live long enough to develop the

disease because smoking greatly increases the risk for deadly cancers and cardiovascular diseases. But now, we should be able find non-toxic ways to hit the same target."

More information: "Neuroprotection of midbrain dopamine neurons by nicotine is gated by cytoplasmic Ca2+". *FASEB J.* August 2011 25:2563-2573; doi:10.1096/fj.11-182824

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