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## *Transgenic Mice Expressing Luciferase in Dopaminergic Neurons*

Currently, no method exists for high throughput longitudinal studies of dopaminergic neuron survival *in vivo*. Such a system would be particularly useful in the study of Parkinson's disease (PD), a disorder characterized by the gradual loss of dopaminergic neurons. Here we have created, by pronuclear injection, transgenic mice expressing the firefly luciferase reporter gene driven by a 4.5kb rat tyrosine hydroxylase (TH) promoter specific to the dopamine pathway. After injection of the substrate luciferin, dopamine producing neurons of these mice were tracked *in vivo* via bioluminescent imaging with charged cooled device cameras. Several founder lines were selected by luciferase PCR and their progeny were screened and characterized by bioluminescent imaging. Imaging revealed luciferase activity in multiple brain regions implicated in PD. Current work aims to develop mice with luciferase expression restricted to areas implicated in PD. These anticipated low-background strains will utilize either a 9kb TH promoter or a dopamine transport (DAT) promoter to drive luciferase expression. Historically, both 9kb TH-GFP and DAT-GFP mice have demonstrated excellent specificity to dopaminergic neurons. When coupled with luciferase, such specific expression will likely allow investigators to quantify the number of dopaminergic neurons, test possible therapeutic agents, and study the compounds responsible for dopaminergic neuron loss. Furthermore, the current 4.5kb TH-Luc and both future strains of mice could be used to study the biology of TH-expressing cells and to develop stem cells lines, the dopaminergic progeny of which may be followed *in vivo* after transplantation.

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