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Janet A Best* (jbest@math.ohio-state.edu), Department of Mathematics, 231 West 18th Ave, Columbus, OH 43065, and **H. Frederik Nijhout** and **Michael C Reed**. *A Mathematical Model of Dopamine Homeostasis*.

Dysregulation of the neurotransmitter dopamine is associated with disorders such as Parkinson's disease, schizophrenia, Tourette's syndrome, and drug addiction. These consequences of dopamine dysfunction highlight the importance of maintaining dopamine functionality through homeostatic mechanisms: dopaminergic systems must respond robustly to important biological signals such as bursts in firing, while at the same time maintaining homeostasis in the face of routine fluctuations in inputs, expression levels, and firing rates. Here we describe a mathematical model for the synthesis, release and reuptake of dopamine at a nerve terminal; the model includes several known feedback mechanisms and allows us to make predictions concerning their relative contributions to dopamine homeostasis. (Received September 08, 2009)