

Unique properties of mesoprefrontal neurons within a dual mesocorticolimbic dopamine system

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The mesocorticolimbic dopamine system is essential for cognitive and emotive brain functions and is thus an important target in major brain diseases like schizophrenia, drug addiction, and attention deficit hyperactivity disorder. However, the cellular basis for the diversity in behavioral functions and associated dopamine-release pattern within the mesocorticolimbic system has remained unclear. We identified a new type of dopaminergic neuron within the mesocorticolimbic dopamine system with unconventional fast-firing properties and small DAT/TH mRNA expression ratios that selectively projects to prefrontal cortex and nucleus accumbens core and medial shell as well as to basolateral amygdala. In contrast, well-described conventional slow-firing dopamine midbrain neurons only project to the lateral shell of the nucleus accumbens and the dorsolateral striatum. Among this dual dopamine midbrain system defined in this study by converging anatomical, electrophysiological, and molecular properties, mesoprefrontal dopaminergic neurons are unique, as only they do not possess functional somatodendritic GIRK2-coupled dopamine D2 autoreceptors.

Previews:

- Ford C, Williams, JT "*Mesoprefrontal dopamine neurons distinguish themselves*" (NEURON 57:5, 2008)
- Welberg L "*A split (mid)brain for dopamine*" (NATURE REVIEWS NEUROSCIENCE, Research Highlights, Vol. 9, May 2008)