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Neural Development of The Striatum In The Mammalian Forebrain
(前腦紋狀體的神經發育基礎)

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My laboratory is devoted to studying neural development and plasticity of the basal ganglia circuits in the mammalian forebrain. The striatum is the major input structure of the basal ganglia circuits. What makes the striatum an attractive and important system for neurobiological study is its involvement in processing multiple dimensions of neurological functions ranging from movement, cognition, learning, memory and reinforcement. The importance of the striatum is also reflected in a number of neurological disorders including Parkinson's disease, Huntington's disease and mental illness. The study of development and function of the striatum is thus fundamentally important not only to the understanding of integrative brain function, but also to the development of therapeutic approaches to neurological diseases. The long-term goal of my research is to elucidate how the infrastructure of the basal ganglia circuits is built to function in the forebrain. To this end, we focus our study to identify and characterize the striatum-enriched genes including transcriptional regulators and associated signaling molecules. Two lines of work have been pursuing in my laboratory. First, as retinoid signaling molecules are highly expressed in the developing striatum, we study the mechanisms by which retinoid signaling regulates striatal development. Second, using the subtractive cDNA library cloning technique, we recently identified a novel C_2H_2 zinc-finger gene, *Nolz-1*, that is highly expressed in the developing striatum. By pursing these two lines of studies, we are gaining insights into the genetic programs underlying neural development of the striatum in the basal ganglia.

我的實驗室研究主題為大腦基底核的神經發育與可塑性。基底核內一個主要的結構為紋狀體神經核。紋狀體對大腦神經訊息的整合扮演重要的角色，紋狀體的功能參與運動控制，認知，學習記憶與行為增強性。而一些神經性疾病如巴金森症、杭庭頓舞蹈症與精神性疾病皆與紋狀體的神經元退化或功能不正常有關。因此研究紋狀體的神經發育與功能對瞭解腦部的整合性功能是相當重要的。我的實驗室研究目標為在於瞭解紋狀體所在的基底核神經迴路是如何在神經發育過程中建構於腦部內。我們的研究策略是研究在早期紋狀體發育中有高度表現的基因，特別是可以調控基因啟動的轉錄因子。我們目前有兩個研究方向，一為研究 retinoid signaling 如何調控紋狀體神經元的發育；另一方向為研究我們最近發現的一個高度表現於發育中紋狀體的新穎基因 *Nolz-1*。我們希望藉由這兩個方向的研究能幫助我們瞭解紋狀體神經元發育的基因調控基礎。