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# Opioid Receptor-Induced GTPγ$^{35}$S Binding during Mouse Development

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## Abstract

Although a large superfamily of G-protein-coupled receptors serves multiple functions, little is known about their functional activation during ontogeny. To examine the functional activation of the mu-opioid receptor (MOR) and the delta-opioid receptor (DOR) during development, sections of mouse embryos and fetuses from e11.5 until birth were treated with DAMGO and DPDPE, respectively, and the ability of these drugs to induce G-protein coupling was assessed by using GTPγ$^{35}$S binding autoradiography. MOR activation was first detected in the caudate-putamen (CPU) at e12.5, and by e15.5, activity had not only increased in this region but also expanded to include the midbrain, medial habenula, hypothalamus, pons, and medulla. DOR activity first appeared at e17.5 in the hypothalamus, pons, medial habenula, and medulla and at p1 in the CPU at levels noticeably less than those of the MOR. In general, MOR and DOR activation lagged only slightly behind the appearance of MOR-1 and DOR-1 mRNA but delayed activation was particularly pronounced in the trigeminal ganglia, where MOR-1 gene expression was first detected at e13.5, but MOR activity was not observed even at birth. Thus, the data demonstrate temporal and often region-specific differences in the appearance and magnitude of functional activity in cell groups expressing either the MOR-1 or DOR-1 genes, suggesting that interaction between the opioid receptors, G-proteins, and other signaling cofactors is developmentally regulated.

## Keywords

embryonic; development; opiate; opioid receptors; GTPγ$^{35}$S binding autoradiography; G-protein coupling

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