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Cellular Dispersion Patterns and Phenotypes in the Developing Mouse Superior Colliculus

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Abstract

The mammalian superior colliculus is structurally and functionally divided into two entities: superficial visual and deep multimodal motor. To discover the role, if any, of developmental processes in establishing separate tectal compartments, we have used highly unbalanced mouse chimaeras to mark cell dispersion pathways and trace cell lineages. Two forms of cell dispersion were detected: radial and tangential. Neither radial nor tangential forms of cell dispersion were found to exist on their own in any group of labeled cells. Radial cell dispersion was the predominant form of cell movement from the germinal zones and primarily associated with the differentiation of glutamatergic neurons. In contrast, tangential cell dispersion involved a minority of tectal cells, concentrated chiefly in the superficial layers and often associated with the upper aspects of radial columns. More scattered cells expressed γ -aminobutyric acid (GABA) compared to columnar cells. Taken together, these results indicate separate developmental constraints for the development of glutamatergic and GABAergic neurons in the superior colliculus.

Keywords






superior colliculus; chimeras; radial migration; tangential dispersion; glutamate; GABA

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