Linking the neural crest cell cycle to developmental abnormalities

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ABSTRACT

The neural crest (NC) is a population of embryonic stem cells appearing during early vertebrate embryo development[1]. The NC proliferates, delaminates, acquires mesenchymal properties, and migrates from the neural plate to distant tissues, where it differentiates into various cell types[2]. Failure in any of these processes can lead to developmental malformations, such as craniofacial abnormalities or the transformation of NC stem cells (NCSCs) into cancer cells[3]. Despite the importance of understanding the causes of these conditions, the knowledge of the genetic, environmental, and developmental origins is limited.

Here, we focus on understanding how the cell-cycle/migration interrelation is regulated in a mammalian model. Using an *ex vivo* neural plate system, we study how these cellular processes are controlled in normal conditions and compare cellular behaviors of cranial NCSCs versus trunk NCSCs. We also manipulate the function of specific molecules involved in cell migration or proliferation using small molecule inhibitors. The information obtained from these experiments, can prove valuable in comprehending the mechanisms responsible for aberrant craniofacial development, cancer transformation and metastasis.

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