Abstract

The craniofacial region, a complex structure defining the vertebrate head, results from intricate cellular and molecular processes governed by various genetic regulations and signaling cascades, including the noncanonical Wnt pathway. Dysregulations in this pathway, particularly involving Wnt5a, have been linked to craniofacial malformations, as seen in conditions like Robinow syndrome. This study aimed to elucidate the role of Wnt5a signaling in craniofacial development using mice with targeted deletion of *Wnt5a* specifically in the neural crest cells, which give rise to craniofacial structures. Our findings highlight the critical involvement of Wnt5a in shaping craniofacial precartilage condensations and regulating cellular behaviors such as proliferation, oriented cell division, and primary cilia polarity during early craniofacial morphogenesis. Wnt5a signaling is also important for key developmental populations, such as $Msx1^{+}$ and $Pax3^{+}$ populations. These findings not only contribute to the current understanding of noncanonical Wnt signaling in craniofacial development but also offer valuable insights into the intricate regulatory networks governing this process.

Keywords: Wnt5a signaling, neural crest cells, morphogenesis