

# PAX3

## Related Genes

**Nine *Pax* genes exist, and most of these are expressed during embryonic development with precise temporal and spatial expression patterns.** Mutations in other *Pax* genes reveal functional roles: *Pax1* mutations are responsible for the mouse mutant undulated, which displays defects in the vertebrae and sternum ([Balling et al., 1988](#)). *Pax6* mutations are seen in the mouse mutant small eye and the human disease of aniridia, both of which display defects of ocular, nasal, and brain development ([Glaser et al., 1992](#), [Hill et al., 1991](#), [Jordan et al., 1992](#)). *Pax2* mutations cause eye, kidney, and ear defects ([Torres et al., 1995](#)).

*PAX* genes are frequently expressed in numerous cancer cell lines, and immunohistochemical analysis of primary tumor tissue revealed widespread PAX2 protein expression. **PAX2- and PAX3-targeted RNAi treatments result in apoptosis of cancer cells, suggesting PAX genes function in promoting cancer cell survival** and are therefore reasonable targets for cancer drug treatment ([Muratovska et al., 2003](#)).

**In chick, PAX3 and PAX7 proteins are both expressed in dorsal neural tube, premigratory and early migrating neural crest, while in mouse only PAX3 is expressed in these cells.** Chick melanoblasts continue to express PAX7 in a manner similar to that of PAX3 ([Lacosta et al., 2005](#)).

**Contradictory data exists on the expression of zebrafish Pax7 in pigment cells. Lacosta et al. state that Pax7 protein is expressed in premigratory and migratory neural crest, as well as in all pigment cell lineages** (melanophores, xanthophores, and iridophores). Expression of Pax7 continues after pigment production and through metamorphosis ([Lacosta et al., 2007](#)). **In contrast, Minchin et al. state that in zebrafish, Pax7 is expressed in xanthophores, but excluded from melanophores.** Expression of Pax7 appears necessary for terminal differentiation of xanthophores, but is not essential for fate specification of these cells, although the presence of a duplicated *pax7* gene, *pax7b*, may account for this result ([Minchin and Hughes, 2008](#)).