Neural crest and Schwann cell progenitor-derived melanocytes are two spatially segregated populations similarly regulated by Foxd3.

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Nitzan, E, Pfaltzgraff ER, Labosky PA, Kalcheim C. 2013.

Abstract:

Skin melanocytes arise from two sources: either directly from neural crest progenitors or indirectly from neural crest-derived Schwann cell precursors after colonization of peripheral nerves. The relationship between these two melanocyte populations and the factors controlling their specification remains poorly understood. Direct lineage tracing reveals that neural crest and Schwann cell progenitor-derived melanocytes are differentially restricted to the epaxial and hypaxial body domains, respectively. Furthermore, although both populations are initially part of the Foxd3 lineage, hypaxial melanocytes lose Foxd3 at late stages upon separation from the nerve, whereas we recently found that epaxial melanocytes segregate earlier from Foxd3-positive neural progenitors while still residing in the dorsal neural tube. Gain-and loss-of-function experiments in avians and mice, respectively, reveal that Foxd3 is both sufficient and necessary for regulating the balance between melanocyte and Schwann cell development. In addition, Foxd3 is also sufficient to regulate the switch between neuronal and glial fates in sensory ganglia. Together, we propose that differential fate acquisition of neural crest-derived cells depends on their progressive segregation from the Foxd3-positive lineage.

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