Synopsis of Original Research Paper

Pten/PI3-kinase pathway in melanocytes governs hair graying and melanomagenesis

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PTEN is a tumor suppressor gene inactivated in numerous sporadic cancers, including melanomas. To analyze *Pten* functions in melanocytes, we used the *Cre-loxP* system to delete Pten specifically in murine pigment-producing cells and generated *DctCrePten*$^{flox/flox}$ mice. Half of *DctCrePten*$^{flox/flox}$ mice died shortly after birth with enlargements of the cerebral cortex and hippocampus. Melanocytes were increased in the dermis of perinatal *DctCrePten*$^{flox/flox}$ mice. When the mutants were subjected to repeated depilations, melanocyte stem cells in the bulge of the hair follicle resisted exhaustion and the mice were protected against hair graying. Although spontaneous melanomas did not form in *DctCrePten*$^{flox/flox}$ mice, melanomas developed after carcinogen exposure. *DctCrePten*$^{flox/flox}$ melanocytes were increased in size and exhibited heightened activation of Akt and Erks, increased expression of Bcl-2, and decreased expression of $p27^{Kip1}$. Our results show that *Pten* is important for the maintenance of melanocyte stem cells and the suppression of melanomagenesis.