

## Comparative Postnatal Growth and Development of Skin in Precocial, Intermediate and Altricial Rodents as an Ontogenetic Reference to Regeneration

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**Abstract :** The spiny mouse (*Acomys* species) is a precocial rodent that has emerged as an interesting mammal model for various organ regeneration studies due to its remarkable ability to restore all tissues in punched ear holes and injured skin. There is a scarcity of information regarding neonatal and postnatal skin development in precocial mammals in comparison to other close relatives in the altricial-precocial spectrum. The varying developmental degrees of neonates and how they relate to adults are the focus of this study. The study compares neonatal characteristics and postnatal skin development in *Acomys Percival* to its close relative *Lophuromys zena* (*Lophuromys flavipunctatus* group) in the *Deomyinae* subfamily to establish their neonatal maturity status and growth pattern. Breeding colonies of *A. percivali*, *L. zena* and *Mus musculus* were established. The off-springs postnatal stages of structural dorsal and auricular skin development were studied where manifesting external features established through gross examination were used to unravel histogenesis of skin in neonates and aged groups. Skin specimens from the different rodents showed striking differences between the neonatal and aged groups. Moreover, the skin structure also exhibited considerable inter-species differences at the same postnatal time points but followed similar development patterns to maturity. The integument of the newborn *A. Percival* was the most advanced in development compared to the in-between nidicolous semi-precocial young of *L. zena* with a rapid postnatal development pattern and the altricial *M. musculus*, where most maturation of the integumentary system occurred in a prolonged postnatal period. We then utilized a 4-mm ear punch assay to compare the ability to replace auricular tissue and the rate of pinnal hole closure. *L. zena* closed the pinnal hole at a faster rate compared *A. percivali*. Taken together, our findings support the conclusion that neonatal maturity status and developmental patterns are not directly related to regenerative ability. This study deepens the understanding of skin morphogenesis across developmental, regenerative and evolutionary levels in mammals.

**Keywords :** altricial, intermediate, precocial, skin development, regeneration

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