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發育再生研究快報

Topology of Feather Melanocyte Progenitor Niche Allows Complex Pigment Patterns to Emerge

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Abstract

Color patterns of bird plumage affect animal behavior and speciation. Diverse patterns are present in different species and within the individual. Here, we study the cellular and molecular basis of feather pigment pattern formation. Melanocyte progenitors are distributed as a horizontal ring in the proximal follicle, sending melanocytes vertically up into the epithelial cylinder which gradually emerges as feathers grow. Different pigment patterns form by modulating the presence, arrangement, or differentiation of melanocytes. A layer of peripheral pulp further regulates pigmentation via patterned agouti expression. Lifetime feather cyclic regeneration resets pigment patterns for physiological needs. Thus, the evolution of stem cell niche topology allows complex pigment

patterning via combinatorial co-option of simple regulatory mechanisms.

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