

Light microscopic studies of pedicle skin formation and transformation to antler velvet in red deer

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Abstract

Deer pedicle and antler consist of two components: an interior osseocartilage and an exterior skin. Histological studies of the osseocartilage of red deer showed that the histogenesis of a pedicle and an antler covered four ossification stages. This experiment investigated pedicle skin formation and transformation to antler velvet using histological techniques. The results showed that pedicle skin formation was initiated from the frontal lateral crest and proceeded through three distinct stages: compression of the subcutaneous loose connective tissue (at the transitional stage), stretching of the undulated epidermis (at the early pedicle endochondral stage, pECO) and neogenesis of the skin and its associated appendages (at mid pECO stage). Antler velvet transformation (at late pECO stage) was mainly associated with alteration in the skin appendages (sebaceous glands, sweat glands and arrector pili muscles). The results from this study suggest that the factor which drives expansion of pedicle skin may be the mechanical force derived from fast formation of the underlying tissue. The transformation from pedicle skin to antler velvet may be accomplished by both mechanical stimulation and chemical induction. The former drives skin neogenesis and the latter determines the type of newly formed skin.