

A NOTE ON MICROSCOPIC ANATOMY OF THE SKIN OF THE GREAT INDIAN RHINO CALF (*RHINOCEROS UNICORNIS*)

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The present study records the main histomorphological characteristics of skin of the great Indian one-horned rhino, found in Assam forests.

Small tissue pieces of skin from the head and facial regions of a one year-old male rhino calf, were collected from the State Zoo-cum-Botanical Garden, Guwahati. These were processed for paraffin sectioning and subsequently stained by Mayer's H.& E., Mallory's method, Hart's method and Gomori's method for different connective tissue fibers (Luna, 1968).

The skin of rhino calf was composed of epidermis, dermis and subcutaneous layers as was reported in other domestic animal species (Dellmann and Brown, 1987). The microscopic ridges and folds of skin was similar to that of the African black rhino (Bhayani *et al.*, 1991). The average thickness of the skin of rhino calf was found to be 2486.0 μm while that of the epidermis, dermis, reticular and papillary layers revealed 338.8 μm , 2147.2 μm , 453.2 μm and 1694.0 μm , respectively. The skin thickness of the African black rhino was reported to be about 2.0cm

(Bhayani *et al.*, *loc.cit.*) and that of the Indian one-horned rhino to be 1.0 to 1.9 cm (Bhattacharya *et al.*, 1989). The papillary and reticular layers of the dermis were distinct and the former was recorded to be $252.55 \pm 16.07 \mu\text{m}$ thick in the African black rhinoceros (Bhayani *et al.*, *loc.cit.*).

The epidermis of rhino calf consisted of five distinct layers viz., stratum corneum, stratum lucidum, stratum granulosum, stratum spinosum and *stratum basale* with their average thickness of 89.1 μm , 8.8 μm , 19.8 μm , 163.9 μm and 19.8 μm , respectively. The stratum corneum exhibited stratified squamous epithelium with less keratinization and the cells of stratum basale revealed prominent basement membranes. The presence of five different layers of epidermis of Indian rhino calf was in agreement with that of the African black rhino. However, the stratum corneum revealed more thickness of $151.45 \pm 14.73 \mu\text{m}$ than that of the great Indian rhino (Bhayani *et al.*, *loc.cit.*).

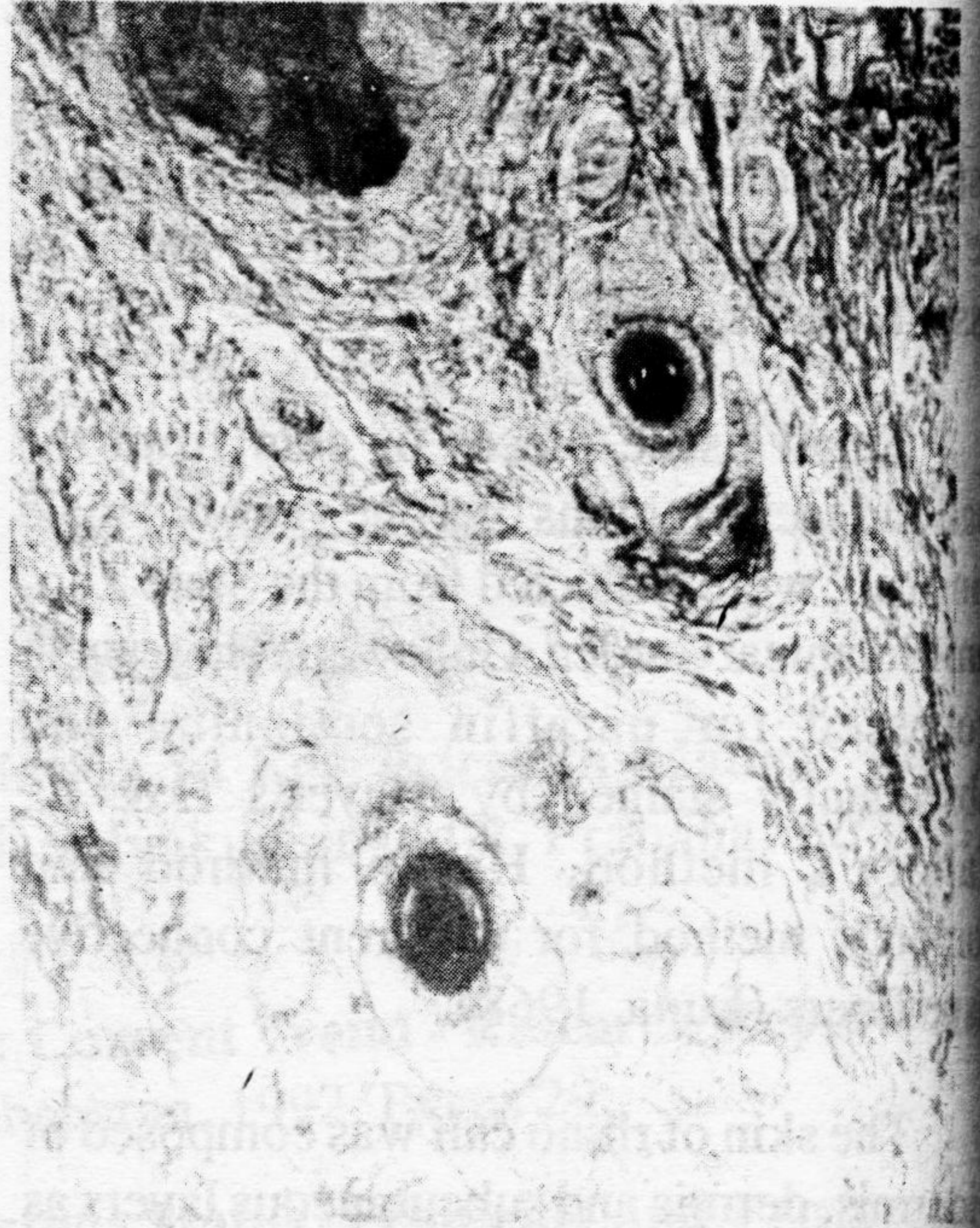
The papillary layer of rhino skin demonstrated very prominent dermal papillae (Fig.1) with numerous prominent blood

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Fig. 1. Photomicrograph of skin of rhino calf, showing epidermis, dermis and well developed dermal papillae. (H & E)



Fig. 2. Photomicrograph of skin of rhino calf, showing cross section of hair follicle along with prominent sebaceous gland in the reticular layer. (Gomori's method for reticulum)



vessels. The much thicker reticular zone mainly exhibited presence of dense irregular collagenous bundles. These findings agreed with that of Bhayani *et al.* (*loc.cit.*) in African black rhino. These however, might served to increase more surface contact with the epidermis (Banks, 1981) and to loose heat load as had been stated for buffalo (Majeed *et al.*, 1975).

A large number of sebaceous glands and secretory portions of sweat glands were observed in the reticular zone of rhino skin. Cross sections of hair follicle with prominent

sebaceous gland was marked (Fig.2). These hair follicles were rudimentary in nature. The bundles of smooth muscle fibers, arranged circularly, were the main feature in the deeper part of this reticular zone. The presence of sebaceous glands, sweat glands and hair follicles in the Indian rhino showed similarity to that of the African black rhino (Bhayani *et al.*, *loc.cit.*).

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