



Research Paper

On the Various Layers of Integument of *Microhyla ornata*

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Abstract: Anura is the largest order of class Amphibia of phylum Chordata that includes various kinds of frogs and toads. Their integument is adopted to suit their micro-habitat in which they live. Anuran integument consists of two major regions i.e. epidermis and dermis which further are composed of many layers. These layers differ in their structure and cellular details. In present studies, a detailed investigation was made on the integument of *Microhyla ornata*. Histology of integument of *Microhyla ornata*, was done. A new type of layer between stratum spongiosum and stratum compactum was observed and termed as stratum dubetium, new name.

Keywords: anuran, integument, layers, epidermis, dermis, stratum dubetium

Abbreviations: Epidermal layer (E), dermal layer (D), hypodermal layer (H), Chromatophore layer-1 (Chr-1), Chromatophore layer-2 (Chr-2), stratum dubetium (sd), stratum corneum (Sc), stratum granulosum (Sg), stratum spinosum

(Ss), and stratum germinativum (Sgm), stratum spongiosum (Sp) and stratum compactum (Cp).

INTRODUCTION

Frog belongs to the order Anura of the class Amphibia. The anurans are unique in having an integument which is more or less without protective derivatives like scales, feathers, hairs and other derivatives. Their skin is exposed to water. The integument of anuran is basically formed by an epidermal and a dermal layer. Epidermal layer is subdivided into the stratum corneum having keratinized cells, and the stratum germinativum. The dermal layer has a classic structural morphology into the stratum spongiosum and the stratum compactum.

Cameron (1936) described the bodies as reserve accumulations of secreted materials which were used up in the formation of the dermal connective tissue. The dermis contains many unmyelinated nerve fibers,

© Copyright 2014 | ijgsr.com | All Rights Reserved and some of these axons extend into the epidermis. Elias and Shapiro (1957) were provided definition and a terminology of the fine structure of the anuran integument. Voute (1963) and Parakkal and Matoltsy (1964) studied the structure of *R. pipiens* epidermis, Farquahar and Palade (1965) studied the epidermis of adult *Xenopus laevis*, and Fox (1972) described the structure of *R. temporaria* epidermis. Duellman and Treub (1986 & 1994) described the biology of amphibians. Felseburgh *et al.* (2006) reported that the thin hypodermis was located below the dermis found in the basic integument morphology of all anurans. Since then no study was found in which details of types of layers and their cellular composition was studied. Therefore, present study was planned to investigate detailed histology of integument of *Microhyla ornata*.

MATERIAL AND METHODS

Histology of integument of *Microhyla ornata*, (Dumeril and Bibron, 1841) was done using standard methods corresponds to the protocol of preparation of samples and specimens suggested by García del Moral (1993), and MacManus (1948).

RESULT

Anuran integument consists of three layers epidermis, dermis and hypodermis. Between epidermis and dermis, epidermal basement membrane was observed. Two types of pigment layers were arranged in different manner, first is chromatophore -1 layer, which is found below epidermal basement membrane and above the glandular regions. In dorsal region, second layer, chromatophore-2 layer was found below glandular region. In ventral region, second chromatophore-2 layer observed between stratum compactum and hypodermis. In this region, this layer

was observed very broad and girdle (belt) shaped (figure-1)

In classical account of integument four types of layers were observed in epidermis. These are stratum corneum, stratum granulosum, stratum spinosum, and stratum germinativum. In dermis, two types of layer were observed, namely stratum spongiosum and stratum compactum, showing in figure-2. A new layer between stratum spongiosum and stratum compactum was observed which is absent in control (figure-3). This purple coloured layer was seen for the first time and was wide, single cell thick and wavy in appearance. To this layer, a new name was given stratum dubetium, showing in both figure-1 and figure-2.



FIGURE 1

Figure-1: Light micrograph of histology of dorsal skin of frog *Microhyla ornata* showing epidermal (E), dermal (D) and hypodermal layers (H), Chromatophore-1(chr-1) and chromatophore-2 (chr-2). A new layer *stratum dubetium* (sd) visualized purple in colour. Magnification 400 X



FIGURE-2

Figure-2: Light micrograph of histology of ventral skin of frog *Microhyla ornata* showing stratum corneum (Sc), stratum granulosum (Sg), stratum spinosum (Ss), and stratum germinativum (Sgm), stratum spongiosum (Sp) and stratum compactum (Cp) Chromatophore-1(chr-1) and chromatophore-2 layers (chr-2). A new layer *stratum dubetium* (sd) visualized purple in colour. Magnification 400 X

DISCUSSION

In present investigation, detailed cytological, histological study was carried out on the integument of *Microhyla ornata*. All the previously described layers were observed. These observations are in accordance with earlier studies (Voute, 1963; Parakkal and Matoltsy, 1964; Farquhar and Palade, 1965; Fox, 1972). However, few authors such as Marenco-Gomez *et al.* (2014) has given names i.e. basale, intermediate and apical strata of keratinocytes and non-keratinized layer. A new layer showed some histological peculiarities such as wavy lining of columnar cells just above and below the collagen bundles and took purple colour by HE-stain. This was a first time observation therefore; a new name (*stratum dubetium*) was given to this layer.

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