

# The Comparison of the Histological Skin Structures of Common Sunda Toad (*Duttaphrynus melanostictus*) and Grass Frog (*Fejervarya limnocharis*)

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## ABSTRACT

Anuran skin preserves all functional activities, especially for respiration and water regulation. *Duttaphrynus melanostictus* and *Fejervarya limnocharis* are the common species found in Borneo lowlands and are well-adapted to humans. Hence, they can reproduce quickly and rapidly in great numbers in the urban area. This study aims to select these urban-type anurans and describe the skin structure and glands. Four regions of skin samples were obtained, namely Dorsal Head (DH), Dorsal Centre (DC), Ventral Head (VH) and Ventral Centre (VC). The microscopic slides were prepared accordingly as in the histological techniques including skin grossing, fixing, processing, embedding, sectioning and were stained with Haematoxylin and Eosin staining. The seromucous glands are most prevalent in all four regions for both species. Parotoid glands are clearly visible in the skin structure of *D. melanostictus*, while there is a lack of parotoid glands in *F. limnocharis*. Nonetheless, *F. limnocharis* contains regular rows of glands, whereas the distribution of glands in *D. melanostictus* is scattered. In addition, *D. melanostictus* possess dermal bones, which are absent in *F. limnocharis*. Since anuran skin is a mucosal surface that in constant direct contact with the environment, their adaptations to harsh habitats should be reflected in the skin, particularly in the urban and invasive species in this study.

Keywords: *Duttaphrynus melanostictus*, *Fejervarya limnocharis*, glands, skin histology, urban-types anuran

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## INTRODUCTION

An anuran's skin consists of epidermis and dermis, which is the largest and heaviest single organ of the body. Their skin can be described as the mucosal surface which will be in constant and direct contact with the aquatic and terrestrial environments that are microbial diverse and laden (Varga *et al.*, 2019). Thus, they must be adapted to the demands of both habitats with their soft, moist integument. All the functional activities of the anuran skin are preserved by the skin of amphibian, which cooperates with the cardiac and respiratory systems (Zainudin *et al.*, 2018). Hence, for efficient cutaneous respiration and reduced evaporative water losses, their skin compensates for them by osmotic reabsorption when in contact with water. In addition, anuran skin is the essential innate organ of immunity, constituting a complex network of physical, chemical, immunological, and microbiological barriers, serving as the first line of defence against pathogens in the environment (Varga *et al.*, 2019). Their skin is composed of a lot of

chemical compounds secreted from the glands that may play an important role as a defensive mechanism against potential predators and as a protection against ectoparasites (Moreno-Gómez *et al.*, 2014). Most of the anurans have mucous, granular, and seromucous glands, which granular glands are also called poison glands. In the dermal layer, all these glands play different functions and vary in size and surface area. Interestingly, toads have parotoid glands and warts on their skin. When toads are disturbed, they will secrete a milky and latex-like toxin that makes them smell nasty and harmful to predators (Inger *et al.*, 2017). In the same way, toads also possess the granular gland that aids in protecting them from enemies and inflict insects that might harm them.

*Duttaphrynus melanostictus*, is a stocky and medium-sized to large true toad belongs to the family Bufonidae. The dark crests that border the eyelids and extend downwards on either side of the eye, as well as the round warts of various sizes on the back, make *D. melanostictus* easy to