

Z204 Structure and vascularization of the skin of an air-breathing mudskipper fish, *Periophthalmus magnuspinnatus*

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Epidermis of mudskipper fish, *Periophthalmus magnuspinnatus* consisted of three layers, an outermost layer, middle layer and stratum germinativum. Extensive vascular capillary networks are present near the superficial layer of epidermis, outermost layer, and the diffusion distance between the vascular capillaries and the surface of epidermis was about $1.5 \mu\text{m}$ (± 0.85). The middle layer consists of small or voluminous cells, so-called swollen cell, swollen by epidermal cell. Due to the swollen cells, the thickness of the epidermis increase and the epidermis exhibits a web-like structure in appearance. The swollen cell contains tonofilaments, lucent contents, and desmosome. Fine blood capillaries are also discernible in this layer. Well-developed lymphatic spaces containing lymphocytes exist in the stratum germinativum. Numerous blood capillaries are present under the basement membrane. The dermis consisted of a stratum laxum and stratum compactum, and there was a definite area with acid mucopolysaccharides and a small scale in the stratum laxum. The skin has an epidermal pigment cell, dendritic melanophores (-cytes) containing melanin granules within their cytoplasm, and two kinds of dermal pigment cells, melanophores and colorless pigments containing reflecting platelets.

Z205 Heavy Metal Effects on Gill Structure in the Clam, *Ruditapes philippinarum*

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This study was initiated to establish the mud flat indicating species related to environmental contamination. We investigated the fine structural effect by the heavy metals, Cd, Pb, and Hg accumulation in the gill of *Ruditapes philippinarum*, the most popular species of mudflat clam. Experiment was carried out on *R. philippinarum* exposing to different concentrations of three selected metal solution. The major effects induced by heavy metals appeared at the surface structure of gill filaments. Accumulated of heavy metals caused an gradual increase of the empty spaces among the adjacent filaments. Characteristically, apoptotic reactions of the epithelial cell of the gill filament, such as nuclear fragmentation, increase of Golgi-derived vacuoles, accumulation of dense bodies, and mitochondrial destruction were observed by the Hg treatment.