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〈シンポジウム〉

第49回日本香粧品学会（2024）・シンポジウムII「最新技術で皮膚を観る～明日の肌のサイエンス～」

Volume EMで観てはじめてわかる皮膚のメソスケール

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Mesoscale in Skin Visualized by Volume Electron Microscopy

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Abstract

Biological systems exhibit hierarchical complexity, with mesoscale structures (10 nm to a few microns) being directly involved in numerous biological functions. Volume electron microscopy (vEM) has become a pivotal method for three-dimensional reconstruction of mesoscale structures, offering high spatial resolution and comprehensive analysis capabilities. This review focuses on the application of vEM in characterizing the mesoscale architecture of skin tissue, revealing previously uncharacterized structural details. Examples include the three-dimensional arrangement of desmosomes and tonofilaments in epidermal keratinocytes, the interactions between fibroblasts and collagen bundles in the dermis, and dynamic contacts between macrophages and fibroblasts. Additionally, we discuss the integration of vEM with correlative light and electron microscopy (CLEM), enabling molecular identification within three-dimensional ultrastructures. The advancements in vEM not only provide a precise morphological framework for understanding biological phenomena but also facilitate the association of molecular markers with ultrastructural features, opening new perspectives for biological research.

Key words: skin architecture, volume electron microscopy (vEM), mesoscale structure, correlative light and electron microscopy (CLEM), 3D reconstruction.