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'SHINGLE' MICROSTRUCTURE IN SCLERACTINIAN CORALS: A POSSIBLE ANALOGUE FOR LAMELLAR AND MICROLAMELLAR MICROSTRUCTURE IN PALEOZOIC TABULATE CORALS

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Interpretations of biogenicity of skeletal microstructures in ancient organisms commonly rely on analogy with extant organisms. In the case of Tabulata and Rugosa, the organisms are extinct, but scleractinian corals can serve as appropriate analogues (Sorauf, 1996). However, lamellar and microlamellar microstructures observed in tabulate, and less commonly rugose, corals have been controversial, being interpreted as original biogenic structures (e.g., Wang, 1950; Lafuste, 1983; Rodriguez, 1989) and as possible later diagenetic features (Sorauf, 1993). One reason for the controversy is the lack of lamellar-microlamellar microstructures in scleractinian corals, which are dominated by fibrous –trabecular microstructures. However, Sorauf (1993, 1996) noted that lamellar-microlamellar microstructures might be produced by fibrous biominerals if the fibres grew roughly parallel to the surface. Possible candidates for such structures were described as 'scale-like units' in the scleractinian coral, *Acropora*, by Gautret et al. (2000). We used ultrathin sections and scanning electron microscopy to directly compare the 'shingle' microstructure of extant *Acropora* to that of *Michelinia meekana* from the Mississippian of Arkansas, which Plusquellec and Sando (1987) considered to be lamellar, and to published data from other tabulate corals.

Acropora microstructure consists of aragonite fibers arranged in typical radiating trabeculae and in bundles that are arranged in a low-relief, overlapping, shingle-like pattern. Individual bundles range from 4-20 μm in width and 2-7 μm in thickness. Length of shingles varies between 20 and 110 μm. Fibers within shingles are roughly parallel to the surface of underlying shingles and radiate laterally 6-45°. Shingle growth is directed mostly distally within corallites, and they may originate from the distal edges of trabeculae or occur on any surface with discontinuity with underlying trabecular structures. In ultra-thin sections *Acropora* shingles are similar in size and appearance to lamellae-microlamellae in Paleozoic corals, commonly having roughly crescent-shaped cross-sections. Lamellar-microlamellar microstructure in *Michelinia meekana* consists of roughly parallel scales measuring 4-50 μm in diameter and 1.5-7 μm in thickness. The scales do not appear to be fibrous. Scales in other Paleozoic tabulate corals have dimensions of 10-50 μm diameters and 2-8 μm thickness (Rodriguez, 1989). If the fibrous nature of the shingles of *Acropora* was obscured by recrystallization, but the shingles survived as recognizable units, perhaps owing to the surrounding organic matter (Gautret et al., 2000), the resulting structures would be very similar in appearance to lamellae-microlamellae. Hence, lamellar-microlamellar microstructure may have an analogue in scleractinian corals, as speculated by Sorauf (1993), thereby supporting their fundamentally biogenic nature.

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