

Neoproterozoic thrombolite and spherical structures from Brazil: Expected images of the oldest multicellular animal

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Intensive researches on the Neoproterozoic sediments in the last two decades have demonstrated drastic climate changes and unveiled traces of biological evolution. We studied the Neoproterozoic Salitre Formation (Una Group) in central Bahia (Brazil) for seeking novel signature of early life. This formation contains cap carbonate on the base, and overlies diamictites corresponding to Marinoan or Sturtian glaciation.

Lithofacies of the Salitre Formation are various from shallow-water stromatolite to deep-water slumped bedded carbonate. Organic-rich carbonate unit partly appears an enigmatic feature consisting of digitate structures of 5 mm in width. This has been called thrombolite. The digitate structures are concentrated in a lentic body of ~5 m thick and ~20 m wide. In the silicified digitates, aggregation of clots or peloids was observed. The thrombolites could be microbial, as stromatolites, but this interpretation is inconsistent with homogenous outer forms and lack of internal lamination. This might be a structure originated from a lithified animal body. According to the historical background of the animal evolution, a most likely candidate was a sponge. The clots and peloids found in the silicified part resembles in appearance of structures formed in decayed body of sponge (Neuweiler et al., 2007).

The Salitre carbonate also contains spherical structures of ~4 mm in diameter. The spheroids have organic membrane and calcite filling. They are too large for acritarchs that are abundant in the Neoproterozoic strata. They are unlikely giant microbes, such as *Thiomargarita*. An animal egg was a possible origin, but they are again too large as an egg of the modern sponges. Digitate and spherical structures may bring novel material considering evolution of multicellular animals if they were originated from sponges.

Neuweiler et al. (2007) *Jour. Sediment. Res.*, 77, 552-563.

Sial et al. (2010) *Development in Precambrian Geology*, 16, 31-69.

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