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### **New Small Shelly Fossils *Acanthocassis* from the Early Cambrian**

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*Acanthocassis* is a microfossil reported from the early Cambrian small shelly fauna of South China. It is polyp-like and is composed of an apical main branch and an abapical aggregate of several sub-branches arranged in radial symmetry. Isolated sub-branches are common and were assigned to different genera by different authors. The affinity of *Acanthocassis* remains a matter of debate, though several hypotheses were presented.

We describe *Acanthocassis orthacanthus* from the early Cambrian of South China. *A. orthacanthus* has a long, cylindrical main branch that is ornamented with irregularly and sparsely distributed small nodes at the abapical portion. The sub-branches range in number from three, four, five, six, seven, to eight. They were originally soft and flexible, and merged at their bases to form a common plane among them. They are coniform and hollow internally, and their surfaces are ornamented with irregularly distributed small nodes/spines as well as densely-spaced longitudinal lines. These anatomic features permit a detailed revision of the generic diagnosis of *Acanthocassis*. Previous studies regarded *Acanthocassis* as disarticulated hard parts for support, or cuticular armourings for defense. Here, we reinterpret *Acanthocassis* as an independent organism, and tentatively assign it to the stem group of Hydrozoa. *Acanthocassis* might be a sessile hydrocolony with radial symmetry, hollow tentacles, no mesenteries (gastric setpae) and no perisarc (athecate). The nodes/spines on the surfaces might be nematocyst batteries that accommodate cnidae functioning for defense and food capture. No mouth or hypostome is developed in the present specimens, indicating that they were non-feeding and implying that they formed colonies and got nutrient from other feeding polyps. *Acanthocassis* might represent the oldest known hydrozoan, and it indicates that representatives of crown-group cnidarians (anthozoans, cubozoans, scyphozoans and hydrozoans) have emerged simultaneously in the early Cambrian.

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