

## **SUPPLEMENTARY INFORMATION**

### **A sclerite-bearing stem group entoproct from the early Cambrian and its implications**

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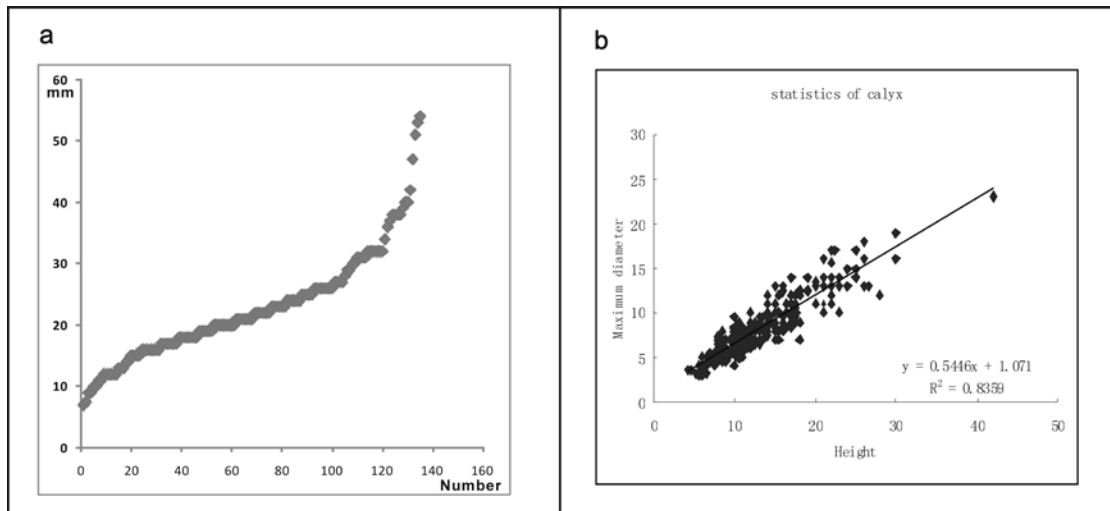
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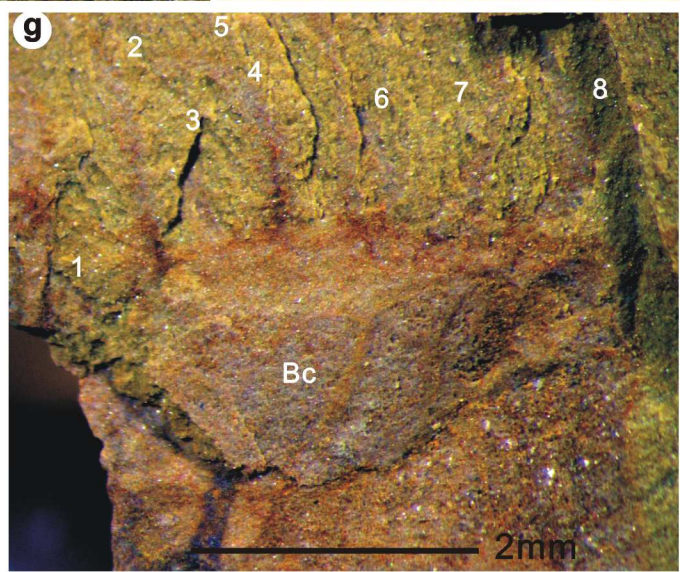
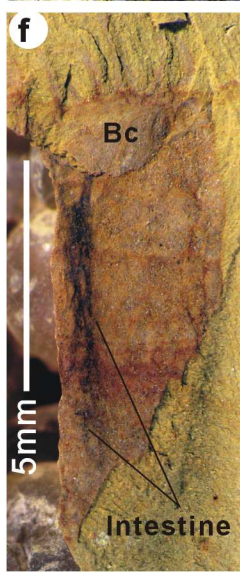
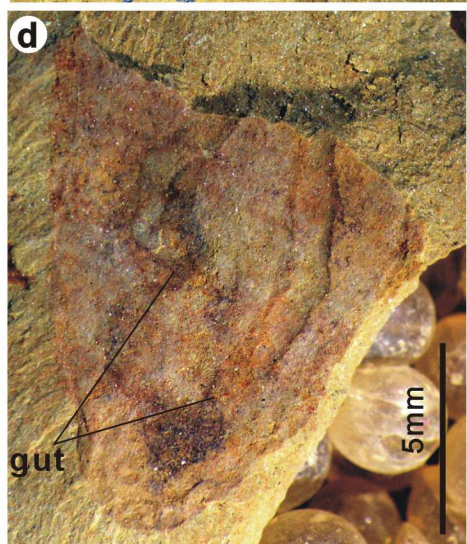
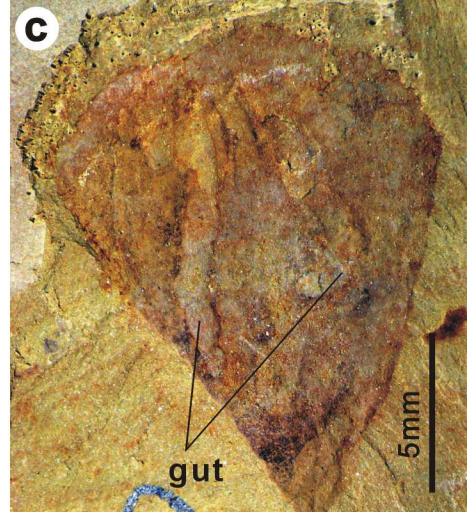
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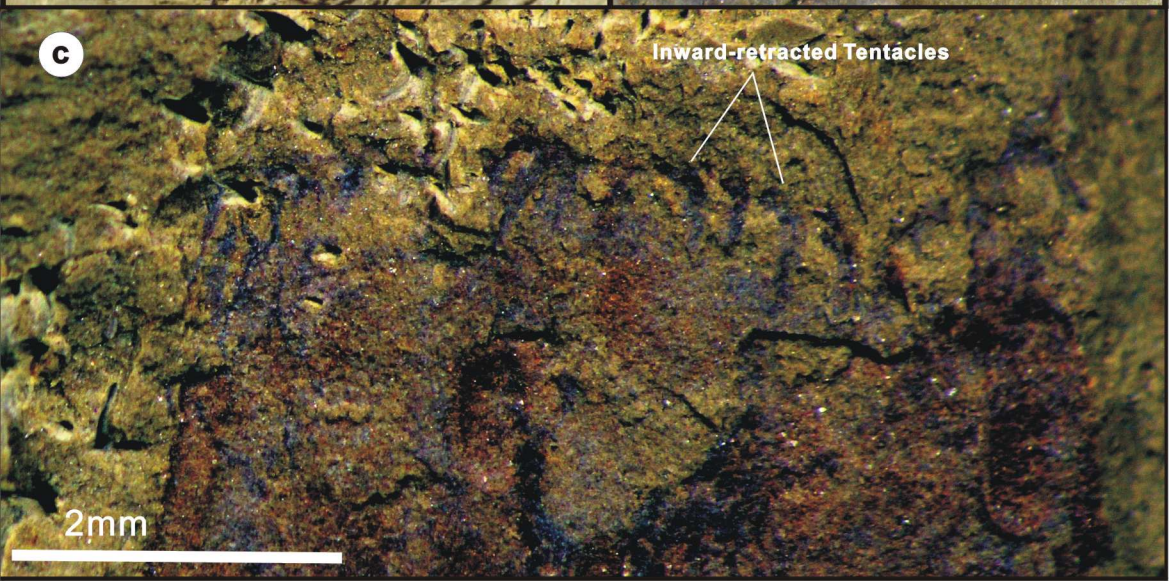
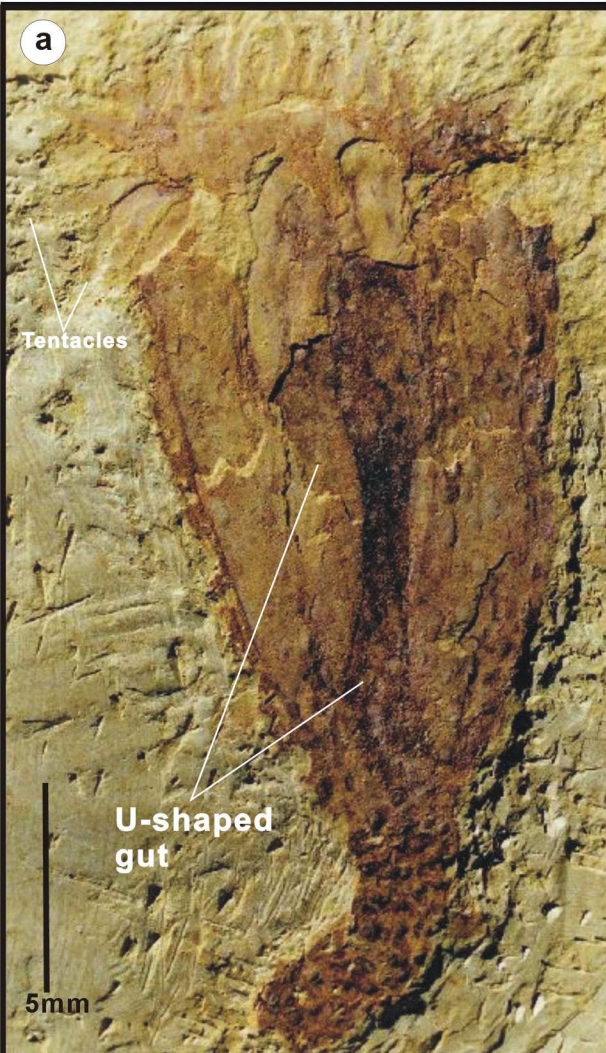
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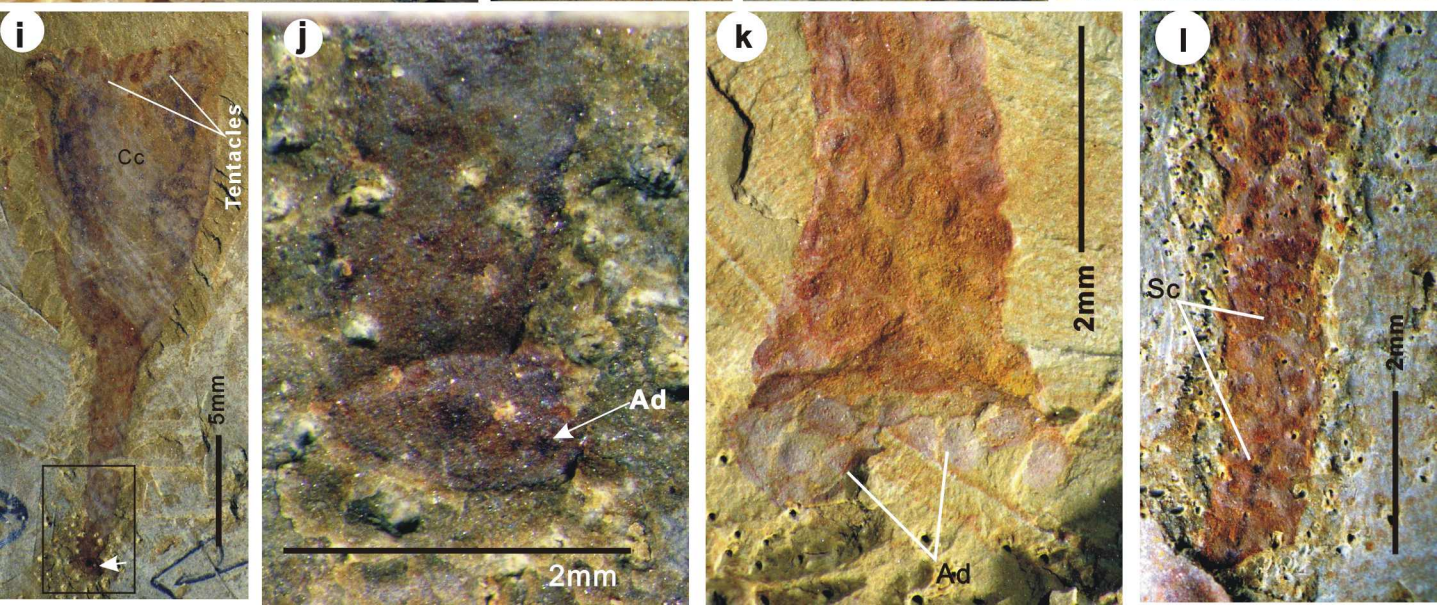
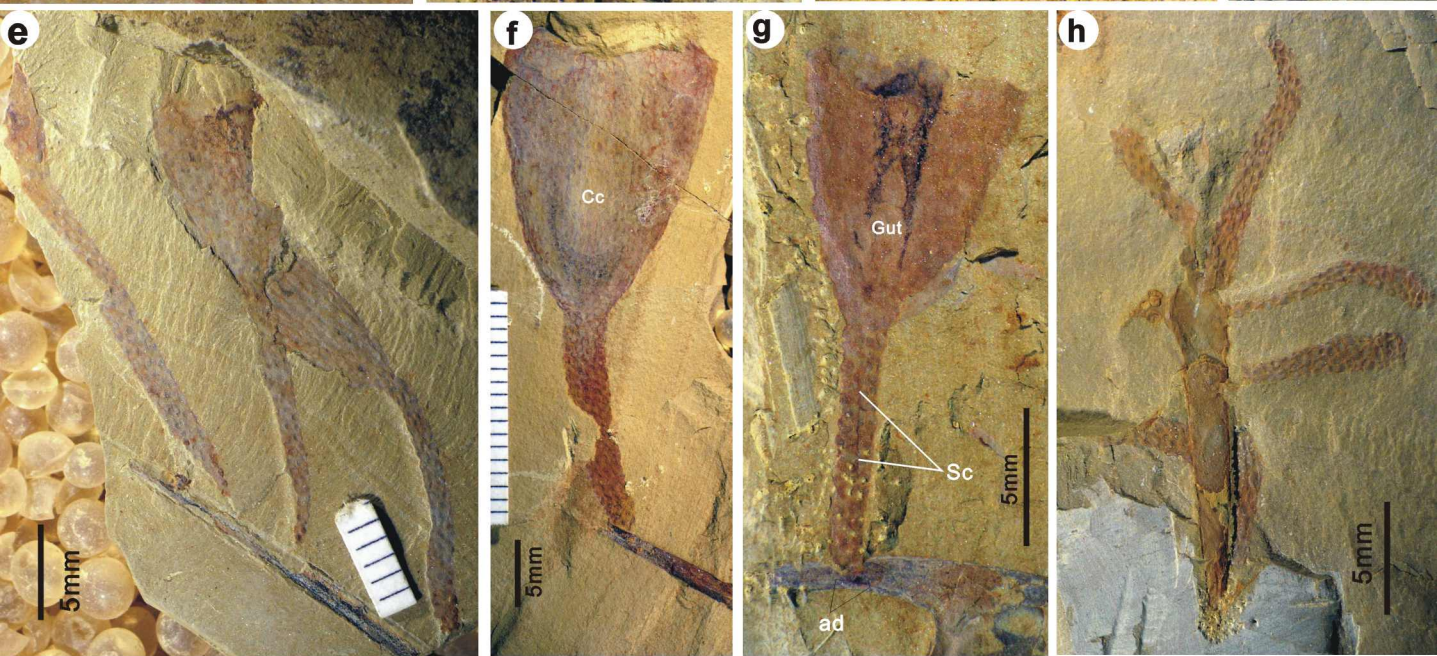
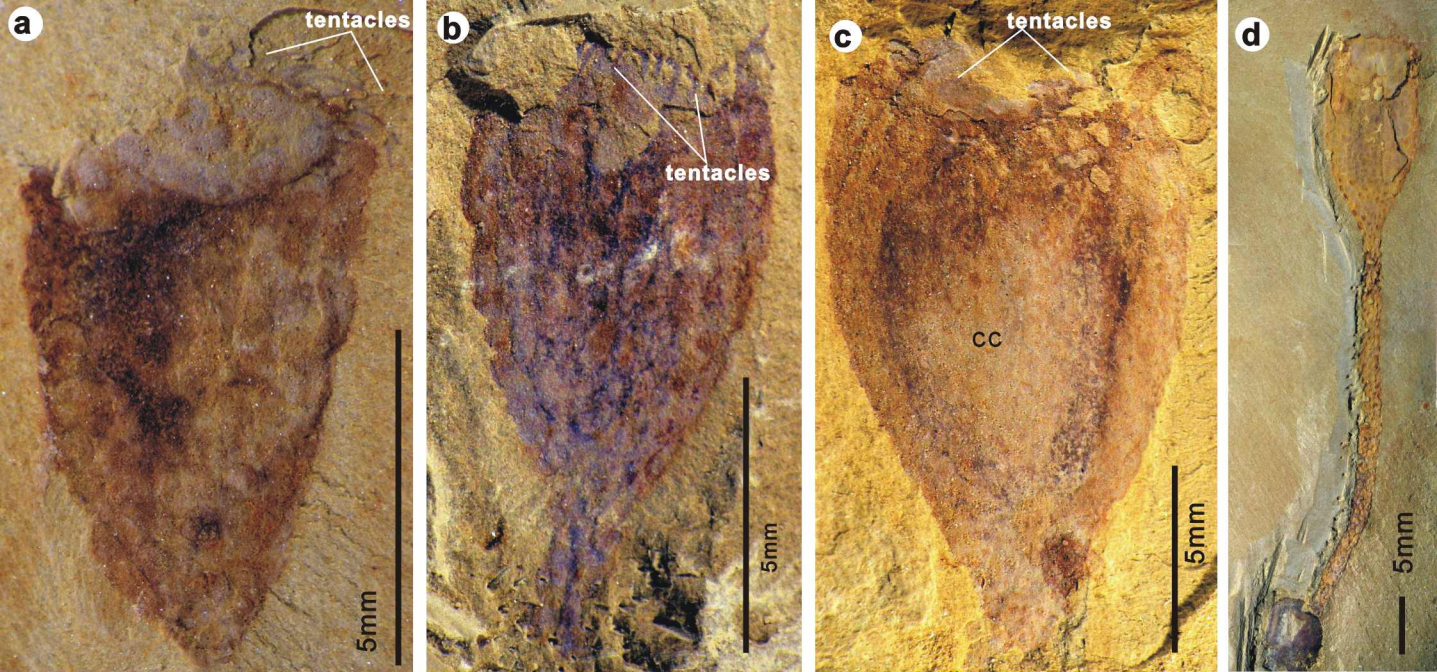
**Fig. S1.** Size statistics for the stem entoproct *Cotyledion tylodes* Luo et Hu 1999 from the Chengjiang fauna. **a**, body height variations of *Cotyledion*; **b**, plots of maximum height versus diameter of calyx in *Cotyledion* based on ELI collection from the early Cambrian Chengjiang fauna of China.



**Fig. S2.** The early Cambrian Chengjiang stem entoproct *Cotyledion tylodes* Luo et Hu 1999. **a**, ELI-C-0367B, Internal mould of mud-filled calyx cavity (Cc); **b**, ELI-C-0045A, an anterolaterally crushed specimen showing mud-infilled buccal cavity (Bc) and 3-D preserved gut; **c**, ELI-C-0346A, showing the mud-filled U-shaped digestive tract with pronounced relief; **d**, Counterpart of c; **e**, ELI-C-0312B, internal view of a calyx, showing the U-shaped impression of gut (ug) and basal impressions of sclerites on the internal wall of calyx; note the membrane band with tentacles; **f**, ELI-C-0296B, general view of a specimen squeezed in a mouth-anus direction; **g**, Details of the tentacles in f, note the mud-filled slit-like mouth (Bc).

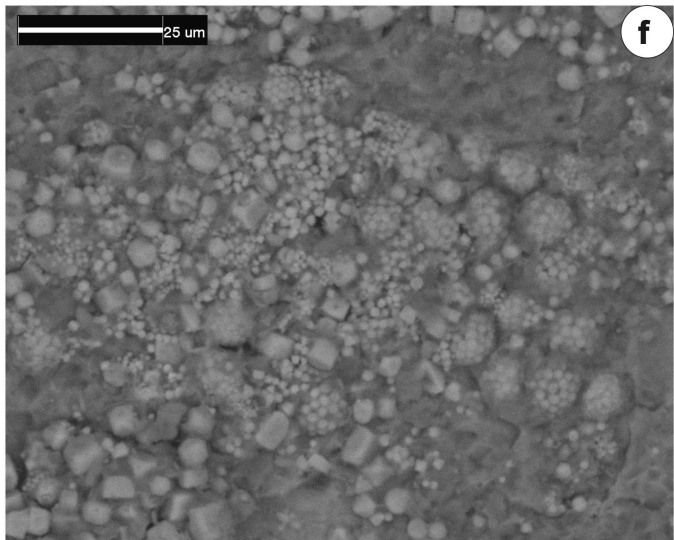
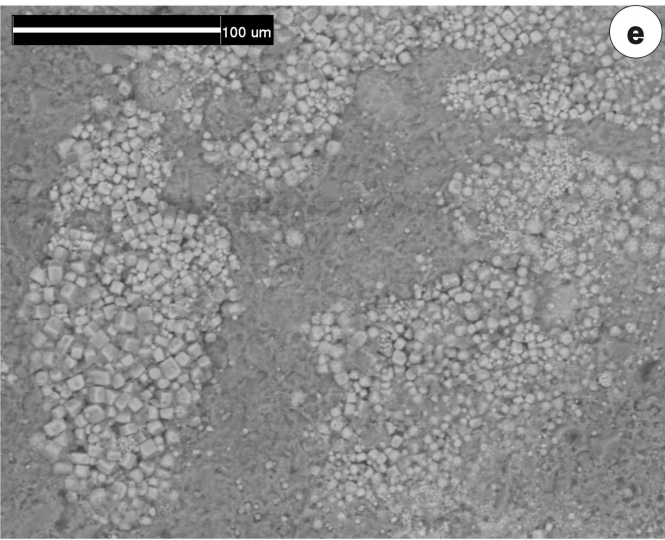
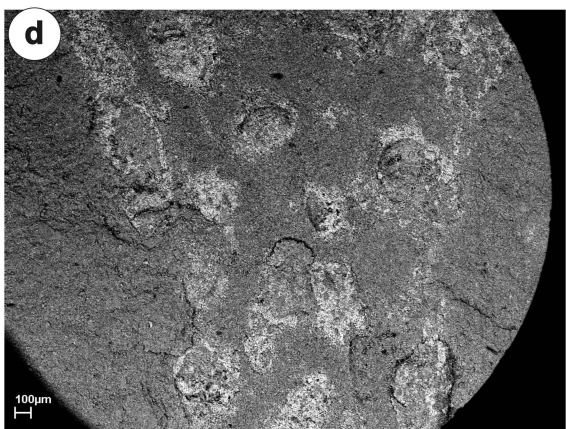
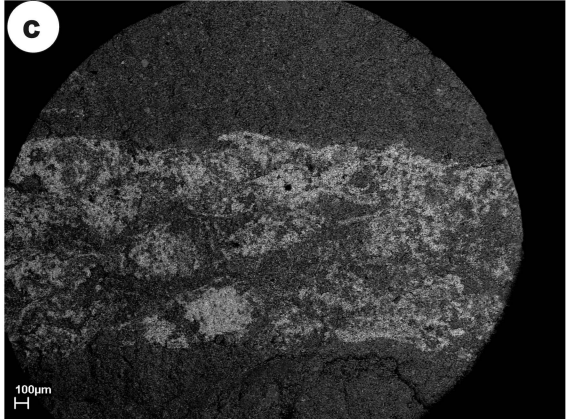
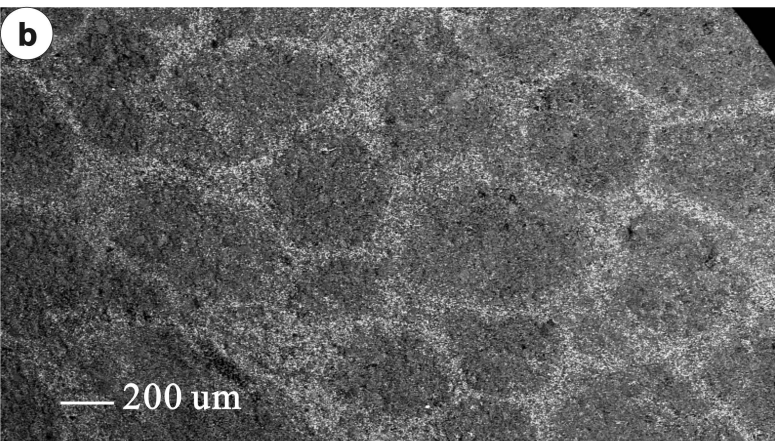
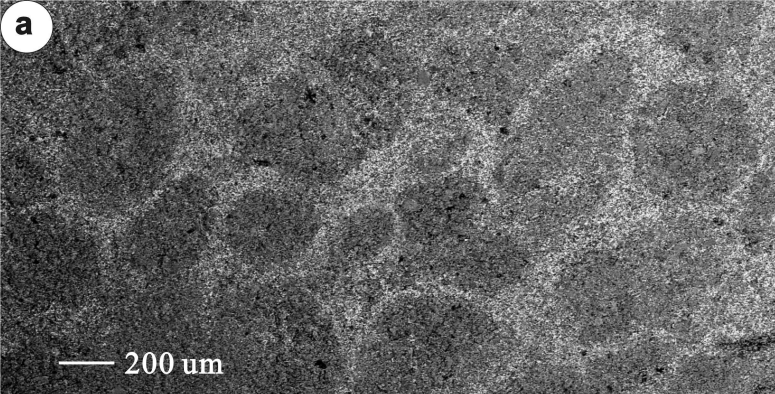


**Fig. S3.** Showing the tentacles of *Cotyledion* from the Chengjiang fauna. **a**, a anterior-laterally squeezed specimens with a circle of extended tentacles superbly preserved<sup>11</sup>; **b**, ELI-C 0375B, enlargement of the tentacles. **C**, ELI-C 0025A, close-up view of the inward-retracted and contracted tentacles.



**Fig. S4.** Additional specimens of *Cotyledion tylodes* Luo & Hu 1999 from the Haikou and Erjie areas of Yunnan, China. **a**, ELI-C-0326, top view of the calyx with tentacles; **b**, **c**, ELI-C-0025A and 0034A, laterally compressed two specimens with contracted tentacle crown encircling retracted centrally pointing tentacles; **d**, ELI-C-0370, a specimen with long stalk attached to a trilobite, putatively crushed in mouth-anus direction; **e**, ELI-C-0346A, 3 individuals of *Cotyledion* commonly attached to a cheek of trilobite; **f**, ELI-C-0337A, a flattened specimen, showing the calyx cavity (Cc) and stalk attached to a trilobite spine; **g**, ELI-C-0194B, note the coelomic cavity of stalk (Sc); **h**, ELI-C-0346A, a gregarious population of *Cotyledion tylodes* attached by stalks in common to a single hyolith shell; **i**, ELI-C-0250A, a flattened impression of *Cotyledion*, noting the tentacles on the top calyx and knob-like holdfast at the end of the stalk. **j**, ELI-C-0250A, enlarged view of the knob-shaped attachment disc (Ad) in **i**. **k**, ELI-C-0333B, showing the distal attachment disc (Ad) of stalk; **l**, ELI-C-0352A, close-up view of the coelomic canal in the stalk.





**Fig. S5.** BSEM examination of the sclerites of *Cotyledion* Luo et Hu 1999 from Chengjiang. **a**, ELI-C-0359A, interior mould of calyx, showing the pyrite preservation of sclerite impressions; **b**, BSEM of ELI-C-0359A; interior mould of calyx, showing calyx sclerite impressions netted together; **c**, ELI-C-0369, BSEM picture of stem sclerite impressions of *Cotyledion*; **d**, BSEM picture of transition section between the Calyx and stem of ELI-C-0370. **e** and **f**, Enlarged and detailed view of pseudomorphed framboidal pyrite on the sclerite of **d**.

**Table S1.** Statistics for *Cotyledion* based on ELI collection from the Chengjiang fauna, Yunnan, South China. All measurements are in mm. The following abbreviations are used: Lc, the height of calyx; Ls, the length of stalk; Wc, the diameter of calyx; Ws, the diameter of stalk. H, the body height of *Cotyledion* based on ELI collection.

	Lc	Ls	Wc	Ws	Lc/Wc	Lc/Ls	Ws/Wc	H
Count	292	120	300	203	293	70	194	107
Min	4.3	2.7	3	0.8	1.05	0.33	0.11	8
Max	42	38	23	3	2.57	2.4	0.5	56
Mean	13.3	15.44	8.32	1.65	1.61	0.78	0.23	26.4
SD	5.55	6.47	3.2	0.39	0.26	0.33	0.06	0.23

**Table S2.** EDX analysis of the sclerites of *Cotyledion*, showing the high concentration of iron oxide with fewer amounts of phosphorus; note the moderate amount of aluminosilicates from the surrounding matrix.

Elements	Weight(%)	Atom(%)
Mg K	1.15	1.25
Al K	7.15	6.96
Si K	9.19	8.59
P K	0.88	0.74
K K	1.16	0.78
Fe K	43.01	20.22
O	37.45	61.46
Total	100.00	

