

New evidence for the protoconodont origin of chaetognaths

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An earlier hypothesis concerning the origin of chaetognaths from protoconodonts found additional support in new discoveries and in recent structural, chemical and molecular investigations. The new findings show that the head armature of protoconodonts was composed not only of grasping spines but also of much smaller spicules corresponding in size and shape to the chaetognath teeth. Grasping spines of protoconodonts were originally built mainly of an organic substance. Their original composition was changed by secondary phosphatisation. The thickest layer of the protoconodont spines was originally constructed of organic fibrils, similar to those in the corresponding layer of chaetognaths. Recent molecular investigations show that the chaetognath lineage separated in the early stage of metazoan radiation, which fits the presented hypothesis. Described are some previously unknown structural details of chaetognath grasping spines, including composition of the outer layer and the origin of their distinctive tips.

Key words: Chaetognatha, Conodonta, protoconodonts, problematic fossils, Metazoan phylogeny, Cambrian, Ordovician.

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