COMPARATIVE MICROANATOMY OF THE SIPHUNCULAR CORD IN PERMIAN AMMONOIDS AND RECENT *NAUTILUS*

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Ammonoids are extinct chambered cephalopods that flourished in the Middle Paleozoic and Mesozoic seas. In spite of their rich fossil records, available data on their soft anatomy have long been restricted to organic hard tissues such as jaws and radula. Certain peculiar calcified or pyritized objects associated with ammonoid conchs have previously been interpreted as remains of soft organs (1-5), but a serious question still remains regarding their biological nature, because of the absence of detailed tissue structure.

We have recently discovered exceptionally well-preserved remains of siphuncular cords in three specimens of a prolecanitid ammonoid *Akmilleria electraensis*. These specimens were recovered from carbonate concretions, which were collected from the Lower Permian (Wolfcampian) Areturus Formation exposed on the south side of Buck Mountain, Ely County, Nevada. X-ray dispersion microanalysis of one of the specimens reveals that the fossilized siphuncular cord is made of fluorapatite. The siphuncular cord was presumably phosphatized immediately after death and before significant bacterial decay occurred.

Comparative SEM observations of the siphuncular cords of *Akmilleria* and *Nautilus pompilius* allows us to describe their microanatomy. In cross section, the siphuncular cord of *Akmilleria* consists of a large central vein, possibly two pairs of arteries, connective tissue, and a thin epithelial layer on the outside. The outer surface of the cord is sculptured by many evenly spaced, longitudinal ridges and grooves; the ridges correspond to the distal ends of individual epithelial cells. These external and internal microanatomical features are also observed in the siphuncular cord of *Nautilus*. However, *Nautilus* possesses relatively smaller and more numerous epithelial cells around the siphuncular cord than *Akmilleria*. This is the first reported occurrence of soft tissue preservation of the ammonoid siphuncle and reveals anatomical differences between ammonoids and modern *Nautilus*.

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