

***Tesakoviaspis concentrica:* microskeletal remains of a new order of vertebrate from the Upper Ordovician and Lower Silurian of Siberia**

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Abstract

Tesakoviaspis concentrica n. gen. et sp. is an Early Silurian vertebrate with a distinctive and unique histology. This represents a new order of a tesselate agnathan. The crown growth is cyclomorial with simple odontodes of smooth pear-shaped, morphology. These microremains, collected from the southern part of the Siberian platform, are attributed to the Late Ordovician and Early Silurian. Some are complex scales, or tesserae, from a microsquamous exoskeleton, which shows variability interpreted as a growth series, as well as species variability. Zones of areal growth can be recognized of many small, round, oval, or pear-shaped tubercles surrounding a single large, round or pear-shaped central primordial tubercle. Each tubercle (odontode) grows centripetally around a separate pulp cavity, later the acellular bony base is added below the odontodes in a series of growth layers. These almost close the pulp cavities except for narrow, central openings, continuous with vertical, vascular canals opening onto the inner surface. The same type of concentric areal growth is found in both tesakoviaspids and astraspids.

The coronal tissue is a new type of atubular dentine termed conical lamellin, with a unique histology and without an enamel or enameloid covering. Parallel growth zones are well demarcated, the first coronal layers appear as numerous, steep sided cones, but become gradually flattened in the circumpulpal layers, these are indicative of a new type of vertebrate dermal production. The acellular basal bone has sequential lines of growth where each layer is coincident with the increase in area of the scale. Vertical lines penetrate all layers of bone from the basal surface, where spaces for Sharpey's fibre bundles existed. The most closely related histology is that of the Mongolepidida. There is no equivalent tissue in other known Ordovician, or Silurian agnathan vertebrates, such as astraspids, eritychiids, or thelodontids.

Introduction

The first report of Early Silurian vertebrates of South Siberia was published by OBRUCHEV (1958), but a more detailed report providing information on Early Silurian agnathans from Siberia was later published by MOSKALENKO (1968). The samples for the later report were collected by Yu. I. Tesakov in 1960 and by T. A. Moskalenko in 1963 and 1965, in the basin of the Podkamennaya Tunguska river, in the valley of the Nizhniaya (Lower) Tchunku river. The precise location was the right tributary of the Tchunia river (for geographical position of sections see locality map in KARATAJUTE-TALIMAA & PREDTECHENSKYJ: 1995: fig. 1). These rock samples were dissolved to obtain the three-dimensional microremains, to which was added a collection of vertebrate microremains, given to Karatajute-Talimaa by Moskalenko, these had been obtained only incidentally during an investigation principally designed for conodonts.

Small tesserae from this locality (three outcrops) were illustrated by MOSKALENKO (1968: fig. 2: 1-7) and later by KARATAJUTE-TALIMAA (1978: tab. XXXII, figs. 4-7) and referred to as *Tesakoviaspis concentrica* nomen nudum, without a systematic description. They were used as an example to illustrate cyclomorial growth of discrete, tiny elements of an ornamented dermal skeleton.

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