ACTA PALAEONTOLOGICA POLONICA

The middle ear in multituberculate mammals

Jørn H. Hurum, Robert Presley,and Zofia Kielan-Jaworowska
Acta Palaeontologica Polonica 41 (3), 1996: 253-275

The ear ossicles, preserved in skulls of a tiny Late Cretaceous multituberculate *Chulsanbaatar vulgaris* from Mongolia are arranged as in modern mammals. This makes the idea of an independent origin of the multituberculates from other mammals unlikely. We report the finding of ear ossicles in Mesozoic multituberculates.
Three almost complete incudes and two fragments of malleus are described and compared with those reported in the Paleocene *Lambdopsalis* and in non-multitubercltate mammals. In these Late Cretaceous multituberculates lateral expansion of the braincase is associated with the presence of sinuses and development of extensive masticatory musculature, but not by the expansion of the vestibule, which is moderately developed. It is argued that because of the lateral expansion of the multituberculate braincase, the promontorium is arranged
slightly more obliquely with respect to the sagittal plane than in other mammals and the fenestra vestibuli faces anterolaterally, rather than laterally. This results in a corresponding alteration in orientation of the stapes. The
epitympanic recess is situated more anteriorly with respect to the fenestra vestibuli than in other mammals. The recess is deep, and the incus must therefore be oriented somewhat vertically. The incus is roughly A-shaped, with crus breve subparallel to the axis of vibration of the malleus. This axis, approximately connecting the anterior process of the malleus and the crus breve of the incus, lies at 45-55' to the sagittal plane in *Chulsanbaatar*. Probably most multituberculates were similar in this respect. The fragments of the malleus show a very long anterior process, which agrees with the reconstruction of the malleus in *Lambdopsalis* by Meng & Wyss (1995), and with the partial malleus of *Kryptobaatar*, described by Rougier et al. (in press).

Key words: Multituberculata, ear ossicles, promontorium, vestibule, evolution.

This is an open-access article distributed under the terms of the Creative Commons Attribution License (for details please see creativecommons.org), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Full text (601.9 kB)