

The ear in mammal-like reptiles and early mammals

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The early members of the Therapsida lacked a tympanic membrane. In the later therapsids, the Therapsida, a tympanic membrane developed from the skin on the lateral side of the lower jaw. The tympanum is not homologous in the Therapsida and the Sauropsida. The therapsid ear was a poor receiver of airborne sound, both in high frequency response and in the range of frequencies encompassed. With the radiation of the Sauropsida in the Triassic the large therapsids became extinct, the small therapsids evolved in to the mammals and became nocturnal. High frequency hearing was essential for the nocturnal mode of life; quadrate and articular became dissociated from the jaw hinge to become the mammalian auditory ossicles. In the Theria the cochlea became coiled. The spiral cochlea could not have existed until there was a middle ear with the necessary high frequency response. This may not have been until the Cretaceous.

Key words: Therapsida , Therapsida, *Morganucodon*, *Kuehneotherium*, monotremes, Theria, Mesozoic, ear, hearing.

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