
Form and Function

Functional morphology of the cochlea of the laminate-toothed rats (family: *Muridae*, subfamily: *Otomyinae*)

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Many species of desert rodents and certain subterranean rodents are known to have hypertrophied auditory bullae. A common functional explanation for this trait is that it is an adaptation to sound amplification that improves low-frequency hearing which is hypothesized to help in both prey capture and predator avoidance; thermoregulation and interspecific communication in burrows and open mostly desert environments. However, besides the hypertrophied bulla, the middle and inner ear are also important in improving low-frequency hearing. Although a plethora of hearing studies in rodents have been conducted, most of these have focused mainly on *Gerbillinae*, *Dipodomysinae*, *Meriones*, and subterranean rodents. However, no studies have looked at the hearing capabilities of *Otomyinae* subfamily in detail only vocalization has been studied on two species (*brantsii* and *littledalei*), although a vague description of *Otomys* (unknown species) malleus and incus and *Parotomys* middle ears basic data have been made. In this study, cochlea morpho-anatomical variation of seven *Otomyinae* species (*Otomys angoniensis*, *Otomys auratus*, *Otomys barbouri*, *Otomys helleri*, *Otomys sloggetti*, *Otomys unisulcatus* and *Parotomys brantsii*) from widely different environments was investigated, focusing on five cochlea features [external cochlear length (ECL), number of turns (TUR), relative length (RECL = ECL/TUR), the curvature gradient (CUR), and the oval window area (OWA)] that play a role in hearing capabilities. Micro-computed tomography and Avizo were used for skull scanning and cochlea segmentation respectively. When correcting for phylogeny and body size OWA and RECL were significantly greater in *P. brantsii*. There was no correlation between cochlea features, bulla and alpine environments.

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6th International Conference of Rodent
Biology and Management
and
16th Rodens et Spatium

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