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SUPPLEMENTARY DATA

The auditory region of a caviomorph rodent (Hystricognathi) from the lower Miocene of Patagonia (South America) and evolutionary considerations

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TABLE S1. Taxon list and scanning parameters used for each specimen. **Abbreviation**: **FV**, field of view (in cm).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Species | Collection number | slices |

|  |
| --- |
| File size(pxl) |

 | voxel size (µm) | FV | kV | mA~~s~~ | Scanner |
| *Prospaniomys priscus* | MACN-PV CH1319 | 1105 | 1120 × 1120 | 47.16 | 5.29 | 120 | 66 | SkyScan1173 |
| *Octodontomys gliroides* | MLP 00369 | 1023 | 704 × 704 | 45.03 | 3.17 | 80 | 100 | SkyScan1173 |
| *Ctenomys talarum* | MLP 7-XI-95-12 | 1023 | 680 × 680 | 45.03 | 3.06 | 70 | 114 | SkyScan1173 |
| *Abrocoma* sp. | MLP 31-XII-02-80 | 1113 | 1120 × 1120 | 47.21 | 5.29 | 70 | 114 | SkyScan1173 |
| *Proechimys* sp. | MLP 536 | 1083 | 704 × 704 | 47.9 | 3.37 | 80 | 100 | SkyScan1173 |
| *Myocastor coypus* | MLP 20-XII-89-29 | 1860 | 1020 × 1020 | 60.01 | 6.73 | 130 | 60 | SkyScan1173 |

TABLE S2. Measurements used in this work.

|  |  |
| --- | --- |
| Measurements  | Description |
| Bony labyrinth |  |
| Length of the bony labyrinth  | Is the longest distance from the apex of the cochlea to the apex of the common crus (sensu Billet et al., 2013). It is a linear measure of the entire series of inner ear cavities (Jeffery and Spoor, 2004; Ekdale, 2013).  |
| Cochlea |  |
| Coiling of the cochlea | The number of turns of the coil is counted by drawing a line, from the proximal end of the primary and secondary bony laminae at the base of the cochlea, to the center of the apex of the cochlea. Each time that the cochlea crosses this line is counted as one half turn (180º) (West, 1985). |
| Width of the cochlea | Measured as the greatest distance from the ventral edge of the fenestra cochleae to the outer wall of the outer curve of the basal turn of the cochlea (Ekdale, 2010, 2013) |
| Height of the cochlea | Measured from the top of the spiral to the level of the dorsal edge of the fenestra cochleae, perpendicular to the width and parallel to the plane of the basal turn of the cochlea (Ekdale, 2010, 2013).  |
| Aspect ratio of the cochlea | Calculated as the height /width of cochlea (Ekdale, 2010) |
| Length of the cochlear canal | Was obtained measuring the length of the cochlear canal, using CurveMaker of Slicer software. This measure reflects the length of the basilar membrane, from the point between the fenestra vestibuli and the fenestra cochleae to the apex of the cochlear canal (Ekdale and Racicot, 2015).  |
| Frequency of Hearing | Was calculated from the low and high-frequency hearing limits at 60 dB SPL, predicted from anatomical correlations calculated by West (1985). log10 = (LFL) = 1.76 - 1.66log10 (BML × CT)log10 = (HFL) = 2.42 - 0.994log10 (BML/CT)Where BML = basilar membrane length (mm) and CT = number of cochlear turns.  |
| Semicircular canals (SCs) |  |
| Length (l) of a semicircular canal | Defined as the greatest distance from the wall of the vestibule to the internal border of the semicircular canal (Spoor and Zonneveld, 1998) |
| Width (w) of a semicircular canal | Is perpendicular to the height, irrespective of the orientation of the canal in the skull (Spoor and Zonneveld, 1998). |
| Radius of curvature of the arc of the SCs (RSC)  | Calculated using the following equation: [0.5(*l* + *w*)/2] where *l* is the length of the SC, and *w* is the width of the SC (Spoor and Zonneveld, 1998). It is correlated to the sensitivity of the canal and the agility of the animal. |
| Angulations of the SCs (90var) | Deviation from orthogonality (90var; Malinzak et al., 2012) was calculated by taking the absolute value of the difference between each canal pair angle and 90º, adding those differences for all six ipsilateral canal pairs, and dividing by six (Berlin et al., 2013).  |
| Sagittal labyrinthine index (SLI) | Defined as the percentage of the width of the posterior semicircular canal arc below the plane of the lateral semicircular canal. It is calculated as: SLIi/SLIs + SLI × 100; where SLIi and SLIs is the inferior and superior portion of the LSC in relation to the PSC, respectively. This measure quantifies the relative positions of the LSC and PSC and might be useful in phylogenetic analysis (Spoor and Zonneveld, 1995; Ekdale, 2013).  |
| Stapedial ratio  | Is the ratio between the greatest height (H) versus the width (W) of the footplate of the stapes (Segall, 1970). |
| Other measurements  |  |
| Area of the ellipses | Calculated with mathematical formula *a x b x π* (where *a* is the major radius and *b* is the minor radius). Used to calculate the area of the stapes and the tympanic membrane. The linear measurements of the tympanic membrane were obtained following Nummela (1995) and two linear measurements were taken: the longest diameter of the tympanic membrane and a measure perpendicular to this. Both areas were used to calculate the area ratio(see above)*.* |
| Volumes of the bony labyrinth, middle ear, and cochlea | Calculated directly from the 3D software.  |
| Relative middle ear volume | Calculated as the cube root of the middle ear volume divided by the naso-occipital length of the skull (Webster and Webster, 1975). |
| Angular measurements | Were made in the Slicer software (Federov et al., 2012).  |