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ABSTRACT BOOK

Editors:

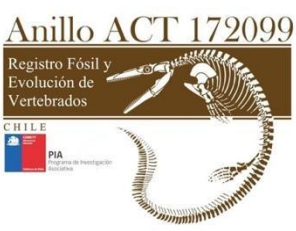
Carolina Loch

Ana Valenzuela Toro

Judith M. Pardo-Pérez

Mónica R. Buono

Carolina S. Gutstein



Organizing and Host Committee

Carolina S. Gutstein
Red Paleontológica U.Chile, Dep. Biología, Universidad de Chile, Santiago, Chile.
Mónica R. Buono
IPGP, CCT CONICET-CENPAT, Puerto Madryn, Argentina.
Judith M. Pardo-Pérez
Centro de Investigación GAIA-Antártica, Universidad de Magallanes, Punta Arenas, Chile.
Martín Chávez
Universidad Austral, Valdivia, Chile
Carolina Loch
Dept. of Oral Sciences, University of Otago, New Zealand.
Ana Valenzuela Toro
Dept. of Ecology and Evolutionary Biology, University of California Santa Cruz, California, USA.
Camila F. Márquez Iturriaga
Red Paleontológica U.Chile, Dep. Biología, Universidad de Chile, Santiago, Chile.
Alexander Vargas
Lab. Ontogenia y Filogenia y Red Paleontológica U. Chile, Dep. Biología, Universidad de Chile, Santiago, Chile.

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Coordinator: Dr. Judith Pardo-Pérez

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Dr. Jorge Velez-Juarbe
Dr. Alex Werth

HEARING THE PUZZLE: THE INNER EAR EVOLUTION OF PLATANISTOIDEA (CETACEA: ODONTOCETI)

MARIANA VIGLINO[1], MAXIMILIANO GAETÁN[1], MÓNICA BUONO[1], R. EWAN FORDYCE[2], TRAVIS PARK[3]

[1]Instituto Patagónico de Geología y Paleontología (IPGP), CCT CONICET-CENPAT, Boulevard Brown 2915, Puerto Madryn, Argentina
[2]Department of Geology, University of Otago, Box 56, Dunedin, New Zealand
[3]Department of Life Sciences, Natural History Museum, Cromwell Road, London, United Kingdom

Hearing is one of the key senses for modern cetaceans (Neoceti) to hunting and communication, adapted for either infrasonic (Mysticeti) or ultrasonic (Odontoceti) frequencies. Among odontocetes, the Platanistoidea comprises a single extant riverine representative (*Platanista gangetica*) but numerous extinct marine species from the late Oligocene onward. Platanista is a critically endangered odontocete species that possess unique morphological characteristics, but their evolutionary patterns remain mostly unknown. Studying extinct platanistoids' hearing abilities might contribute a piece to the complex evolutionary puzzle of this group to understand its drastic diversity reduction. Thus, we describe for the first time the inner ear morphology of 6 late Oligocene–early Miocene extinct marine platanistoids from New Zealand and Patagonia (Argentina). These species represent the most diverse moment in the evolutionary history of Platanistoidea. In this study, we hypothesized that extinct marine platanistoids lacked a specialized inner ear like *P. gangetica* and thus, their morphology and inferred hearing abilities were more similar to extant marine odontocetes. Based on microCT scans and 3D models, we took 15 measurements, 3 ratios, and estimated their low-frequency limit. Then, we applied 3D geometric morphometric and statistical analyses to inner ear models of 7 platanistoids, 2 stem odontocetes, 9 extant odontocetes, and 1 archaeocete species (n=21). We did not find a “typical” platanistoid cochlea but rather a disparate range of high-frequency hearing morphologies in the group, supporting an early-acquired specialized underwater hearing ability in odontocetes. *Notocetus* and *Platanista s*hare a loosely coiled and wide cochlea, and a low number of turns that are widely separated. Stem odontocete *Prosqualodon australis* and platanistoid *Otekaikea huata* are the only species that possess a tympanal recess, of yet unknown function. *Aondelphis* talen’s inner ear morphology indicates it had lower high-frequency hearing than other platanistoids. As expected, *Platanista* has the most derived cochlear morphology and is always distant in the morphospace from its sister genus *Zarhachis*, adding to evidence that it is an outlier within the group. Inner ear morphology, pneumatized maxillary crests, and pterygoid sinus system, among other unique characteristics, would have ultimately allowed the survival of Platanista to the present day. New fossil platanistoids, particularly from the middle–late Miocene onward, will help test these hypotheses.

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