3D models associated to: Paleoneurology of Artiodactyla, an overview of the evolution of the artiodactyl brain

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Abstract

The present 3D Dataset contains the 3D models illustrated and described in the chapter "Paleoneurology of Artiodactyla, an overview of the evolution of the artiodactyl brain" (Orliac et al. 2022) published in "Paleoneurology of amniotes: new directions in the study of fossil endocasts", edited by Dozo, Paulina-Carabajal, Macrini and Walsh.

Keywords: artiodactyl, brain, cerebrum, endocast, neopallium

INTRODUCTION

The purpose of the chapter about Artiodactyla endocasts by Orliac et al. (2022) is to present a detailed review of works published on Artiodactyla endocasts and to provide a comprehensive examination of artiodactyl brain morphology. The present dataset provides access to the 3D models of new data regarding Paleogene representatives of North American (*Homacodon*, *Helohyus*, *Leptauchenia*, *Agriochoerus*; Fig. 1 and Table 1) and endemic European extinct clades (*Mouillacitherium*, *Dichobune*, *Caenomeryx*, *Anoplotherium*; Fig. 2) illustrated and described in Orliac et al. (2022). The brain of artiodactyls is remarkable by the expansion and by the folding of the neopallium and the diversity of neopallium patterns at the Artiodactyla scale is highlighted on the models by labels of the neopalleal grooves and fissures. This sample of Paleogene artiodactyl endocasts from North America and Europe illustrates the great diversity of artiodactyl brain and the potential of endocasts as a source of phylogenetic and paleoecological information.

METHODS

The 3D data acquisition was performed at the μCT scanner facility of the Montpellier Ressources Imagerie platform (MRI) at the University of Montpellier, using an EasyTom 150 μCT scanner for the European taxa, and at the μCT scanner facility of the American Museum of Natural history with a GE phoenix—vtome—x s240 scanner. Segmentation was performed manually slice by slice using the pencil segmentation tool of Avizo 9.3 (Thermo Fisher Scientific). The 3D surface models are provided in .ply and .vtk polydata formats, and can therefore be opened with a wide range of freeware.

ACKNOWLEDGEMENTS

Clade	Inv nr.	Taxon
Dichobunoidea	AMNH 12695	*Homacodon vagans*
Heloyidae	AMNH 13079	?*Helohyus*
Merycoidodontidae	AMNH 45508	*Leptauchenia* sp.
Agriochoeridae	AMNH 95330	*Agriochoerus* sp.
Dichobunoidea	UM ACQ 6625	*Mouillacitherium elegans*
Dichobunidae	MNHN.F.QU16586	*Dichobune leporina*
Cainotheriidae	UM PDS 2570	*Caenomeryx filholi*
Anoplotheriidae	MNHN no nr.	*Anoplotherium* sp.

Table 1. List of specimens for which the endocranial cavity model is provided. Abbreviation for collections: AMNH, American Museum of Natural History, New York; MNHN, Museum National d'Histoire Naturelle, Paris; UM, Université de Montpellier, France.

BIBLIOGRAPHY

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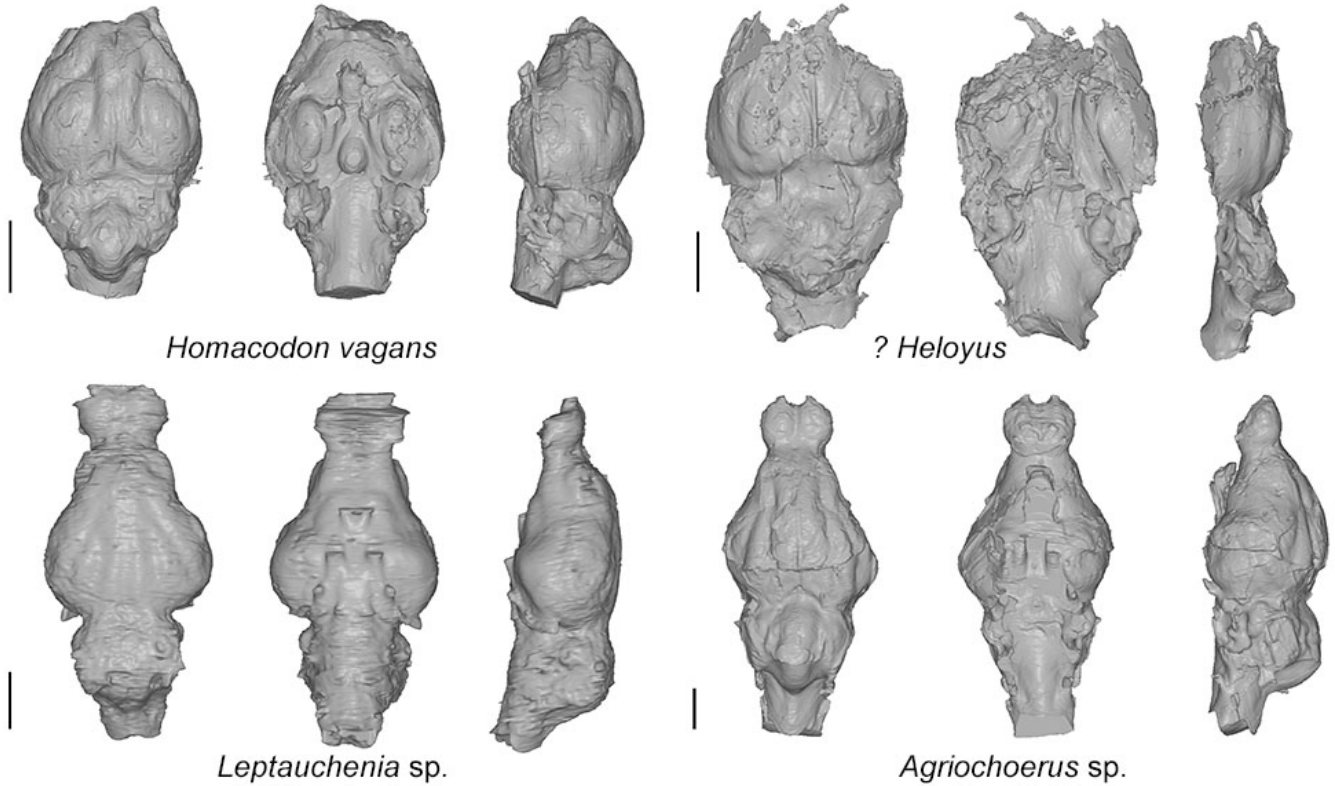
Figure 1. Endocast morphology of North American artiodactyls: *Homacodon vagans* (AMNH 12695); ?*Helohyus* (AMNH 13079); *Leptauchenia* sp. (AMNH 45508); *Agriochoerus* sp. (AMNH 95330). For each taxa, orientation from left to right in dorsal, ventral, and lateral views. Scale bars = 1cm.
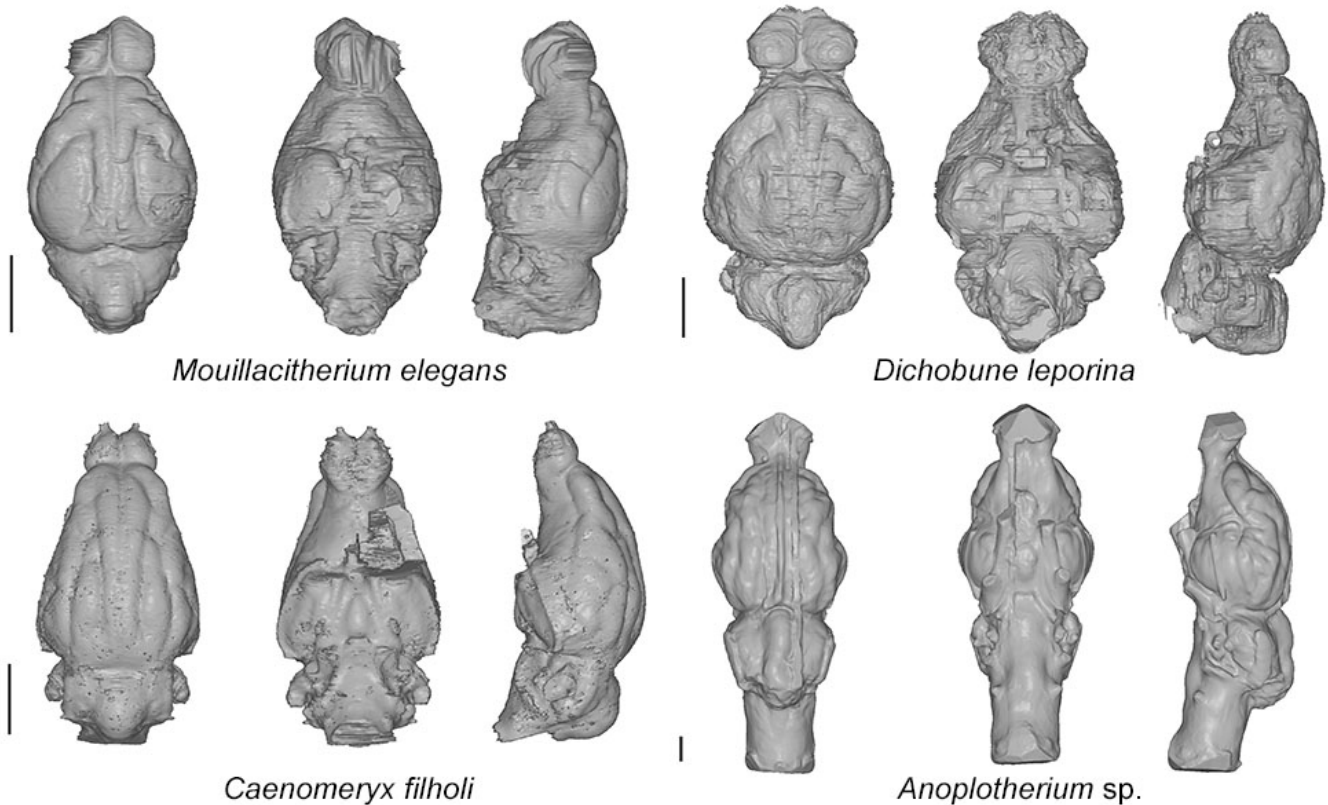

Figure 2. Endocast morphology of endemic European artiodactyls: *Mouillacitherium elegans* (UM ACQ 6625); *Dichobune leporina* (MNHN.F.QU16586); *Caenomeryx filholi* (UM PDS 2570); *Anoplotherium* sp. (3D surface of plaster cast illustrated by Dechaseaux 1969:fig.6). For each taxa, orientation from left to right in dorsal, ventral, and lateral views. Scale bars = 1cm.