

3D models related to the publication: Brain drain: exceptional pattern of calvarial venation in pangolins and its phylogenetic significance for Ferae

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Abstract

The present 3D Dataset contains a selection of 3D models analyzed in Billet G, Hautier L, Gaudin TJ, Flynn JJ, Ruf I, Carrillo JD, Ladevèze S, Lehmann T, Nicolas V, Orliac MJ, Tornero C, Wible JR, Wong N, Gaubert P. Submitted. Brain drain: Exceptional pattern of calvarial venation in pangolins and its phylogenetic significance for Ferae. Zoological Journal of the Linnean Society.

Keywords: Carnivora, cranium, Diploic veins, Pholidota, Placentalia

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Inv nr.	Taxon	Collection
SMNS40759	<i>Erinaceus europaeus</i>	SMNS Stuttgart
NHM-UK 48.13.26	<i>Phataginus tricuspis</i>	NHM UK
NHM-UK 9.1.5.858	<i>Manis javanica</i>	NHM UK
UM-ZOOL-149N	<i>Felis silvestris</i>	UM
MNHN.F.Qu8301	<i>Pterodon dasyuroides</i>	MNHN

Table 1. List of the selected specimens for which 3D models of the diploic veins and crania are provided. Abbreviations: SMNS, Staatliches Museum für Naturkunde, Stuttgart, Germany; NHM UK, Natural History Museum, London, UK; UM, Université de Montpellier, France; MNHN, Muséum national d'Histoire naturelle, Paris, France.

INTRODUCTION

We present selected 3D models of crania and their associated intraosseous channels running between the inner and outer tables of cranial calvarial bones, in five selected placental species. Reconstructed from high-resolution microtomography, these models provide clear evidence for the exceptional presence of an extensive network of diploic veins in pangolins, carnivorans, and hyaenodonts (see Figure 1). This network is integrated with the endocranial venous networks that drain the brain. Conversely, the prevailing placental pattern, here represented by the European hedgehog, shows largely endocranial venous drainage of the cerebral hemispheres, with only modest development of the diploic veins (Billet et al., 2026).

METHODS

Using high-resolution microtomography, we studied the distribution of intraosseous venous channels in the cranial vault of selected placental species. The five selected species (*Phataginus*

tricuspis, *Manis javanica*, *Felis silvestris*, *Pterodon dasyuroides*, *Erinaceus europaeus*) were sampled from the collections of the Natural History Museum (NHM, London, UK), Université de Montpellier (France), Muséum national d'Histoire naturelle (MNHN, Paris, France) and the State Museum of Natural History Stuttgart (SMNS, Germany) (Table 1). The crania were μ CT-scanned at the Imaging and Analysis Centre of the NHM, at the MRI platform of the Institut des Sciences de l'évolution de Montpellier, at the AST-RX platform of the MNHN and at the SMNS. Three-dimensional reconstruction of the cranium and internal osseous canals were performed using image stacks with manual segmentation in Avizo v.2021.1 software (Thermo Fisher Scientific) and smart interpolation tools in Biomedisa (Lösel et al., 2020). The 3D surface models of the crania and of the intraosseous canals of the cranial vault are provided in .ply format, and can therefore be opened with a wide range of freeware.

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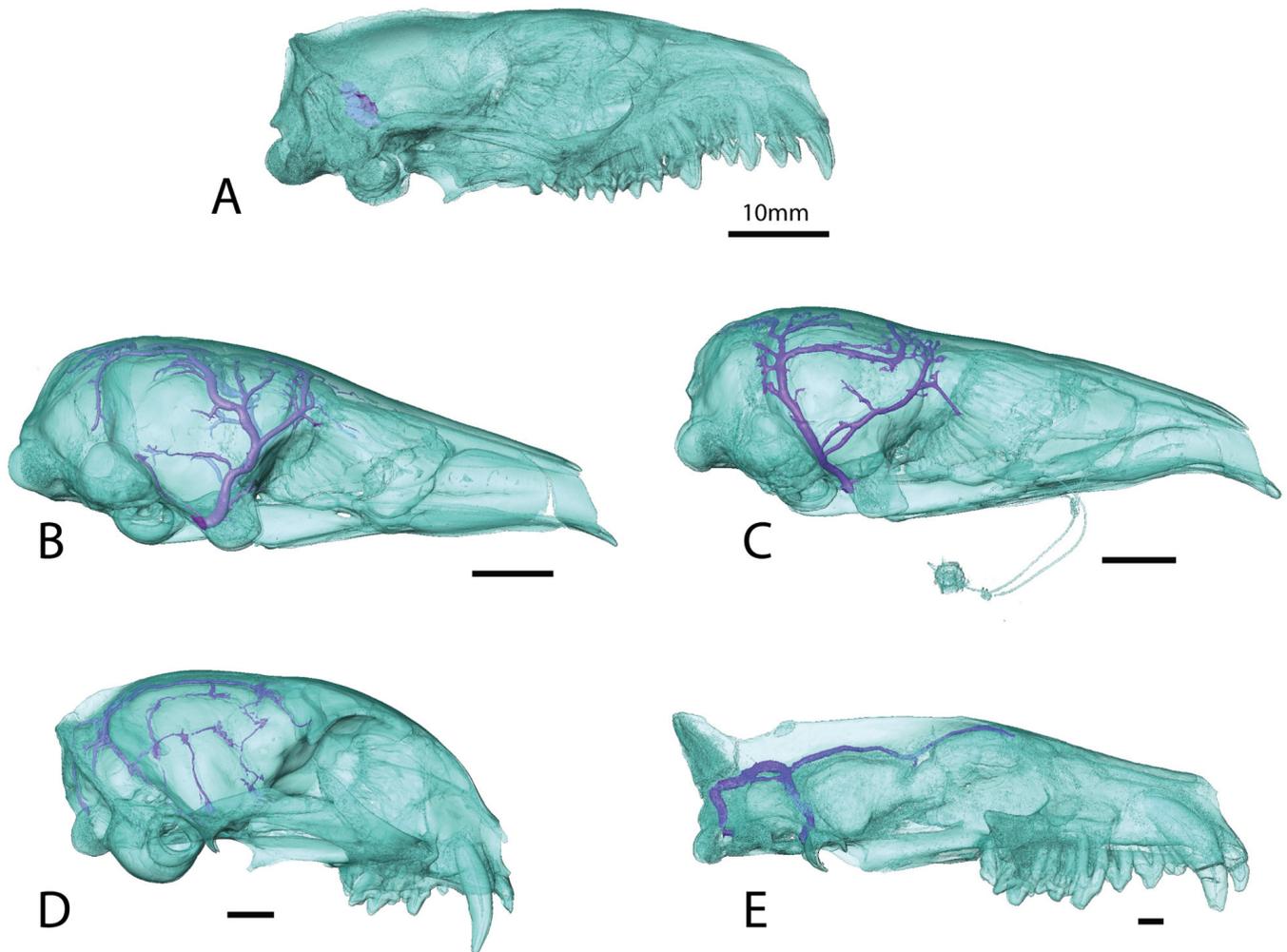


Figure 1. Comparative plate showing transparent lateral views of crania (light blue) and intradiploic canals (purple) in selected placental mammal species for which 3D models are provided. A, the European hedgehog *Erinaceus europaeus*. B, the white-bellied pangolin *Phataginus tricuspis*. C, the Sunda pangolin *Manis javanica*. D, the European wildcat *Felis silvestris*. E, the hyaenodont *Pterodon dasyuroides* †. For specimen information, see Table 1.

thesis Project, <http://synthesys3.myspecies.info/> : GB-TAF-5606 and BE-TAF-5661).

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