Dataset

3D models related to the publication: Virtual endocasts of *Clevosaurus brasiliensis* and the tuatara: rhynchocephalian neuroanatomy and the oldest endocranial record for Lepidosauria

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Abstract
The present 3D Dataset contains the 3D models analyzed in the following manuscript: L. Roese-Miron, M.E.H. Jones, J.D. Ferreira and A.S. Hsiou., 2023. Virtual endocasts of *Clevosaurus brasiliensis* and the tuatara: rhynchocephalian neuroanatomy and the oldest endocranial record for Lepidosauria.

Keywords: Endocast, Ontogeny, Rhynchocephalia, *Sphenodon punctatus*, Triassic

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INTRODUCTION

The study of endocranial cavities is a powerful tool for brain evolution research, given that it is the only way to estimate brain anatomy in extinct taxa (Edinger, 1941; Balanoff *et al.*, 2016; Balanoff & Bever, 2017). Yet, such studies remain scarce for many taxa such as the reptilian clade Rhynchocephalia. Nowadays represented only by the New Zealand tuatara (*Sphenodon punctatus*) (Jones & Cree, 2012), rhynchocephalians were very taxonomically and morphologically diverse in the first half of the Mesozoic (Evans & Jones, 2010). Despite that, no endocasts of fossil rhynchocephalians were described until now. Considering this, we scanned and described the brain cavity endocast of *Clevosaurus brasiliensis*, a small species from the Upper Triassic of southern Brazil (*Riograndia* Assemblage Zone, Norian), and the brain cavity, endosseous labyrinth and the initial trunks of the cranial nerves of an ontogenetic series of *S. punctatus* (Table 1 and Figure 1). In the original article, we performed a series of measurements, linear regressions, and calculated the Encephalization Quotient for all specimens to compare both species and examine ontogenetic and allometric tendencies. We also investigated the brain-to-endocast correspondence of *S. punctatus* to improve the interpretation of rhynchocephalian endocasts.

METHODS

Each *Sphenodon punctatus* specimen (n=7) was scanned in separate occasions; for the Computed Tomography (CT) specifications, see the electronic supplementary material in the original article. The CT scan files of two specimens (CM 30660 and YPM HERR 009194) were obtained from the online repository DigiMorph (Maisano, 2001a,b). The *Clevosaurus brasiliensis* specimen (MCN PV 2852) was scanned in an X-Ray µCT scan (model Skyscan 1173, 90 kV, voxel size of 0.0163 mm, and 1828 slices) located in the Instituto do Petróleo e dos Recursos Naturais, Pontifícia Universidade Católica do Rio Grande do Sul. The endocasts of all specimens were manually segmented with a digitizing table in Avizo 3D (Visualization Sciences Group). The 3D models of the cranial nerves of the five bigger specimens of *S. punctatus* and the endosseous labyrinth and brain of the specimen SAMA 70524 were also generated in the same way. The 3D surface models are provided in .ply format.

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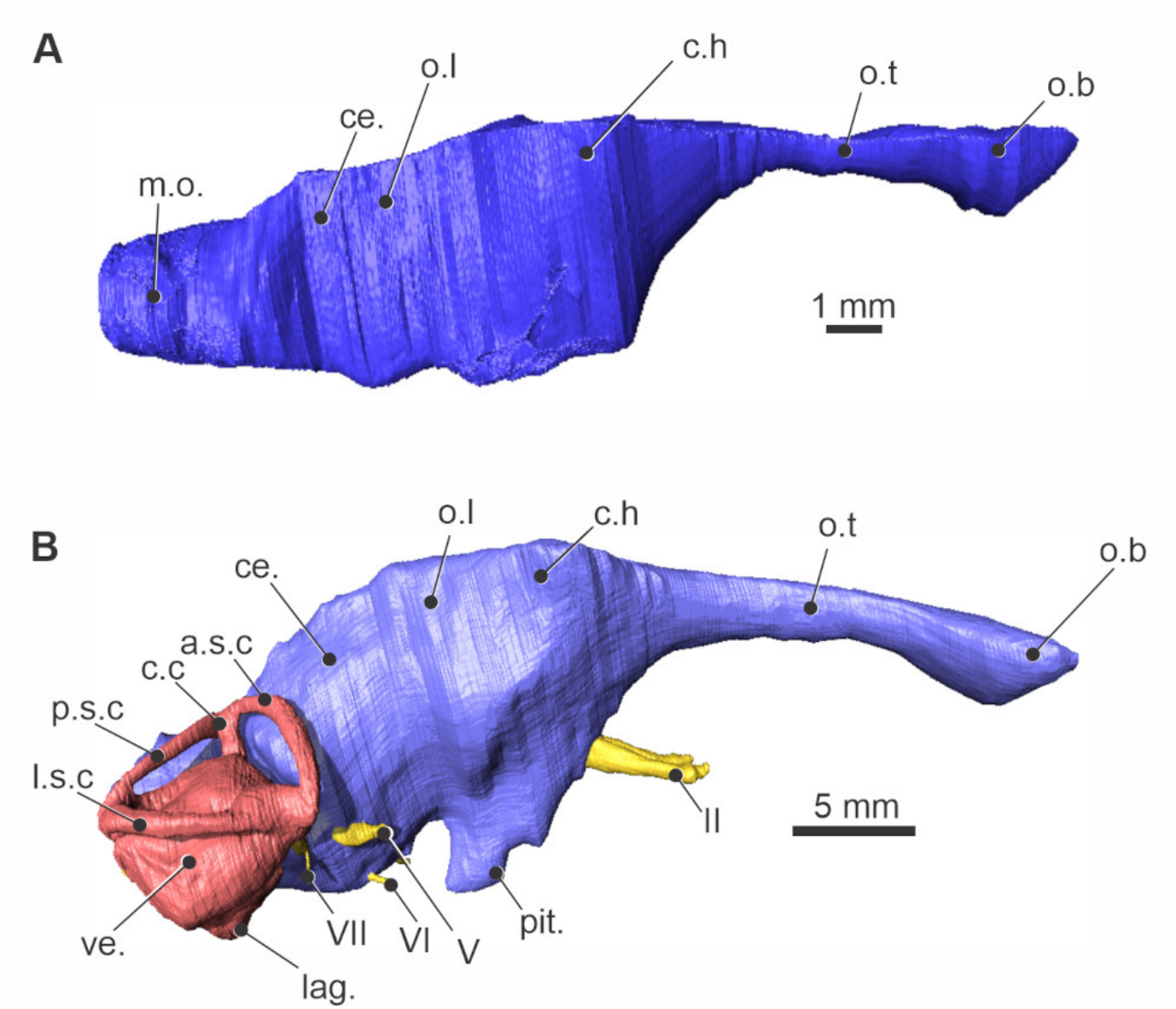

Figure 1. A. Digital endocast of *Clevosaurus brasiliensis* (MCN PV 2852) in lateral view. B. Digital endocast, endosseous labyrinth and initial trunks of the cranial nerves of *Sphenodon punctatus* (SAMA 70524) in lateral view. Scale for each model in the figure. Abbreviations: **a.s.c**, anterior semicircular canal; **c.c**, common crus; **ce.**, cerebellum; **c.h**, cerebral hemispheres; **lag.**, lagena, **l.s.c**, lateral semicircular canal; **m.o**, medulla oblongata; **o.b**, olfactory bulbs; **o.l**, optic lobes; **o.t**, olfactory tract; **pit.**, pituitary gland; **p.s.c**, posterior semicircular canal; **ve.**, ventricle; **II**, **V**, **VI**, **VII**, cranial nerves.

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Inv nr.	Taxon	Description	Collection	Ontogenetic stage
CM 30660	*Sphenodon punctatus*	cranial endocast	CMNH, Pittsburgh, USA	Hatchling (S1/S2)
KCLZJ 001	*Sphenodon punctatus*	cranial endocast and initial trunks of the cranial nerves	KCLZJ, London	Juvenile (T4)
LDUCZ x0036	*Sphenodon punctatus*	cranial endocast and initial trunks of the cranial nerves	GMZ, UCL, UK	Big (old?) adult
LDUCZ x1126	*Sphenodon punctatus*	cranial endocast	GMZ, UCL, UK	Hatchling (S1/S2)
MCN PV 2852	*Clevosaurus brasiliensis*	cranial endocast	MCN, SEMA	Adult
SAMA 70524	*Sphenodon punctatus*	cranial endocast, brain, endosseous labyrinth and initial trunks of the cranial nerves	SAM, Adelaide	Adult
SU1	*Sphenodon punctatus*	cranial endocast	MJ personal collection	Adult
YPM HERR 009194	*Sphenodon punctatus*	cranial endocast and initial trunks of the cranial nerve	YPM, New Haven, USA	Adult

Table 1. List of specimens included in this study, their repositories (institutions) and ontogenetic stage. **MCN**: Museu de Ciências Naturais, Secretaria do Meio Ambiente e Infraestrutura do Estado do Rio Grande do Sul (Porto Alegre, Brazil). **GMZ**: Grant Museum of Zoology, University College London (London, United Kingdom). **CMNH**: Carnegie Museum of Natural History (Pennsylvania, United States). **KCLZJ**: The Museum of Life Sciences, King's College London (London, United Kingdom). MJ: Marc Jones. **YPB**: Yale Peabody Museum (Connecticut, USA). **SAMA**: South Australian Museum (Adelaide, Australia). **LDUCZ**: Grant Museum of Zoology, University College London (London, United Kingdom)

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