

VIRTUAL ENDOCASTS OF *HYRACHYUS MODESTUS* AND THE NEUROSENSORY EVOLUTION OF EARLY RHINOCEROTOIDEA

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Rhinocerotoida are a key clade within Perissodactyla, whose early evolutionary history is closely tied to major ecological and climatic shifts during the Paleogene. Nevertheless, the timing and nature of the neuroanatomical changes that led to brain evolution of the modern rhinoceroses remain poorly understood. It is unclear whether early forms exhibited brain features similar to the extant rhinos or retained more plesiomorphic traits of stem perissodactyls. Using a new 3D endocast, we examine the endocranial anatomy of *Hyrachyus modestus* from the middle Eocene of Wyoming. We made comparisons with living rhinos (*Ceratotherium simum*, *Diceros bicornis*), the fossil rhinocerotoid *Amylodon advenus* (middle Eocene), and the phenacodontid “condylarth” *Phenacodus primaevus* (early Eocene). The objectives of this study are to describe brain morphology, cranial nerves, and vascular structures, quantify key endocranial features, and assess the emergence of rhinocerotoid neuroanatomical traits within an evolutionary framework. Our results indicate that *H. modestus* retains a relatively basal endocranial structure, sharing with *P. primaevus* an elongated brain, moderately prominent olfactory bulbs, and limited neocortical expansion, with a partial dorsal exposure of the midbrain. However, it also exhibits some derived features, as a gyrencephalic neocortex and partial differentiation of the trigeminal pathways. In contrast, *C. simum* and *D. bicornis* show a more globular brain with expanded cerebral hemispheres and a more developed venous sinus system, and *A. advenus* displays an intermediate condition. These findings support *Hyrachyus* as a transitional genus between stem and early perissodactyls and provide new insights into the early evolution of the rhinocerotoid brain.

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