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Program and Abstracts

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Iterative evolution of ecological morphologies presents prime examples of morphological convergence in the mammalian fossil record. Cranial similarities between some eutherian taxa, superficial basicranial anatomy, and a lack of clear morphological connection over that of C. lupus, D. gigantea, and C. crocuta perform better in stress distribution and dissipation than that of S. crenatidens, a "hyena-like" in its capability to distribute and dissipate cranial stress during a bone-cracking bite using the third premolar, finite element models of the skulls of Dinocrocuta gigantea and the spotted hyena Crocuta crocuta were constructed and compared to the hypercarnivorous Canis lupus in a biomechanical analysis. Findings indicate that the crania of D. gigantea and C. crocuta perform better in stress distribution and dissipation than that of C. lupus, regardless of P3 or P4 biting. More specifically, the vaulted fronto-parietal region of D. gigantea and C. crocuta received lower, as well as more evenly distributed stress than C. lupus. Thus, the craniodental structures of the two feliform carnivores are linked by functional advantage over that of C. lupus for bone-cracking, and this capability evolved separately from less diphragmous forms in the two families. Further examination of lineages such as borophagine canids could elucidate the extent of functional convergence of the bone-cracking ecomorphology across the carnivoran order.

New Directions in the Study of Fossil Endocasts: a Symposium in Honor of Harry J. Jerison, Thursday 9:00

NEW INFORMATION ON THE CRANIAL ANATOMY OF AVIMIMUS PORTENTOSUS (DINOSAURIAN THEROPODA) INCLUDING VIRTUAL ENDOCASTS OF THE BRAIN AND INNER EAR

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In the past decade, the Hayashibara Museum of Natural Sciences - Mongolian Paleontological Center expeditions have collected several new specimens of the oviraptorosaur Avimimus portentosus, known for its avian-like skeletal features, from Upper Cretaceous localities in Mongolia. All skull material was micro-CT scanned. Discovery of two braincases and such previously unknown elements as the nasals and maxilla provide new information on the skull and, for the first time, the facial skeleton of this enigmatic theropod. The nasals are fused to each other, as in oviraptorids, comprising a wing-like, postnarial plate and a median, internarial process that bifurcates anteriorly to clasp the nasal process of the premaxilla. Unlike in most oviraptorids, the dorsal surface of the postnarial plate is rather smooth and bears no pneumatic fossa. Instead, a pair of large, presumably pneumatic openings lies posterior to this plate, bounded posteriorly by anterior concavities of the formation. A result of cladistic analysis on those early Late Cretaceous ornithopods including Asian and North American ornithopods (iguanodonts, hadrosaurs, and hadrosaurids) suggests that (1) early Late Cretaceous ornithopods of Mongolia are placed as derived hadrosaurids in the cladogram (positioned between Eolambia and Telmatosaurus); (2) a Dinosauria (Campanian) hadrosaurid from Alag Teg is more closely related to the Bayan Shire (Turonian - Santonian) form than to the Neemergian hadrosaurids. The result that there is no phylogenetic relationship between the Dinosauria hadrosaurid and the Nemegt hadrosaurids suggests that the Mongolian hadrosaurids of Nemegt age immigrated from North America to Mongolia in the early Maastrichtian age, and the early Late Cretaceous (Bayshin) and Dinosauria hadrosaurids became extinct by the beginning of the Nemegt age. There is no co-existence of specimens of derived hadrosaurids and Hadrosauridae in the dinosaur fossil-bearing Upper Cretaceous beds in Mongolian. The “Hadrosaurid Datum” defines the Dinosauria (Campanian) and Nemegt (Maastrichtian) ages in the biostatigraphy of the Upper Cretaceous in Mongolia.

ANTHRACOTHERIID ARTIODACTYLS FROM THE UPPER EOCENE ERGILIN DZO FORMATION OF MONGOLIA

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We report new fossil specimens of two anthracotheriid artiodactyls (Mammalia) discovered from the upper Eocene Ergilin Dzo Formation of southeastern Mongolia. The specimens reported here are: an upper molar, an astragalus, and a calcaneus of a bunodont anthracotheriid; and upper and lower postcanine dentitions, an astragalus, and a distal tibia of a selenodont anthracotheriid. The bunodont anthracotheriid is similar in size and general morphology of the upper molar to small and bunodont anthracotheriids such as Siamotherium, Anthracokeryx, and Microbunodon. The upper molar differs from that of Siamotherium in having much larger parastyle and mesostyle and in lacking the oblique buccal wall and flattening of the buccal wall of the metacone. It also differs from that of Anthracokeryx and Microbunodon in having a better-developed and more mesially protruded parastyle and a more distally shifted mesostyle. The astragalus and calcaneus are similar in morphology to those of Siamotherium. The upper molar specimen indicates an existence of a bunodont anthracotheriid in the northern part of East Asia during the late Eocene. The selenodont anthracotheriid is morphologically referable either to Bothriodont or to Aepiproccodon in having an upper molar wider than long, a mesiodistally compressed paracone and metacone, a large and buccally protruding mesostyle forming a loop around the buccal end of the transverse valley, a relatively well-developed molar paracune, and mesiodistally compressed molar trigonal and talonid. Further generic identification is impossible because the present specimens do not include any anatomical part that is critical to distinguish the two genera. Although anthracotheriids have been listed in the faunal list of the Ergilin Dzo Formation, no information on the specimens has been reported yet. The present new specimens provide precise morphologies of the poorly-understood anthracotheriids of the formation, confirming the existence of two anthracotheriid genera in the formation.