between size and maturity: a correlation test of dentary depth (mm) at angulation per specimen vs. growth stage recovered an r-value of 0.468, and a p-value of 0.004, however homoscedasticity was violated. Based on this foundation, future work will focus on the growth series of *Amia calva*, the closest living relative of *C. fragosus*.

Funding Sources Carthage College

Regular Poster Session 1 (Wednesday, October 30, 2024, 4:30 - 6:30 PM)

Taeniolabis simmonsae (Multituberculata, Taeniolabididae) from the early Paleocene of the Denver Basin, Colorado: implications for taeniolabidid systematics, Paleocene bio/geochronology, and paleoenvironmental reconstruction

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Taeniolabis taoensis is a large, iconic multituberculate mammal of early Paleocene (Puercan 3 or Pu3) age known from abundant craniodental remains from the San Juan Basin, several skulls or partial skulls from the Denver Basin, and a few gnathic and dental specimens from several other Pu3 localities in the Western Interior of the U.S.A. A recently discovered multituberculate cranium with complete cheektooth dentition (DMNH EPV.134107) from the D1 Sequence (aka Denver Formation), Corral Bluffs study area, Denver Basin, Colorado, represents a species of taeniolabidid that is demonstrably smaller than that of *T. taoensis*. Preliminary results suggest that it, as well as an isolated upper molar (M1; DMNH EPV.134086) recovered from the same horizon, pertain to a species described in 2016 from the Nacimiento Formation of the San Juan Basin, New Mexico, which was placed in a new genus and species, *Kimbetopsalis simmonsae*. However, examination of almost all specimens of *T. taoensis* reveals that the differences in cheektooth sizes, M1 cusp counts, and P4/M1 length ratios between *T. taoensis* and *K. simmonsae* are less than previously indicated. We therefore conclude that *K. simmonsae* is not sufficiently distinct from *Taeniolabis* to warrant establishment of a new genus, and therefore refer the species to *Taeniolabis* in a new combination, *Taeniolabis simmonsae*. Questions remain as to whether *T. simmonsae* is morphologically distinct from *T. lamberti* from the Tullock and Ludlow members (Fort Union Formation) of eastern Montana. *T. simmonsae* occurs demonstrably below *T. taoensis* in the composite stratigraphic section in the Corral Bluffs study area and therefore earlier in time than *T. taoensis* and other mammals that characterize the *Taeniolabis taoensis/Periptychus carinidens* Interval Zone (Pu3) of the Puercan North American Land Mammal Age. Because of its association with other mammalian taxa that precede the Pu3 Interval Zone, *T. simmonsae* therefore is taken to lie within the *Ectoconus*/*Taeniolabis taoensis* Interval Zone (Pu2). Significantly also, *T. simmonsae* co-occurs with the first appearance of legumes during a warming interval in the Corral Bluffs section, suggesting that mammalian biogeography and stratigraphic succession may have been shaped, at least in part, by

changes in climate and vegetation in the early Paleocene.

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Regular Poster Session 3 (Friday, November 1, 2024, 4:30 - 6:30 PM)

Soft tissue preservation in Cenozoic fossils from John Day Fossil Beds National Monument, Oregon

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Numerous studies have revealed remarkable preservation of diverse organic microstructures in fossil vertebrates from various eras and depositional paleoenvironments, including cells, structural tissues, and, in some cases, even their component biomolecules. To date, the only well-supported proxy for such exceptional preservation remains exquisite morphological preservation, which implies that lagerstätten and other localities yielding abundant, well-preserved fossils are the most viable targets for studies of soft tissue and molecular preservation. To build on recent tests of this hypothesis by several members of our research team examining Eocene–Oligocene fossils from Badlands National Park in South Dakota, we set out to investigate the extent and nature of organic preservation in Cenozoic vertebrate fossils from John Day Fossil Beds National Monument in Oregon. Ten fossil samples were collected and immediately tested for cellular and soft tissue preservation by demineralization in 0.5 M ethylenediamine-tetraacetic acid (EDTA) pH 8.0, including six fossil specimens from the Miocene Rattlesnake Formation and four specimens from the Oligocene Turtle Cove Member of the John Day Formation. Transmitted-light microscopy of demineralization products revealed frequent, yet variable, preservation of potentially-endogenous microstructures in all samples, including cellular structures morphologically consistent with osteocytes, cylindrical and hollow structures consistent with original blood vessels, and semitranslucent, thin sheets of tissue consistent with fibrous/proteinaceous bone matrix. All 10 specimens yielded osteocytes, but vessels and fibrous matrix were variably recovered and, where present, they exhibited narrower ranges of coloration. Osteocytes recovered from bones from the Rattlesnake Formation also generally exhibited darker color and more elongate and intricate filopodia than those acquired from specimens from the Turtle Cove Member of the John Day Formation. Cumulatively, the observed quality of preservation suggests that taphonomic conditions within paleoenvironments recorded by the John Day and Rattlesnake formations not only facilitated preservation of numerous fossils, but also that vertebrate fossils from the National Monument and nearby outcrops are potentially fruitful targets for paleomolecular analyses. Our findings thus greatly advance understanding of the taphonomy and diagenesis of fossils from John Day Fossil Beds National Monument.

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