Micro CT scan of the dentary revealed two teeth in each alveolus - one functional tooth and one replacement tooth. Using this data we determined crown height in two successive teeth (7.07 mm for the functional tooth and 3.53 mm for replacement tooth) and derived formation time – specifically, 416 days for the functional tooth and 208 days for the replacement tooth and an estimated tooth replacement rate of 208 days.
Tooth replacement rate in the Mussentuchit iguanodontian (NCSM 29373) is 2-4 times slower than calculated for hadrosaurs with specialized tooth batteries (e.g., *Edmontosaurus* and *Prosaurolophus* average 50 and 81 days respectively). In fact, although slightly faster, tooth replacement rate in NCSM 29373 is most comparable to that of theropods, perhaps reflecting a plesiomorphic condition – a slower rate is expected for early-diverging ornithopods not yet exhibiting a sophisticated tooth battery. Alternatively slower tooth formation times and replacement rates may be a dietary specialization of NCSM 29373; further data among non-hadrosaurian ornithopods is necessary to test amongst these competing hypotheses.

Regular Poster Session III (Friday, October 11, 2019, 4:15 - 6:15 PM)

PALEOMETRY: MOLECULAR AND ELEMENTAL CHARACTERIZATION OF THE SLOTH *CATONYX CUVIERI* (MAMMALIA, XENARTHRA, MYLODONTIDAE) FROM THE PLEISTOCENE-HOLOCENE OF PARAGUAY.

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In this work we present the results of the first paleometry studies using X-ray fluorescence (XRF) techniques, X-ray photoelectron spectroscopy (XPS), Fourier transform infrared (FTIR) and Raman spectroscopy, applied to the characterization of a specimen of *Catonyx cuvieri* (Lund 1839) extracted from the caves of Cerro Riso in the district of San Lázaro, Department of Concepción, Paraguay. The specimen is deposited in the Laboratorio de Paleontología collection of the Facultad de Ciencias Exactas y Naturales (FACEN), Universidad Nacional de Asunción (UNA), Paraguay.
A total of 10 bone samples corresponding mostly to fragments of ribs were subjected to non-destructive analysis. These were selected because they did not suffer alterations in their surface as product of the processes of preservation (bonding, consolidation) to which this type of remains are usually subjected for their preservation in collections.
The chemical characterization was performed by means of Fourier Transform Infrared (FTIR) and Raman spectroscopy with 785nm laser excitation source, identifying the functional groups (PO4)-3 and the presence of organic groups assigned to Amide I and II respectively. The elementary identification was performed by X-ray fluorescence spectrometry (XRF) with Silver target (Ag) and SDD detector of the majority elements. In addition to an analysis by X-ray photoelectron spectroscopy (XPS)with dual source of Aluminum (Al,) for light elements and the determination of the proportion of Ca / P in the bone samples through the analysis of Ca 2p and P 1s. The C 1s to corroborate the presence of organic material in the analyzed samples.
Differences of the data obtained with the XRF and XPS will be established, being a central point of discussion the difference in the ratio of Ca / P obtained in both techniques.
The results obtained were compared with hydroxyapatite (main mineral material in bones) synthesized in the laboratory, showing differences in the (PO4) -3 P v3 bands due to the presence of amorphous and / or crystalline calcium phosphate material in the samples. The main objective of this work is to know the processes, molecular and structural changes caused by the incorporation of elements in the structures of bio-apatites in the processes of diagenesis.

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Regular Poster Session III (Friday, October 11, 2019, 4:15 - 6:15 PM)

RECONSTRUCTING COMPLEX PATTERNS OF ENAMEL ON A TOOTH WITH COMPUTATIONAL SIMULATIONS

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Teeth of most mammals are covered by a layer of highly mineralized enamel that cannot be remodeled or repaired. Several mammalian lineages have evolved thick enamel, associated with diverse dietary adaptations. Consequently, differences in enamel thickness among species have been used to examine functional properties of teeth. The thickness of the enamel layer, however, is rarely completely uniform over the crown. Since the enamel surface is not a simple extrapolation of the dentine surface, it is difficult to reconstruct the surface based on the dentine. Variable enamel thickness implies that the process of enamel matrix secretion itself plays a role in dietary adaptations. Nevertheless, it remains to be explained how the distribution of enamel on the tooth crown is developmentally regulated. Here we use molars of extant suids (*Sus domesticus*, *Phacochoerus africanus*) and primates (*Homo sapiens, Gorilla gorilla, Pongo pygmaeus*) with a computational model to explore which kind of mechanisms could underlie the complex patterns of enamel distribution. Starting from tomography-imaged teeth from which enamel has been digitally removed, enamel secretion is computationally simulated. We show how using a diffusion-limited secretion of enamel matrix, it is possible to reconstruct the enamel distribution on the tooth. Moreover, diffusion limited secretion of the enamel matrix can substantially increase the complexity of the tooth surface. These simulations provide a simple principle that accounts for the complex patterns of enamel distribution found in many taxa, and suggest a framework to classify teeth and taxa based on the mode of enamel formation.

Regular Poster Session I (Wednesday, October 9, 2019, 4:15 - 6:15 PM)

A LARGE PTEROSAUR HUMERUS FROM BONE CABIN QUARRY, MORRISON FORMATION, COLORADO

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Bone Cabin Quarry is a historic Morrison Formation quarry in southeastern Wyoming. Here we describe a large pterosaur humerus from this locality (EDP-SM 2017.02.003) housed at the Stewart Museum in Eccles Dinosaur Park. Its stratigraphic position places it among the oldest pterosaurs in the Morrison Formation. The bone is three-dimensionally preserved, although slightly crushed, and is the largest definitively Jurassic pterosaur humerus recorded in the literature. Proximodistal length is 110.5 mm, and the diaphysis measures 16 mm at its median point. The deltopectoral crest is tongue-shaped with a semi-rounded distal end and is inclined proximally. The distal half of the humerus is bowed anteriorly. The ectepicondyle is more expanded than the entepicondyle, and the radial condyle is visible as an elongated lozenge-shape that angles diagonally toward the ulnar condyle.
In order to determine the wingspan of the pterosaur that possessed this humerus, wingspans from various rhamphorhynchid pterosaurs were graphed using a previously published dataset. Deriving a regression equation from this data and substituting in the proximodistal length yields a result of 2067.6 ± 169.7 mm. Previously, the largest definitively Jurassic humerus in the literature measured 100 mm and had an estimated wingspan of 1.6-3.2 m, although there is a 112 mm long humerus from Thailand (PRC 64) that may be from an uppermost Jurassic deposit.
Most rhamphorhynchid humeri to which this specimen could be compared are not three-dimensionally preserved, so it is difficult to assign it to a specific clade within Rhamphorhynchidae. Nevertheless, the humerus is most morphologically similar to those seen in Dorygnathus and to PRC 64, the putatively Jurassic humerus from Thailand that was considered an azhdarchoid but we interpret to be a rhamphorhynchid. The Bone Cabin humerus differs from Dorygnathus humeri in size and in the morphology of the distal condyles. It is similar in size to PRC 64, although the distal condyles in PRC 64 are not well-preserved.
Also found in Bone Cabin Quarry was the holotype rostrum of Harpactognathus gentryii, a rhamphorhynchid. By extrapolating total skull length, the wingspan was estimated to be approximately 2.5 m. Given the wingspan estimate for the humerus is similar, it is possible that the two bones belong to the same species. Regardless, the discovery of this Bone Cabin humerus provides more evidence for surprisingly large pterosaurs (~2-2.5 m wingspans) in the Jurassic of North America.