clade which has an unstable position near to the base of Neosauropoda; but the basal macronarian Gallusaurus does not cluster with other turiasaurs. Rapetosaurus is more closely related to Saulsaurus than to Malawisaurus, contradicting the last analysis of titanosaur relationships.

Reconstruction of footprint ranges and biogeographic analysis provide insights into eusauropod evolutionary history. For example, Bellusaurus is found to be the most basal macronarian, indicating that eusauropods were present in East Asia during the Jurassic, contrary to the hypothesis that members of this clade did not invade this area until the Cretaceous. The position of Bellusaurus supports that Macronaria and Diplodocoidea diverged in, or before, the early Middle Jurassic prior to the break-up of Pangaea.

Poster Session IV (Saturday, November 8, 2014, 4:15 - 6:15 PM)

TYRANNOSAURUS MIGHT RUN FASTER THAN HUMAN: A DETAILED STUDY BASED ON AVAILABLE KNOWLEDGE OF EXPERIMENTAL BIOLOGY AND COMPUTER SIMULATION

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A theory of static calculation was previously presented, stating that Tyrannosaurus was not a fast runner. The work postulated a certain mid-stance posture, and obtained the result that Tyrannosaurus muscle is insufficient to support it. The work and subsequent studies brought insight on the prediction of running ability of Tyrannosaurus. However, parameters involved in the evaluation have not been fully analyzed. Moreover, the evaluation methodology is a static one, hence speed estimation is quite limited. We calculated whole running motion of Tyrannosaurus based on time-dependent biomechanical calculations with the use of the evolutionary computation method. As a result, we obtained the possible locomotion pattern of Tyrannosaurus, and found a possibility that the mid-stance posture is more upright than reported in previous works. This result gives smaller estimation of muscle mass needed to support the posture, and shows that Tyrannosaurus could run at a speed of 14 m/s.

Detailed discussion of involved parameters is also presented. Among them the most important parameters is maximum muscle stress, which is the one at which the muscle exerts force best. We have examined 110 references on this issue. As a result, we have found that previous works misunderstood the parameter as isotropic tenuis force. The correct parameter has been stated as specific tissue in experimental, biology, and the parameter range spans widely as ~11-220 N/cm². The previous works assumed this parameter as 30 N/cm². Therefore the muscle can generate larger force than previously assumed, which makes Tyrannosaurus possibly capable of fast running. The mechanical power of muscle during running is also calculated in the series. This is the first study in this research area. The value of mechanical power also allows for fast running in Tyrannosaurus.

We have completed work discussing known biomechanical parameters based on 150 references of experimental biology, and then applied this to the discussion of running ability of large bipedal theropod, Tyrannosaurus. The result shows a possibility that Tyrannosaurus might run faster than a human. At the presentation, we show all of the data that support the above statements.

Preparators' Symposium (Saturday, November 8, 2014, 3:00 PM)

TRANSFER PREP OF AN EOCENE BIRD FROM THE GREEN RIVER FORMATION, WY.

VAN BEEK, Constance, Field Museum, Chicago, IL, United States of America, 60605

The Green River Formation of the Eocene Epoch is famous for its vast array of beautifully preserved taxa. The fine grained limestone can record the finest details for postarity, including ephemeral specimens of plants, insects, even feathers. While not common, bird fossils have been discovered in the limestone and can range from a single feather to a fully articulated specimen. Usually, bird fossils are found as a single specimen of one bone when an exceptionally preserved complete 52 year old bird with feathers was discovered in the 'split-fish layer' from southwestern Wyoming as a slab and counterpart, it presented a challenging opportunity to attempt 'transfer prep' of the specimen's bones onto a slab.

Bird fossils are notoriously delicate. Their bones are small, thin and hollow; and feathers are essentially a carbon stain showing what type of feather it used to be. Regarding this specimen, all features were present: skull, entire skeleton, feathers. The most important feature (the skull) was on the left slab, as well as its feet and claws. Some of the limb bones and half of the furcula were also on the left slab. The feathers and a greater percentage of the bones were better preserved and more intact on the right slab. After initial dissent on my part, and persistent insistence on transfer prep, after final agreement, the bird was removed from the furcula and containing as much original material as possible. If a bone could be removed from the left slab, it would be carefully dissected off and then transferred into place in its negative impression on the right slab. The bone, now glued into place, could then have the excess matrix removed and it would join the rest of the skeleton and feathers on the right slab. As much of the left slab as possible was to be left intact for 'destructive sampling'.

While a daunting project, the bird's bones proved robust enough to manipulate after careful consolidation of all bones (left and right). Great care was taken to consolidate only bone material. After using extremely fine tools and precise application of glue and consolidants, most of the skeleton was eventually assembled on to the right slab, with minimal destruction to the left side.

This project begged some difficult questions, including ethical ones. "Is this really necessary?" What is the point of this? At 2005 poster a preparator asked, "why a drastic alteration of an important specimen? What is the argument for/against a project of this nature?"