Get an Eyeful of This: Gross Anatomy and Morphometrics of the Squirrel Monkey (Saimiri) Interorbital Region

LAUREN B. HALENAR-PRICE1,2, BRIAN SHEarer2,3, CLAIRE E. TERHUNE4, CAITLIN YOAKUM4, & SIoBHÁN B. COOKE2,5

1 Department of Biology, Farmingdale State College, SUNY, 2 NYCEP Morphometrics Group, 3 Department of Cell Biology, New York University School of Medicine, 4 Department of Anthropology, University of Arkansas, 5 Center for Functional Anatomy and Evolution, Johns Hopkins University School of Medicine

INTRODUCTION & BACKGROUND

Saimiri and Cebus have a narrow interorbital region compared to other platyrhines (Fig. 1). The extreme nature of this trait in Saimiri leads to the development of an interorbital fenestra in adults. This feature has played a role in the phylogenetic interpretation of the fossil Dolichocebus gaetanensis (Fig. 2), but as we know little about variation in the growth and development of the fenestra, its shape, or surrounding anatomical structures in extant taxa, our ability to make additional inferences is limited. Here, we attempt to fill some of these gaps in our knowledge.

Results – Skeletal Morphology

Interorbital fenestra outline and 3D cranial shape were captured from CT scans (n=43) of S. boliviensis, S. oerstedii, and S. sciuereus (Fig. 3). While there is some separation between the three species in shape space for both variables (Figs. 4-5), the two landmark sets do not covary strongly (Fig. 6). The two species with the more divergent cranial shapes (S. boliviensis and S. oerstedii) have the more divergent fenestra outlines (Figs. 4-5). Within S. sciuereus, males share a slightly more rounded fenestra, shorter face, and a more dolichocephalic cranium while females share a slightly more elliptical fenestra, longer face, and a more globular neurocranium (Fig. 6).

Results – Soft Tissue Anatomy

Diffusible iodine-based contrast-enhanced CT (diceCT) scans were conducted on the extraocular muscles and periorbital membrane in Saimiri to visualize the soft tissue correlates for this unique fenestra. Digital and physical dissection of three Saimiri specimens demonstrates that no intrinsic membrane exists in the fenestra, but rather it is closed off by contact between the periorbitum of each eye. No structures perforate the septum (Fig. 7), and the gross ocular anatomy is consistent with that observed in humans (Fig. 8).

References: Kay, R.F., et al. (2008) The anatomy of Dolichocebus gaetanensis, a stem platyrhine monkey from Argentina. JHE 54, 323-382; Rosenberger, A.L. (1970) Cranial anatomy and implications of Dolichocebus, a late Oligocene ceboid primate. Science 279, 416-418. Acknowledgments: MicroCT scans conducted for this research were downloaded from Morphosource, performed at the American Museum of Natural History Microscopy and Imaging Facility, and the University of Arkansas MicroCT Imaging Consortium for Research and Outreach (MICRO), which was originally funded as part of a National Science Foundation Major Research Instrumentation grant (BCS-1725925).