

Exploratory analysis of the neuropil space in the somatomotor, visual and cingulate cortex of the extinct Tasmanian tiger (*Thylacine cynocephalus*)

Rachna Sahasrabudhe DO'25¹, Paul R. Manger PhD², Chet C. Sherwood PhD³ and Muhammad A. Spocter, PhD^{1,2}

¹*Department of Anatomy, Des Moines University, Des Moines*

²*School of Anatomical Sciences, Faculty of Health Sciences, University of the Witwatersrand, Republic of South Africa*

³*Department of Anthropology and Center for the Advanced Study of Human Paleobiology, The George Washington University, Washington, DC*

The Tasmanian tiger (*Thylacine cynocephalus*) was a carnivorous marsupial which was driven to extinction at the start of the 20th Century. While historical records and genetic data have provided us with some insight into thylacine behavior and relatedness, we still know very little about their comparative neurobiology. Through the recent availability of a high-resolution image dataset acquired from hematoxylin-stained sections of a single thylacine brain, we undertook an exploratory analysis of the cortical microcircuitry in the somatomotor, visual and cingulate cortex. The aim of this study was two-fold, 1) to evaluate if there are regional differences in microcircuitry between cortical areas and to assess the quality of the image data for follow-up comparisons with the extant Tasmanian devil (*Sarcophilus harrisii*). Using a design based stereological sampling and image analysis approach, we quantified the neuropil fraction and average cell size in the cortical regions of the Thylacine brain. Our preliminary findings are interpreted within the context of published data on the neuropil space across species and recommendations are made for the use of this image dataset in subsequent histological comparisons.