H12 Quantitative and Spatial Comparison of the Microscopic Bone Structures Of Deer (*Odocoileus Virginianus*), Dog (*Canis Familiaris*), and Pig (*Sus Scrofa Domesticus*)

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After leaving this presentation, attendees will understand the impor- tance of including spatial evaluations of microscopic bone cross-sections for the inter-species histological comparisons and intra-species histological analysis. The research has forensic implications, suggesting additional means to differentiate fragmentary remains.

The implications for this study will impact the forensic science community by suggesting future avenues of research for histologically differ- entiating species for both forensic and archaeological settings. Second, incor- porating spatial analysis of microscopic structures in multiple elements from the same species could prove beneficial in differentiating variation of those structures within a particular species.

Species-specific variables exist that change the structure and morphology of cellular bone tissue. Identifying and quantifying these differ- ences is necessary in the evaluation of fragmentary bones in order to assign specific species identification. In order to under the influence of species of origin on microscopic bone tissue, the influence of development and biome- chanic forces specific to a skeletal element must also be assessed.

This presentation explores the preliminary study of the histological bone structures in terms of the their area, density and spatial location. In order to achieve this research goal, the cross-section of three major skeletal struc- tures of three common, quadrupeds ubiquitous across North American and commonly found in association with human remains were compared. The specimens used for this research were taken from the comparative collection of the Louisiana State University's Forensic Anthropology and Computer Enhancement Services (FACES) Laboratory. The study analyzed the mid- shaft cross-section of six femora, five humeri, and six mid-thoracic ribs of the white-tailed deer (*Odocoileus virginianus*); six femora, six humeri, and six mid-thoracic ribs of the domestic dog *(Canis familiaris*); and five femora, four humeri, and six mid-thoracic ribs of the domestic pig (*Sus scrofa domes- ticus*). Each skeletal element was divided into eight sections along known body planes. All histomorphometric measurements and observations were taken within these sections to explore the spatial organization of the micro- scopic structures.

Plexiform bone observations suggest not only species-specific presence and absence of this bone structure but a relation to the skeletal element. There was an almost complete absence of this bone type in the mid-thoracic rib and reduced presence in the humerus versus the femur of all three species.

Secondary osteon area isolated pig in all three skeletal elements from the other two species, suggesting a species-specific difference in osteon development. On the other hand, though similar in area, deer and dog showed interspecies, parallel patterns between like elements (humerus and humerus, femur and femur). Secondary osteon density followed an expected trend of increasing density associated with older animals.

The implications for this study suggest future avenues of research for histologically differentiating species for both forensic and archaeological settings. Second, incorporating spatial analysis of microscopic structures in multiple elements from the same species could prove beneficial in differen- tiating variation of those structures within a particular species.

Histology, Faunal Analysis, Osteon

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