Characterization of mandibular variation across 43 inbred mouse strains

**Richard Jin,** Christopher J. Vinyard, Department of Anatomy & Neurobiology, NEOMED

The mandible is essential to feeding and communication, and is important for many functions, such as biting and chewing, and facilitates jaw movements. The mandible of inbred mice is an established model for identifying the genetic determinants of morphological variation. Clinically, improving our understanding of the genetic architecture of the mandible may improve treatments that impact feeding and significantly improve quality of life. 809 mice from 43 inbred strains, most of which are Mouse Phenome Database (MPD) priority strains, were raised until 9-12 weeks of age. The mice were euthanized, skeletonized, and the mandible was isolated. The isolated mandible was photographed then digitized. Digital landmarks were collected from the jaw length, condyle length, corpus depth, ramus height, and leverage estimate. Absolute and relative mandibular measures were analyzed. Phenotypic variation, heritability of phenotypic variation, and genetic correlation were measured. It is found that MPD priority strains exhibit significant phenotypic variation in mandibular dimensions supporting inbred mice as a genetic model for understanding the genetic architecture underlying jaw form (p<0.001). Differences in mandibular dimensions are heritable among strains. Jaw measures exhibit significant genetic correlations, suggesting that mandibular features are pleiotropic in mice. Future work will continue evaluating jaw measures relative to publicly-available haplotypes to identify possible candidate genomic regions influencing jaw form.