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## Form and Function

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### **A morphometric mapping analysis of mice molar morphology**

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The mouse dentition has been extensively used as a model for the developmental genetic basis of dental morphology. Phenotypic change and malformation have been reported in a variety of mutant mouse strains. In the case of mutant mice showing drastic morphological change in cusp patterns, however, the conventional quantitative approaches, such as landmark-based methods, cannot be applicable due to the lack of biologically and/or geometrically homologous structures between specimens. Therefore, the phenotype-genotype relationship remains to be tested. Here, we applied a landmark-free approach, morphometric mapping (MM) to quantify mice lower first molars. The sample used in this study comprised two strains of wild type house mouse: ICR and BL6, and mice with either loss or gain of function of different developmental genes. Their lower molars were  $\mu$ CT-scanned and three-dimensional surface models were reconstructed. These models were quantified by MM, using three morphometric parameters: the mean curvature on the crown surface, the height from the cervical plane, and the radius from the centroid of the cervical line. Principal Components Analysis (PCA) was performed in order to identify and visualize major patterns of shape variation in the morphospace. The MM could detect not only the morphological difference between mouse mutants, but also between two wild type strains. The MM method allowed us to quantify and visualize the complicated mice dental morphology precisely. Applying this method to various types of mice mutants that represent altered cusp patterning promises well for an elucidation of the genotype-phenotype relationship.

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Jens Jacob, Jana Eccard (Editors)

6<sup>th</sup> International Conference of Rodent  
Biology and Management  
and  
16<sup>th</sup> Rodens et Spatium

Potsdam, Germany, 3-7 September 2018

Book of Abstracts



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