Abstract: The tribosphenic molar is an ancestral type of mammalian teeth and a phylotypic stage of the mammalian dental evolution. Yet, in contrast to derived teeth types, its enamel microarchitecture attracted only little attention and the information on that subject is often restricted to statements suggesting a simple homogenous arrangement of a primitive radial prismatic enamel. The present paper tests this prediction with aid of comparative study of eight model species representing the orders Chiroptera, Afrosoricida, Eulipotyphla (Erinaceomorpha) and Eulipotyphla (Soricomorpha). Special attention was paid to shrews (Soricidae), the group with most derived tribosphenic dentition among extant insectivores. The detailed electron microscopic (SEM) analysis of standardized cross sections over essential structural elements of tribosphenic molars (in shrews supplemented with sections of the lower incisor, the most derived tooth of the dentition) was a basic source of information.

The results demonstrated common arrangements related to tribosphenic design (heterotopy of enamel thickness, radial prismatic enamels as primary product of amelogenetic activity), yet, an unexpectedly broad span of variation in state of further variables was discovered at the same time. The taxon-specific arrangements and related modification in course of amelogenesis were found to be an essential source of that variation. In conclusion, the organization of the enamel cover of the tribosphenic molars includes unexpectedly large diversity of amelogenetic processes and it cannot be excluded that the complex potential of the amelogenetic dynamics, predicted exclusively for the most derived mammalian dental types until now, actually belongs, together with the tribosphenic molar design and prismatic enamel, into the set of dental apomorphies which long ago constituted the onset of Mammalia.