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Structure and evolution of mammoth molar enamel

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This work investigates the structure of Eurasian Plio-Pleistocene *Mammuthus* enamel, with attention to diagenesis and individual variability. A focal point of this study was to determine whether morphological trends in *Mammuthus* molars were accompanied by correlated enamel microstructure changes. In the examined four taxa the enamel of the cheek teeth consists of three layers delimited by two major discontinuities in enamel prism direction. Noticeably, the enamel capping the occlusal end of the unworn molar plates retains a less derived two-layered structure, similar to that found in the basal proboscidean Moeritherium. In *Mammuthus meridionalis* the third deciduous premolar is differentiated from all other teeth in having more strongly decussating Hunter-Schreger bands in the middle layer, as a possible reinforcement of the very thin enamel. Evidence from this analysis shows that, in the transition from late Middle Pliocene *M. rumanus* to Late Pleistocene *M. primigenius*, the middle enamel layer, which is made up of prisms at an angle to the occlusal surface, providing greater resistance against wear, increased its relative thickness. This is consistent with the hypothesis that *Mammuthus* adapted to a more abrasive diet. Comparison with other proboscidean taxa indicates that the schmelzmuster (enamel pattern) found in *Mammuthus* is a synapomorphy of the Elephantoidea.

Key words: Mammalia, Proboscidea, Mammuthus, enamel microstructure, evolution, systematics.

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