

On the crystal arrangement in small mammal dental enamel

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Dental enamel is the hardest tissue in the mammalian body. It is composed of highly arranged inorganic crystallites consisting of hydroxyapatite. This arrangement of enamel prisms is called schmelzmuster. Throughout the evolution many different patterns have been developed [1]. This work shows a comparison of dental enamel of 18 different species from the taxa of rodents (Rodentia), lagomorphs (Lagomorpha) and insectivores (Eulipotyphla): several Murinae (*Apodemus sylvaticus*, *Mus musculus musculus*, *Mus musculus domesticus*, lab mice strain C57BL/6 and Balb/c), rat (*Rattus norvegicus*, lab rat strain LEW/Crl), woodchuck (*Marmota monax*), guinea pig (*Cavia porcellus*), agouti (*Dasyprocta punctata*), Ansell's mole rat (*Fukomys anelli*), Mechow's mole rat (*Fukomys mechowii*), coruro (*Spalacopus cyanus*), naked mole-rat (*Heterocephalus glaber*) and rabbit (*Oryctolagus cuniculus*), as well as for an outgroup comparison insectivores: European mole (*Talpa europaea*), common shrew (*Sorex araneus*), crowned shrew (*Sorex coronatus*), Eurasian pygmy shrew (*Sorex minutus*), and greater white-toothed shrew (*Crocidura russula*). These samples were analysed to find similarities and differences within and also between the different taxa.

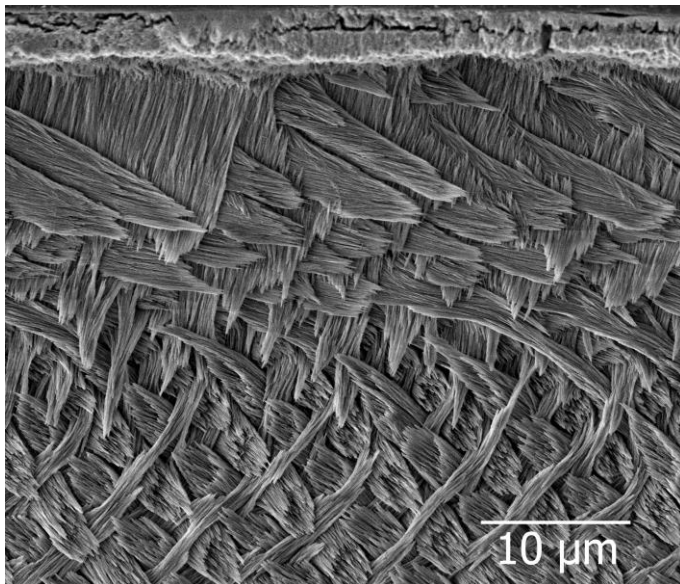


Figure 1 Two-layered schmelzmuster of a wood mouse incisor (*Apodemus sylvaticus*), showing a clear picture of enamel crystallites, magnification 8000x

We prepared tooth sample of incisors and molars by embedding them in epoxy resin and grinding until the inner enamel was exposed. After that, the ground section was polished with a diamond suspension and cleaned from any remaining excess. To make the schmelzmuster visible, the samples were etched with nitric acid. For analyses by scanning electron microscopy (SEM), the samples were coated with gold and palladium. To analyse the chemical composition of the dental enamel, energy-dispersive X-ray spectroscopy (EDS) was used together with X-ray powder diffraction for a structural characterization of the tooth mineral. The taxa can be distinguished by their characteristic schmelzmuster. A differentiation of the subtaxa is difficult due to the high similarity.