

Abstract

Tooth number is reduced in humans and mice when compared to the presumed basic tooth formula in mammals. In the regions, where teeth had been suppressed during evolution, a supernumerary tooth can appear as a result of abnormal development. However development of a supernumerary tooth, as well as origin of other anomalies, cannot be directly investigated in human embryos. That is the development of a supernumerary tooth was studied in a mouse model of this anomaly. **The aims of the thesis were focused to verifying the hypothesis: Development of the supernumerary tooth in mutant mice is based on the revitalization of the rudimentary primordia of the teeth suppressed during evolution.**

We compared the morphological and quantitative aspects of the developing epithelium of the largest rudimentary (premolar) tooth primordia, called MS and R2, in the mandibles of WT, *Spry2*^{-/-}, *Spry4*^{-/-}, *Spry2*^{-/-};*Spry4*^{-/-} and *Tabby* mutant mice. Similarly, the upper incisor in WT mice was analysed and compared to the development of the duplicated incisor in *Spry2*^{+/-};*Spry4*^{-/-} mutant mice.

In comparison to controls, decreased cell apoptosis and increased cell proliferation together with an enlarged volume of the dental epithelium were found during rudimentary tooth development in *Spry* mutant mice. These changes showed the revitalization of the tooth primordia and their ability to form a supernumerary tooth. The revitalization effect continued to later stages only in some of the animals, while the development was arrested in others. However, even a temporary revitalization of the rudimentary tooth primordia had an impact on the size and cusp arrangement of the adjacent first molar. The duplication of the incisor in *Spry* mutant mice was also accompanied by a decrease of apoptosis and increase of proliferation in dental epithelium. The supernumerary tooth in *Tabby* mutant mice developed similarly as that one in *Spry4*^{-/-} mice.

The thesis confirmed the hypothesis about the revitalization of rudimentary tooth primordia during origin of supernumerary teeth in the mouse model.