ABSTRACT

OBJECTIVES: The present study was to compare the expression pattern of ameloblastin and Notch-1 in human tooth germ and associated structures, and in ameloblastoma to determine cytodifferentiation between tooth germ and ameloblastoma and to determine the stem cell pool in the human tooth germ.

STUDY DESIGN: The study included 11 tooth germs (EBS-4 & LBS-7) from 7 fetuses (20 to 26 weeks old) and 6 tissue samples of ameloblastoma retrieved from the archives. The morphological characteristics of the tooth germ and ameloblastoma in hematoxylin and eosin sections were studied under light microscopy and immunohistochemistry was performed using ameloblastin and Notch-1 antibodies against human tooth germ and ameloblastoma tissue sections.

RESULTS: Information regarding expression of ameloblastin and Notch in human tooth germ is limited or negligible. In the present study, in the human tooth germ, ameloblastin was expressed in the acellular zone of the dental papilla with simultaneous fluctuating reaction within the IEE lineage that parallels with the similar type of IEE lineage cells present within the ameloblastoma. In the human tooth germ, Notch-1 was expressed in all cell layers of the enamel organ in both EBS (cytoplasm and nucleus) and LBS (nucleus) with reduced number of positive cells in the LBS when compared to EBS. In ameloblastoma, Notch-1 was expressed in both cytoplasm and nucleus of peripheral and central cells similar to the reaction in the tooth germ. Notch-1 neither identifies stem cell pool in the human tooth germ nor restricted to SI. Ameloblastin and Notch-1 was expressed in the immature osteoid and chondroid matrix but not in the mature bone.

CONCLUSION: Ameloblastin in the acellular zone of the dental papilla are required for the differentiation of odontoblasts and ameloblasts. The expression of ameoblastin in human tooth germ and ameloblastoma showed similar reaction pattern related to the common cytodifferentiation occurring among them. Notch-1may have a role in the differentiation of IEE lineage based on the reduced intensity and decrease in the number of positively stained cells in LBS compared to EBS. The expression of Notch-1 in ameloblastoma parallels the reaction pattern in the EBS and LBS of human tooth germ but difficult to determine the

cytodifferentiation within the tumor. Notch-1 was not specific to identify neither the SI nor the stem cell pool in the human tooth germ rather helped in enamel and bone formation.