

Human mucosal epithelium involvement in prenatal growth of maxillary sinuses

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SUMMARY

The mechanism of formation of the maxillary sinuses is not elucidated as yet, although their morphology during embryogenesis is well described. In the prenatal period, the pneumatization hypothesis is not valid. As the molecular approach to this problem is difficult to apply to human samples, we decided to apply immunohistochemical reactions to analyse the synthesis of selected molecules involved in the rebuilding of tissues. Hematoxylin-eosin staining and immunohistochemical reactions for the detection of MMPs (matrix metalloproteinases), one of their inhibitor TIMP 1 (tissue inhibitor of MMPs), BMP 6 (bone morphogenetic protein 6) and TGF- β (transforming growth factor β) were performed in the epithelium the mucosa of the maxillary sinuses of several human foetuses from the collection of the Anatomical Institute. The age of the foetuses was 8, 11, 15, 16, 17, 18 and 22 weeks. An intense positive reaction for MMPs 1,2 and 3 was found in the mucosal epithelium of developing sinuses in the whole series of foetuses was found. The reaction was more intense in advanced stages of foetal development. Tissue derived inhibitor TIMP was hardly detectable, regardless of the age of samples. However, the intensity of the reaction for TGF β was strong in both young and more mature sinus epithelium. The presence of BMP 6, a member of the superfamily of TGF β , was detected although the intensity of this reaction in the epithelium was rather weak. Both TGF β and BMP 6 are well known as regulators of differentiation in the course of organogenesis.

Results of the histochemical analysis suggest the possible involvement of the epithelium in the growth and formation of the maxillary sinuses. The main argument for this is intense reaction for MMP proteases which, as in bone, regulate the turnover and rebuilding processes of the extracellular matrix (ECM).