

I-7. Differential expression of three superoxide dismutase isoforms in periodontitis patients

나혜진, 김옥수, 정연주

전남대학교 치과대학 치주과학교실

Background

It has been claimed that the imbalances in levels of free radicals and reactive oxygen species with antioxidants may play an important role in the onset and development of several inflammatory oral pathologies. Recently, it was found oxidative damage in the chronic inflammatory periodontal diseases.

Among the diverse endogenous mucosal antioxidant defense mechanisms, superoxide dismutase(SOD) form the primary defense against the deleterious effects of reactive oxygen species(ROS), ensuring that O_2 is efficiently converted to H_2O_2 . There are three major isoforms of SOD in human cells: cytoplasmic copper-zinc superoxide dismutase(CuZnSOD), mitochondrial manganese superoxide dismutase (MnSOD), and an extracellular superoxide dismutase(ECSOD).

This study aims to assess the degree of oxidative stress in patients with periodontitis by detecting their levels of enzymatic antioxidants, SOD.

Materials and Methods

The expression of CuZnSOD, MnSOD and ECSOD, which are essential enzymes that eliminate ROS, was evaluated immunohistochemically in periodontally inflamed gingival tissue.

Result

In general, immunostaining for CuZnSOD produced a diffuse cytoplasmic and nuclear pattern, for MnSOD a granular cytoplasmic pattern, and for ECSOD a diffuse or granular cytoplasmic pattern.

In sections of healthy gingiva, CuZnSOD and MnSOD staining was observed in the epithelium, whereas epithelial expression of ECSOD was absent and ECSOD was mainly localized in the vessel walls of small capillaries.

The expression of CuZnSOD and MnSOD was increased in inflamed areas but, ECSOD was hardly affected by the intensity of inflammation.

Conclusion

This study indicated that SOD isoforms are ubiquitously expressed in healthy gingiva, and induction of CuZnSOD and MnSOD as response to increased production of reactive oxygen species in periodontitis was suggested.