Doxycycline and Caffeic Acid Phenetyl Ester regulates total Antioxidant Status (TAS) and total Oxidant Status (TOS) in experimentally induced periodontitis model of rats

Umut Yiğit1, Fatma Yeşim Kirzioglu1, A.Cihangir Uğuz2,3

1 Department of Periodontology, School of Dentistry, Süleyman Demirel University, Isparta, Turkey.

2 Department of Biophysics, School of Medicine, Süleyman Demirel University, Isparta, Turkey.

3 Neuroscience Research Center, Süleyman Demirel University, Isparta, Turkey.

Periodontitis is defined as inflammation around the tooth characterized with soft tissue and bone damage. Oxidants are also produced under physiological conditions and human body's defense mechanisms try to scavenge these harmful products. Oxidative stress condition is formed when the balance will shift to oxidants.

The main idea of the current study is to evaluate the TAS and TOS levels from brain, heart, kidney, liver and plasma samples. We also evaluated histomorphometrical changes in alveolar bone of rats.

Forty-eight adult Wistar Albino rats were divided into five study groups as follows: 1) group 1 = Control; 2) group 2 = CAPE; 3) group 3 = DOX; 4) group 4 = Periodontitis; and 5) group 5 = CAPE + DOX + Periodontitis.

We determined the lowest TAS levels in periodontitis group. However CAPE administration increased TAS levels significantly in brain, kidney, liver and plasma samples. TOS results also support our findings. CAPE reduces oxidative stress products in heart, kidney, liver and plasma samples. DOX group has some positive effects but not as strong as CAPE. Histomorphometric evaluation results also support our oxidative stress index results. DOX and CAPE have better signs of improvement against periodontitis. But CAPE is more effective than DOX.

Our findings clearly demonstrate that CAPE has powerful protection effect against periodontitis induced oxidative stress model in rats. CAPE administration can tolerate oxidative stress better than DOX administration by its phenolic compounds.