Regulation and Role of Heme Oxygenase-1 (HO-1) During Inflammation in Human Gingival Fibroblasts (HGF)

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ABSTRACT:

Periodontitis is the most common cause of adult tooth loss in the U.S., with an estimated 1 in 3 adults suffering from some form and 10-15% of adults developing severe forms. In addition to its direct impact, periodontitis also contributes to the development of several other diseases, including cardiovascular disease, pre-term low birth weight, and diabetes. Although the primary function of HO-1 is the breakdown of heme to carbon monoxide, iron and bilirubin, it has also been shown to play an important role in wound repair and the resolution of inflammation by mechanisms involving homeostatic regulation of the redox state of cells. A series of experiments has been designed to determine whether and to what extent the levels of HO-1 mRNA and protein are regulated by inflammatory cytokines in HGF isolated from individuals with or without periodontitis. Preliminary results show that HO-1 mRNA is expressed in HGF cultures derived from patients with periodontitis and that mRNA levels are inhibited over 60% by Interleukin-1 at 6 hours (10 ng/ml, p < 0.001). Interestingly however, HO-1 protein levels as measured by ELISA are not decreased by IL-1. Experiments are currently underway to address this apparent paradox, as well as the potential role of HO-1 in the regulation of inflammatory mediators in HGF.