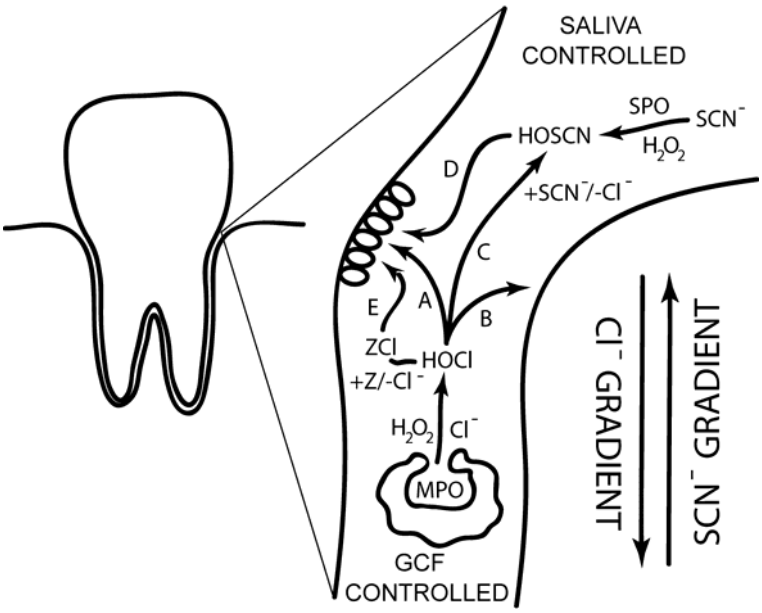

The role of hypohalites (OX^-) in non-immune host defense mechanisms is well-recognized. In the context of the oral cavity, the interplay of hypochlorous acid (HOCl, the biocidal component of household bleach and a killing agent that is generated by certain white blood cells) and hypothiocyanite ($OSCN^-$, an unusual and very reactive molecule that is also produced in the human body) are illustrated in this figure. The spatial relationship between these inorganic host defense factors of the oral cavity and the ion gradients that influence their relative abundance are both important considerations. Thus, hypchlorous acid controls gingival crevicular fluid (GCF) and hypothiocyanite controls saliva. It is proposed that these two biocides work in concert at the gingival margin (which is illustrated in the expansion in this figure). Despite the fact that hypothiocyanite has been known for decades, we have little insight into its fundamental chemical properties. <u>The objective of this PRF project is to study the basic physical and chemical properties of hypothiocyanite</u>. It is expected that insight into the chemical properties of $OSCN^-$ will promote a better understanding of its role as a human defense factor. This figure illustrates some of the relevant reaction pathways in the context of the oral cavity. Thus, HOCl is cytotoxic to pathogenic bacteria (Path A) and gingival tissue (Path B). Alternatively, HOCl can react with SCN^- to produce HOSCN (Path C). HOSCN is also produced during the SPO-catalyzed oxidation of SCN^- by H_2O_2. HOSCN is antibacterial (Path D, but comparatively innocuous with respect to the host tissues). In addition to the reaction of HOCl with SCN^-, it may react with other small molecules (Path E) to produce secondary antimicrobials (e.g., organic amines to produce chloramines that are generally cytotoxic). Path E is perhaps the least understood bacteriocidal mechanism of HOCl.