Myeloperoxidase in Health and Disease

Ernst Malle and Wolfgang Sattler

Institute of Molecular Biology and Biochemistry, Center of Molecular Medicine, Medical University of Graz, A-8010 Graz, Austria, ernst.malle@medunigraz.at

The potent oxidant hypochlorous acid (HOCl), formed by the myeloperoxidase-hydrogen peroxide (MPO-H_2O_2)-chloride system of activated phagocytes, contributes to their microbicidial activity *in vitro* and *in vivo*. However, evidence has emerged that chronic and prolonged production of HOCl contributes to tissue damage and the initiation and propagation of acute and chronic vascular diseases including glomerulosclerosis, ischemia-reperfusion injury, and neurodegenerative diseases. Numerous lines of evidence implicate a role of MPO in the pathogenesis of atherosclerosis. Enriched within vulnerable plaque, MPO serves as an enzymatic source of eicosanoids and other bioactive lipids. A range of different analytical techniques ranging from fast-reaction kinetics to product analysis, have also been employed to reveal the underlying mechanisms and products of HOCl-induced modification of lipids (ether- and ester-phospholipids, unsaturated fatty acids, cholesterol) and proteins *in vivo*. Therapeutic approaches using HOCl scavengers, though still in their infancy, have revealed that a diminution of lesion severity, or regression, can be achieved in animal models, thus tightly linking the inflammatory process with HOCl-induced damage, and altered lipoprotein metabolism. Nevertheless, further clinical/epidemiological studies, as well as animal experiments and analytical approaches, are required to reveal the complex web of processes induced by reagent HOCl and other MPO-induced oxidants in various disease states.