In the course of studies with P450 4A11 and its thiol stimulation, we discovered that the heme cysteine ligand was reversibly oxidized to a sulfenic acid with low levels of H$_2$O$_2$ or after aerobic storage, as verified using LC-MS/proteomic and activity analysis. Further studies showed that this phenomena occurs with several other human (and mouse) P450 (and that sulfenylation occurs with other drug metabolizing enzymes). We have developed more reactive reagents for analysis of sulphydryls and sulfenic acids and are extending our work to cellular systems to address the question of how the redox process relates to modulation of enzyme function.