

Title: Chemical Biology of Gaseous Signaling Molecules

Abstract: Maintenance of redox homeostasis is essential for cellular survival and growth. Small gaseous entities which are reactive biological species derived from oxygen, nitrogen as well as sulfur are generated and quenched during these processes. These small gaseous molecules mediate a number of cellular processes and signaling events. The major challenges in this field include reliable detection, controlled generation as well as inhibition of biosynthesis of these species. Our lab works on developing tools to study these complex biological processes in a systematic manner. Using fundamental and mechanistic organic chemistry as the basis, we develop small molecules that can fragment to produce the aforementioned species. We present case studies of tools developed in our lab that may have potential in mitigating stress due to elevated reactive oxygen species, which is associated with many physiological conditions.