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Safety in Cycling: Novel Redox Proteins from *Escherichia coli.* Melanie A. Adams, Zongchao Jia, Dept. of Biochemistry, Queen's University, Kingston, ON K7L3N6, Canada.

Naturally synthesized quinones perform a variety of important cellular functions. *Escherichia coli* produce both ubiquinone and menaquinone, which are involved in electron transport. However, semiquinone intermediates produced during the one-electron reduction of these compounds, as well as through auto-oxidation of the hydroxyquinone product, generate reactive oxygen species that stress the cell. Here, we present the crystal structures of YgiN (shown right) and 'Modulator of drug activity B' (MdaB), a DT-diaphorase-like enzyme. MdaB is reported to be involved in the protection of cells from reactive oxygen species formed during single electron oxidation and reduction reactions. The three-dimensional fold of YgiN, a protein of hitherto unknown function, is similar to that of ActVA-Orf6 monooxygenase, which acts on hydroxyquinone substrates. The structure of MdaB is highly reminiscent of previously reported DT-diaphorase structures. We demonstrate that YgiN is able to re-oxidize menadiol, the product of the MdaB enzymatic reaction. We therefore refer to YgiN as Quinol Monooxygenase (QuMo). The enzymatic activities, together with the structural characterization of YgiN, lend evidence to the existence of a novel quinone redox cycle in *E. coli*.