



Figure 1 | **The generation of reactive oxygen species and the enzymes used for scavenging.** **a** | The univalent reduction series of oxygen. The standard reduction potentials (pH 7) of molecular oxygen (O_2), superoxide (O_2^-), hydrogen peroxide (H_2O_2) and the hydroxyl radical (HO^\bullet) indicate that, with the exception of O_2 , these compounds are potentially potent univalent oxidants. The standard concentration of O_2 is regarded as 1 M. **b** | The *Escherichia coli* enzymes that are responsible for degrading reactive oxygen species (ROS). O_2^- is dismuted by superoxide dismutase (SOD). H_2O_2 is targeted by catalases (catalase E and catalase G), as well as by alkyl hydroperoxide reductase (Ahp). **c** | Two pathways of adventitious $FADH_2$ oxidation on flavoproteins. Flavin autooxidation is possible because enzymatic flavins commonly have univalent reduction potentials as low as that of O_2 . The pathway to the left requires an electron spin flip by either flavosemiquinone or O_2^- , allowing adduction and, ultimately, H_2O_2 release¹⁴¹. The pathway on the right releases two consecutive molecules of O_2^- to the bulk solution. The left pathway predominates in most enzymes studied to date. ROS and O_2 are shown in bold. E_m , redox potential.