Supplementary Information

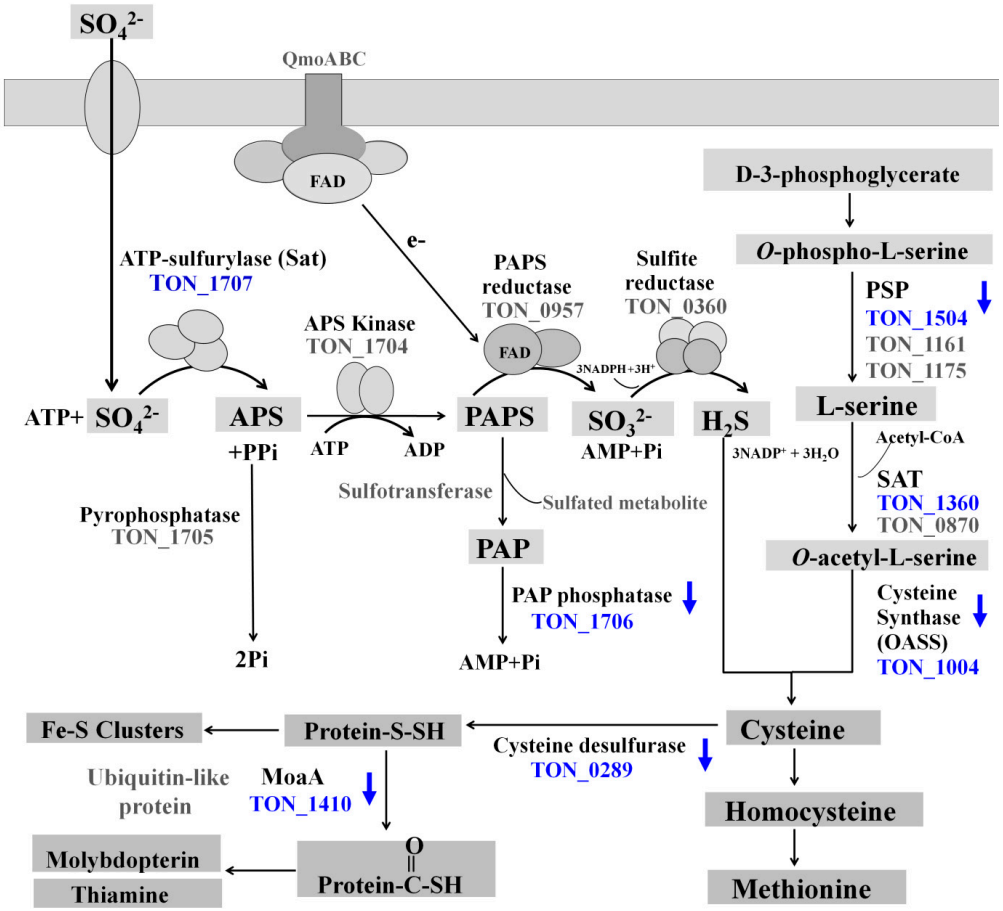

Figure S1. Proposed sulfur assimilation pathway in *Thermococcus onnurineus* NA1. Sulfate is transported into the cell and then reduced to sulfide. Sulfide then reacts with *O*-acetylserine to generate cysteine, which serves as the central sulfur donor for the biosynthesis of other sulfur compounds. For the biosynthesis of other sulfur compounds, cysteine donates sulfur to a conserved Cys residue of cysteine desulfurase to generate a persulfide group, which then functions as the proximal sulfur donor for the biosynthesis of Fe–S clusters. However, the sulfur-carrier protein(s) involved in the Fe–S cluster assembly have yet to be understood. For the biosynthesis of thiamine and molybdopterin, the persulfide group of cysteine desulfurase donotes sulfur to the *C*-terminal Gly of ubiquitin-like proteins such as MoaA to generate a thiocarboxylate group. Enzymes donw-regulated during growth on sulfur are indicated with blue arrows.