

The peroxy radical-induced oxidation of Escherichia coli FtsZ and its single tryptophan mutant (Y222W) modifies specific side-chains, generates protein cross-links and affects biological function

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© 2017 Elsevier Inc. FtsZ (filamenting temperature-sensitive mutant Z) is a key protein in bacterial cell division. The wild-type Escherichia coli FtsZ sequence (FtsZwt) contains three tyrosine (Tyr, Y) and sixteen methionine (Met, M) residues. The Tyr at position 222 is a key residue for FtsZ polymerization. Mutation of this residue to tryptophan (Trp, W; mutant Y222W) inhibits GTPase activity resulting in an extended time in the polymerized state compared to FtsZwt. Protein oxidation has been highlighted as a determinant process for bacterial resistance and consequently oxidation of FtsZwt and the Y222W mutant, by peroxy radicals (ROO[•]) generated from AAPH (2,2'-azobis(2-amidopropane) dihydrochloride) was studied. The non-oxidized proteins showed differences in their polymerization behavior, with this favored by the presence of Trp at position 222. AAPH-treatment of the proteins inhibited polymerization. Protein integrity studies using SDS-PAGE revealed the presence of both mo