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Comparison of the redox chemistry of sulfur- and selenium-containing analogs of uracil[☆]

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ABSTRACT

Selenium is present in proteins in the form of selenocysteine, where this amino acid serves catalytic oxidoreductase functions. The use of selenocysteine in nature is strongly associated with redox catalysis. However, selenium is also found in a 2-selenouridine moiety at the wobble position of tRNA^{Glu}, tRNA^{Gln} and tRNA^{Lys}. It is thought that the modifications of the wobble position of the tRNA improves the selectivity of the codon-anticodon pair as a result of the physico-chemical changes that result from substitution of sulfur and selenium for oxygen. Both selenocysteine and 2-selenouridine have widespread analogs, cysteine and thiouridine, where sulfur is used instead. To examine the role of selenium in 2-selenouridine, we comparatively

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