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Copper (II) complexes activate hydrogen peroxide : studies by ESR–spin trapping and TBA methods.*

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It has been reported that hydroxyl radical (·OH) plays a major role in the indirect action of radiation on cells. Most of ·OH generated *in vivo* is derived from the metal ion–dependent breakdown of hydrogen peroxide (H_2O_2) according to the following equation,

$$M^{n+} + H_2O_2 \rightarrow M^{(n+1)+} + \cdot OH + OH^-,$$

where M^{n+} is an unidentified endogenous metal ion, such as Fe (II), Cu (I), Ti (III) or V (IV).

It has been suggested that the rate constant for the reaction of Cu^+ with H_2O_2 is several orders of magnitude greater than that for Fe^{2+} and that Cu (II) complexes with some proteins, peptides and amino acids may coexist with H_2O_2 in the living body. We have studied the reactions of some Cu (II) complexes with H_2O_2 by use of ESR spin–trapping and thiobarbituric acid (TBA) methods.

It has been shown from the results that Cu $(en)_2$ (en : ethylenediamine) has, among the Cu (II) complexes examined, the highest activity towards H_2O_2 to give ·OH, whereas Cu (II) complexes with polyamine–polycarboxylate such as edta (ethylenediaminetetraacetic acid) and dtpa (diethylenetriaminepentaacetic acid) do not react with H_2O_2.

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