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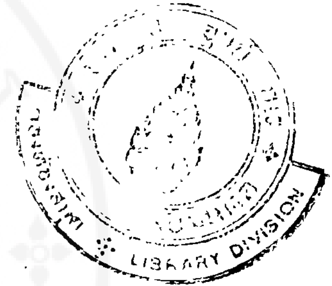
COMPARATIVE STUDIES ON IRON-ASCORBATE TREATED AND VITAMIN E-DEFICIENT RABBIT SARCOPLASMIC RETICULUM Ca^{2+}- ATPase

BY



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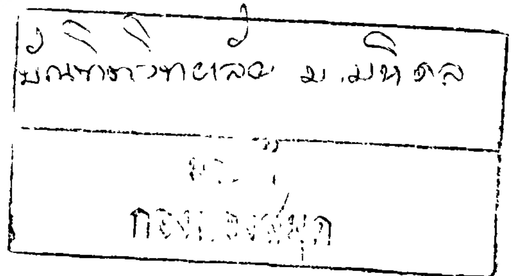

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ABSTRACT

The properties at molecular level of purified Ca^{2+} - ATPase isolated from sarcoplasmic reticulum (SR) of vitamin E - deficient (E^{-}- Ca^{2+}- ATPase), vitamin E supplemented rabbit muscle (E^{+}- Ca^{2+}- ATPase) and Fe^{2+}- ascorbate treated Ca^{2+} - ATPase (E_{T}- Ca^{2+}- ATPase) were compared. Cross - linking of these Ca^{2+}- ATPase with dimethyl suberimidate and copper phenanthroline at 10 °C and 37 °C showed similar patterns on rate of reduction in % monomeric Ca^{2+}- ATPase or concentration of cross - linking reagent required to obtain 50 % cross - linked Ca^{2+}- ATPase indicating that the three groups of Ca^{2+}- ATPase were similar in aggregational state. Limited proteolysis by trypsin and chymotrypsin followed by SDS - PAGE showed different patterns of proteolytic fragments suggesting that E^{+}-, E^{-}- and E_{T}- Ca^{2+}- ATPase were different in conformational state. Analysis of E^{+}-, E^{-} and E_{T}- Ca^{2+}- ATPase showed 50 % reduction in -SH content of E^{-}- and E_{T}- Ca^{2+}- ATPase with similar number of disulfide bonds and amino groups to those of E^{+} - Ca^{2+} - ATPase. Peptide mapping of performic acid - treated proteolytic fragments of E^{+} -, E^{-}- and E_{T}- Ca^{2+} - ATPase suggested that positions of intramolecular disulfide linkage were different. It is concluded that different conformation of E^{-}- and E_{T}- from that of E^{+}- Ca^{2+}- ATPase may be due to different position of intradisulfide linkages and different oxidation products of SH groups.

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