

# Quantitative Evaluation of the Antioxidant Effect of Biomembrane Lipids in the Presence of Vitamin E

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## Abstract

In this report, oxidation of biomembrane lipids, phospholipid (LH) and cholesterol (ChH), were examined experimentally in the presence of vitamin E (VEH) by using a liposome system, which is used widely as a biomembrane model. A kinetic model was constructed by taking into account mechanisms of anti-oxidation and pro-oxidation by VEH to the co-oxidation mechanisms of biomembrane lipids reported previously. The model quantitatively described the oxidation behavior in the liposome system under various VEH addition conditions. The model also predicted the oxidation behavior in vivo under various oral ingestion conditions of VEH. The results suggest that ChH oxidation, which causes various diseases, can be suppressed effectively by taking a certain amount of VEH once a day to avoid a reduction in the VEH concentration present in the biomembrane. The proposed kinetic approach should be a useful tool for characterizing invisible and complicated reaction systems, such as biomembrane oxidation.

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