

## Influences on the phase transition of membranes induced by lipid peroxidation

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Biological membranes containing polyunsaturated fatty acids tend to be easily attacked by oxidative mechanisms. Therefore, the molecular effects of lipid peroxidation on the functional maintenance and the stability of lipid membranes have been studied by means of spectroscopical methods.

A homogeneous suspension of unilamellar vesicles of mixed dipalmitoyl lecithin (DPL) and egg lecithin (EL) was prepared by a dialysis technique. The extent of peroxidation was determined by measuring the UV absorption of conjugated dienes and the application of thiobarbituric acid as an indicator of malonaldehyd produced. The changes of the phase transition were detected by fluorescence polarization and ESR spin label techniques.

It has been found that the lipid peroxidation induced by the direct application of oxygen or by  $\gamma$ -irradiation is facilitated by certain sensibilisators as e.g. small quantities of copper ions. Ascorbic acid, known as an antioxidant in fats, exhibits a bivalent function on membranes dependent on its concentration. With the degree of peroxidation the temperature range of the phase transition decreases whereas the temperature itself increases. This is discussed as a consequence of an alteration in the lipid structure of the membranes and unduced fusion of the lipid vesicles as well. The extent of those processes depending on the constitution of the membranes can be correlated with their content of polyunsaturated fatty acids and is also discussed with respect to biological systems, e.g. erythrocyte membranes.