

The effect of aliphatic alcohols on the fast photosignal of bovine photoreceptor membranes

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Electric fast photosignals (FPS) were measured in alcohol containing ringer solution across the intact bovine retina (1) and an artificial membrane system (2). The photosignals with R_1 and R_2 component were analyzed separating the flash induced charge displacements from the charge equilibration process with the following results:

1) With increasing concentration of alcohol in the incubating medium the R_1 component is gradually reduced until it is completely abolished while the amplitude of the R_2 charge displacement remains essentially unchanged. Thus it must be concluded that R_1 and R_2 are independent processes.

2) The R_2 charge displacement is accelerated depending on alcohol chain length and concentration. The temperature dependence of the corresponding time constant is flattened.

The alcohol effect is largely reversible.

These findings agree with those obtained for the meta transition in the rhodopsin photolysis sequence (3). On the basis of the elasto-mechanical expansion model proposed for the meta transition of bleached rhodopsin (3) these results can be explained by assuming the alcohol to decrease the surface pressure of the rhodopsin containing membrane. This model also explains the missing R_1 component and the R_2 acceleration in rhodopsin containing monolayers (4) having a lower surface pressure.

It cannot be decided yet whether the decrease of surface pressure in the rod outer segment membrane is due to alcohol adsorption in the outer head group zone or to alcohol incorporation into the structure zone.

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(3) Schnitzkewitz, G., (1980), thesis TU Berlin

(4) Trissl, H.W., (1979), *Photochem. Photobiol.*, **29**, 579