

Fluorescence Polarization in Planar Lipid Membranes

E. Frehland, R. Kreikenbohm and W.G. Pohl ⁺

Fakultät für Physik und Biologie, University of Konstanz
D-7750 Konstanz, Germany (F.R.)

The steady state polarized fluorescence experiment with pigment molecules incorporated into planar bilayer membranes contains much more information about orientation and mobility of the fluorescent molecules than experiments with nonoriented probes (1). In a series of experiments we have measured the steady state polarization properties of a number of fluorescent probes:

1-Anilino-8-naphtalenesulfonate (1,8-ANS), 1,6-Diphenyl-1,3,5-Hexatriene (DPH), Dansyllysine-valinomycin (Dns-VAL) and n-(9-anthroyloxy) fatty acids⁺⁺ (n = 2,6,9,12, and 16).

The analysis of the experimental results has been done with a theoretical approach being developed by one of us (2,3) some years ago. In the case of n-(9-anthroyloxy) fatty acids we were able to show that the orientation and the mobility of the (fluorophores) depend significantly on the position at the acyl chain. The mobility increases with the depth of the fluorophore within the membrane.

We hope that the informations about the behaviour of different fluorescent probes in model membranes will be useful for the analysis of corresponding experiments in biological membranes.

+) Permanent address: Höhere Technische Bundeslehranstalt II
A-4040 Linz, Paul Hahnstr. 4

++) These probes have been a generous gift of Dr. W.H. Sawyer, University of Melbourne.

1. Frehland, E. (1975) Z. Naturforsch. 30a, 1241 - 1246.
2. Frehland, E. and Trissl, H.W. (1975) J. Membrane Biol. 21, 147 - 173.
3. Frehland, E. (1976) Biophysical Chemistry 4, 65 - 78.