

**RECENT APPLICATIONS OF SOLVENT RELAXATION IN
BIOMEMBRANES: EFFECT OF MEMBRANE CURVATURE AND
BINDING OF ANTIBACTERIAL PEPTIDES**

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Solvent relaxation (SR) provides information on the water organization in fully hydrated biological systems. As far as the phospholipid bilayers are concerned, a set of available dyes enables to monitor water structure at various bilayer regions depending on the probe localization. In general, the solvent relaxation (SR) refers to the reorientational motions of the solvent dipoles provoked by the rapid change in the dipole moment of the excited fluorescence solute [Horng, M.L. *et al.*. **J. Phys. Chem.** 99 (1995) 17311]. By recording so called “time resolved emission spectra” (TRES), which are red-shifted and changes their shape as the solvent relaxation proceeds, one can follow the micropolarity and microviscosity of the dye microenvironment in the system of interest. This contribution focuses on two recent applications of SR method.

Firstly, the suitability of the SR method for studying membrane-peptide interaction is exhibited by two antibacterial peptides, magainin and melittin [Sheynis, T. *et al.* **Eur. J. Biochem.** 270 (2003) 4478]. It is demonstrated that the SR method can reveal the depth of the peptide penetration into the neutral (POPC) and negatively charged membrane (POPC:DOPS mixture). The SR kinetics in the headgroup region is almost unaffected by the presence of peptides in the case of neutral bilayer implying the peripheral interaction at the membrane-water interface. On the other hand, the interaction of the peptides with the bilayer containing negatively charged lipids makes the SR kinetics in the headgroup region significantly slower, indicating that peptides are incorporated deeper close to the glycerol moiety of the bilayer.

Secondly, SR appears to be also sensitive to the curvature of the phospholipid bilayer. By the use of the dyes located at gradual depths of the headgroup region, it is documented that the SR kinetics gets faster with higher curvature, however, when moving toward the bilayer interface, this effect is becoming less pronounced.

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