**WATER POCKETS IN LIPID MEMBRANES EVALUATED BY FTIR SPECTROSCOPY**

***Disalvo, E. A, Bouchet, A. M. and Frias, M.A.***
*Laboratory of Biointerfaces and Biomimetic Systems, CITSE (UNSE-CONICET)*
*Santiago del Estero, Argentina.*

FTIR spectroscopy is a valuable tool to obtain molecular information about changes in water states produced at the phase transition temperature of lipid membranes. In carefully design experiments it is possible to evaluate the position and width of the 3200-3600 nm bands in parallel to the changes produced in the $CH_2$ region corresponding to the lateral interactions of the lipid acyl chains.

When acyl chains melt, the pattern of water in solid lipids disappears. Moreover, when the fully hydrated lipids cross the phase transition the band in the gel state is shifted to higher frequencies indicating a decrease in water bonding. An increase in the hydrogen bonded water populations appears when $CH_2$ groups are surrounded by water domains or probably water domains are created around $CH_2$ groups.

With this strategy, we present a rational description of the water pockets creation and the influence of the adjacent lipid wall formed at the phase transition on water structure for different types of lipids. Changes in the type of water populations are concomitant with the shift of methylene vibrational mode frequencies to higher values. The increase in isolated populations of methylene residues is congruent with the formation of highly ordered water cluster bonded by hydrogen bonds. This is consistent with the formation of water pockets in nano environments that accumulates free energy. The low entropy of these water arrangements, compensated by the disorder in the acyl chains, can be the thermodynamic driving force for peptide insertion into membranes.