

Studies of ion channel activities in the presence of amphiphilic molecules using model cell membranes

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Membrane proteins, directly related to the survival of cells, are highly sensitive to membrane structure. Therefore, it is necessary to investigate effects of amphiphilic molecules on membrane proteins. Hence, we chose gramicidin A (gA), a pore-protein that can represent most types of membrane proteins, to test the effects of ionic liquids on the membrane. The impact on gA of ILs were studied through fluorescence quenching method, utilizing stop-flow spectrometer, and electrophysiological method, utilizing axopatch amplifier. Our work suggests that ILs incorporate into cell membranes based on their hydrophobic alkyl chains, resulting in perturbation of lipid membrane structure. Moreover the efficiency of ILs increases as a function of both alkyl chain length and concentration. We anticipate that our research will contribute to establishing more biocompatible and greener ionic liquids.