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Effects of NSAIDs on the Dynamics and Phase Behavior of DODAB Bilayers

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Dioctadecyldimethylammonium bromide (DODAB), show rich phase behavior [1]. We have studied the effects of Non-steroidal inflammatory drugs (NSAIDs), aspirin and indomethacin, on the phase behavior and the dynamics of DODAB lipid bilayer using quasielastic neutron scattering technique (QENS). Elastic window scan showed that aspirin and indomethacin shifts coagel to fluid phase transition at lower temperatures, compared to pure DODAB. While cooling, aspirin and indomethacin suppresses the intermediate gel phase, found in pure DODAB. QENS data analysis showed that only internal motion exists in coagel phase whereas in fluid phase DODAB involves both lateral and internal motions. In coagel phase, although rotational diffusion coefficient of DODAB is found to be almost twice with both NSAIDs, the dynamically active hydrogen fraction in DODAB becomes twice for aspirin but remains same for indomethacin. In the fluid phase, lateral motion decreases in presence of indomethacin. Whereas, aspirin does not affects lateral motion. DODAB internal motion remains unchanged in presence of indomethacin, whereas, aspirin enhances the internal motion of DODAB. This study reveals that NSAIDs, aspirin and indomethacin affects DODAB lipid bilayer phase and dynamics uniquely.
1. F-G Wu, N-N Wang, Z-W Yu. *Langmuir* **25**, 13394–13401 (2009).
2. P S Dubey, H Srinivasan, V K Sharma, S Mitra, V Garcia Sakai and R Mukhopadhyay, *Scientific Reports* **8**, 1862 (2018).

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