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Translational and Rotational Diffusion of Cholesterol in Lipid Membranes YOUNGHOON OH, BONG JUNE SUNG, Sogang Univ — Cholesterol introduces structural order and dynamic fluidity to lipid membranes. The translational and rotational diffusion of cholesterol relates closely to the structural order and fluidity. However, its diffusional behavior, especially the dynamic heterogeneity of cholesterol, remains elusive at a molecular level. In this work, we investigate the peculiar rotational dynamics of cholesterols and its relation to heterogeneous dynamics of binary component lipid membranes. We perform coarse-grained molecular dynamics simulations using Martini force fields. A previous study revealed that lipids underwent translational and rotational hopping motions in single component gel phase lipid membranes [1]. In the binary component lipid membranes, however, we find no hopping motions for lipids in liquid ordered and disordered phases. Interesting is that cholesterol undergoes rotational hopping motions regardless. We also find that the rotational hopping angle of cholesterol is about 120 degrees, which may be due to the asymmetric cross sectional structure of the cholesterol. [1] Y. Oh, J. Kim and B. J. Sung, Phys. Rev. E. 93, 012409 (2016)

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