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A 2h-nmr Study Of Popc/sterol Membranes: Some Exciting Anomalies MEHRAN SHAGHAGHI, MARTIN ZUCKERMANN, JENIFER THEWALT — In a recent article [1], Y-W Hsueh et al showed that the 2H-NMR order parameter, M1, of 1-[2H31]palmitoyl, 2-oleoyl, sn-glycero-3-phosphocholine (POPC)/ergosterol multi-bilayers at 25oC increased linearly as a function of ergosterol concentration to 25 mol%, but did not increase further when more ergosterol was added. By contrast, M1 for POPC/cholesterol bilayers increases linearly to at least 50% sterol. The structural difference between cholesterol and ergosterol is that ergosterol has an additional double bond in its fused ring (C7-8) and a trans double bond (C22-23) plus a methyl group (at C24) in its alkyl chain. We study which of these structural changes is responsible for the observed saturation of the order parameter in POPC/ergosterol bilayers. In [1] it was shown that the M1 of POPC/7-dehydrocholesterol (7-DHC) multilayers behaves similarly to that of POPC/cholesterol, increasing linearly with [7-DHC]. 7-DHC has an ergosterol fused ring structure but a cholesterol alkyl tail. To explore this phenomenon, we determined the sterol concentration dependence of POPC containing two different sterols with structural similarities with respect to the before studied sterols. Other sterols are also being investigated in order to understand the sensitivity of POPC/sterol membranes to the sterol's alkyl tail structure. [1] Y-W Hsueh et al., (2007) Biophys. J. 92:1606-1615.

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