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MICROTUBULES FROM FLUORINATED PHOSPHORYLATED AMPHIPHILES IN AQUEOUS/ALCOHOLIC AND NON-AQUEOUS SOLVENTS

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Phospholipids are known to self-organize into bilayer membranes and liposomes. Recently, much attention has also been focussed on highly ordered cylindrical, bilayer-based hollow microstructures usually called tubules, that form, for example, from diacetylenic phosphatidylcholines [1]. However, despite the potential of these new supramolecular architectures in both fundamental and applied area, only few tubule-forming surfactants have been reported yet. We have shown that the driving force required to form and stabilize coiled membranes in water can be brought by fitting amphiphiles with a single fluorinated chain, without need for rigid segments, hydrogen bonding between polar head or chiral centers [2,3].

We now report the formation of multilayered tubular edifices from perfluoroalkylated dimorpholinophosphoramidates, $C_nF_{2n+1}(CH_2)_2OP(O)[N(CH_2CH_2O)]_2$, $n = 8, 10$, in ethanol or methanol or glycerol/water mixtures, as well as in dimethylformamide. Well-developed tubules, as shown phase contrast optical microscopy and negative staining transmission electron microscopy (10-20 μm , Φ : 0.5-2 μm , fig. 1), are obtained, for example, using a 2/1 ethanol/water ratio. These tubules are very robust and retain their morphology after centrifugation, drying and resuspension in an alcohol/water mixture. In DMF, it was possible to monitor the formation of isolated tubules by progressive rolling-up of planar bilayer sheets. Reversible interconversion of the tubules into giant multilayered vesicles was observed upon heating.

- [1] J. M. Schnur, *Science* 1993, **262**, 1669-1675.
- [2] F. Giuliani, M.P. Krafft, J.G. Riess, *Angew. Chem. Int. Ed.* 1994, **33**, 1514.
- [3] J. G. Riess, *J. Drug Target* 1994, **2**, 455-468.

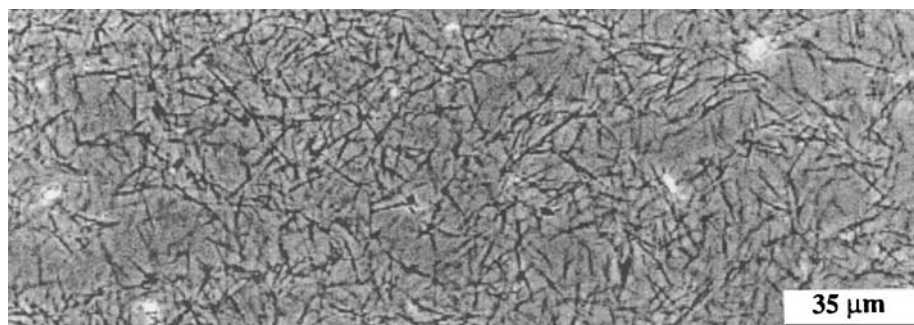


FIGURE 1: Fluorinated tubules obtained from EtOH/H₂O medium.