Fluorescence studies on new potential antitumoral 1,3-diarylurea derivatives in the thieno[3,2-*b*]pyridine series encapsulated in magnetoliposomes

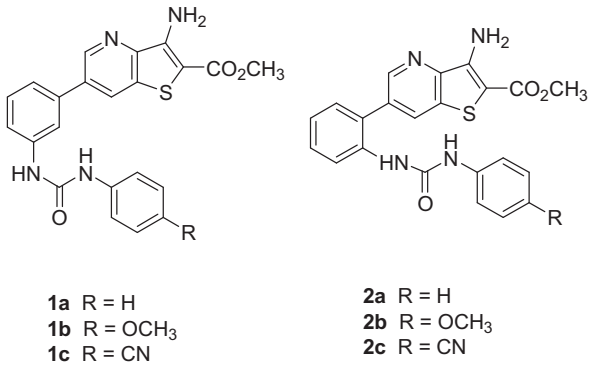
A. Rita O. Rodrigues[1], Pedro M. F. Mendes[1], Elisabete M. S. Castanheira[1], Paulo J. G. Coutinho[1], Daniela Peixoto[2] and Maria João R. P. Queiroz[2]

[1]Centre of Physics (CFUM) and [2]Centre of Chemistry (CQ/UM), University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal; ecoutinho@fisica.uminho.pt

Liposomes entrapping magnetic nanoparticles (magnetoliposomes) are of large importance in drug delivery, as they can be guided and localized to the therapeutic site of interest by external magnetic field gradients and used in cancer treatment by hyperthermia [1,2].

New fluorescent 1,3-diarylurea derivatives of thieno[3,2-*b*]pyridines (Fig.1), recently synthesized by us, have shown promising antitumoral activity in human tumor cell lines. Compounds **1a-c** and **2a-c** present very reasonable fluorescence quantum yields in several solvents ($0.10 \leq \Phi_F \leq 0.50$), but are not fluorescent in alcohols and water.

In this work, magnetic nanoparticles of magnetite and of nickel core with silica shell were prepared by soft chemical methods and either covered with a lipid bilayer or entrapped in liposomes. The 1,3-diarylureas **1a-c** and **2a-c** were then encapsulated in liposomes and magnetoliposomes and their photophysical behavior was studied.



1a R = H
1b R = OCH_3
1c R = CN

2a R = H
2b R = OCH_3
2c R = CN

Figure 1. Structure of the compounds **1a-c** and **2a-c**.

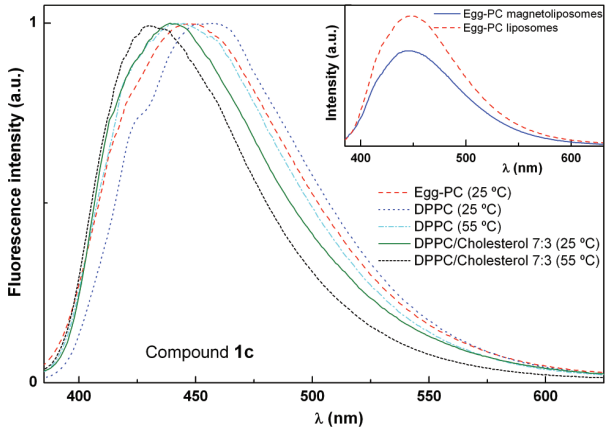


Figure 2. Normalized fluorescence spectra of **1c** in liposomes. Inset: Comparison between Egg-PC liposomes and magnetoliposomes.

All compounds exhibit reasonable fluorescence emission when incorporated in liposomes (example of **1c** in Fig. 2). Fluorescence anisotropy measurements indicate that these compounds can be transported in the hydrophobic region of the lipid bilayer. Incorporation in magnetoliposomes leads to an appreciable fluorescence quenching of the compounds by the entrapped magnetic nanoparticles. These results are promising for future drug delivery applications of these potential antitumoral compounds using magnetoliposomes.

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