IN VIVO FFC-NMR OF TUMOR-ASSOCIATED MACROPHAGES (TAMs) IN MURINE MELANOMA WITH ASSESSMENT OF INTRA-CELLULAR LOCALIZATION OF IRON OXIDE PARTICLES

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Tumour associated macrophages (TAMs) are forced by the cancer cells to adopt an anti-inflammatory phenotype and secrete factors to promote angiogenesis and tumor invasion [1]. For these reasons, sensitive and non invasive methods to detect TAMs are needed for tumour classification and individual patient stratification to stronger or targeted therapies.
Herein we propose a new, alternative diagnostic protocol to assess the localization of an USPIO-NP (ferumoxytol) in TAMs in melanoma tumours. The method is based on the acquisition of *in vivo* NMRD profiles on a FFC relaxometer endowed with a wide bore magnet and a dedicated transmitter/receiver solenoid detection coil placed around the mouse's leg [2]. The slopes of the obtained R_1^{POST}-R_1^{PRE} profiles acquired 3 and 24 h after ferumoxytol injection (Fig.1) appear the most significant parameter that can act as an unequivocal reporter of nanoparticle intra- or extracellular localization thus allowing an unambiguous TAM quantification. In fact, 24h after the injection the remaining ferumoxytol is taken up by macrophages as confirmed by histological analysis (Pearls assay). This finding open new horizons for the field of cell tracking applications [3].

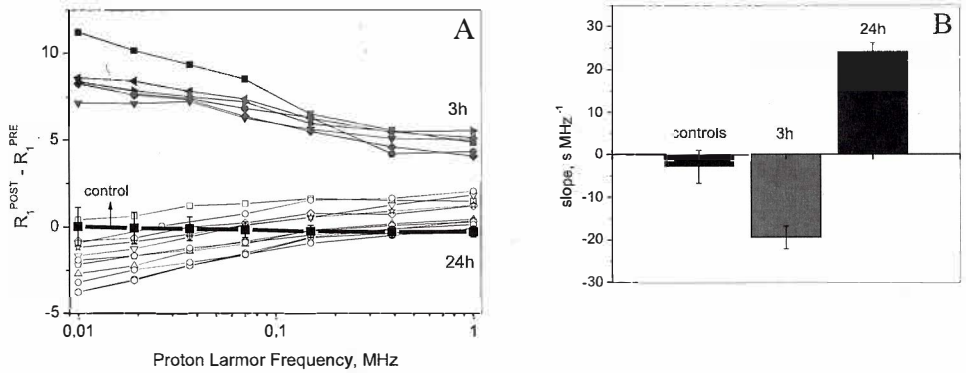

Fig. 1. A) NMRD profile differences, obtained by subtracting PRE profiles to the corresponding POST profiles acquired 3 h and 24 h after ferumoxytol injection. Black square points correspond to POST-PRE control profiles acquired 24 h after the injection of a physiological solution; B) Average slopes of R_1 profiles calculated at low field.

References

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