

## Supplementary material

# RGD\_PLGA Nanoparticles with Docetaxel: A Route for Improving Drug Efficiency and Reducing Toxicity in Breast Cancer Treatment

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**Keywords:** breast cancer; Docetaxel; PLGA nanoparticles; magnetic resonance imaging; RGD; theranostic

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## **Supplementary figures**

**Figure S1. NMR spectra of Docetaxel**

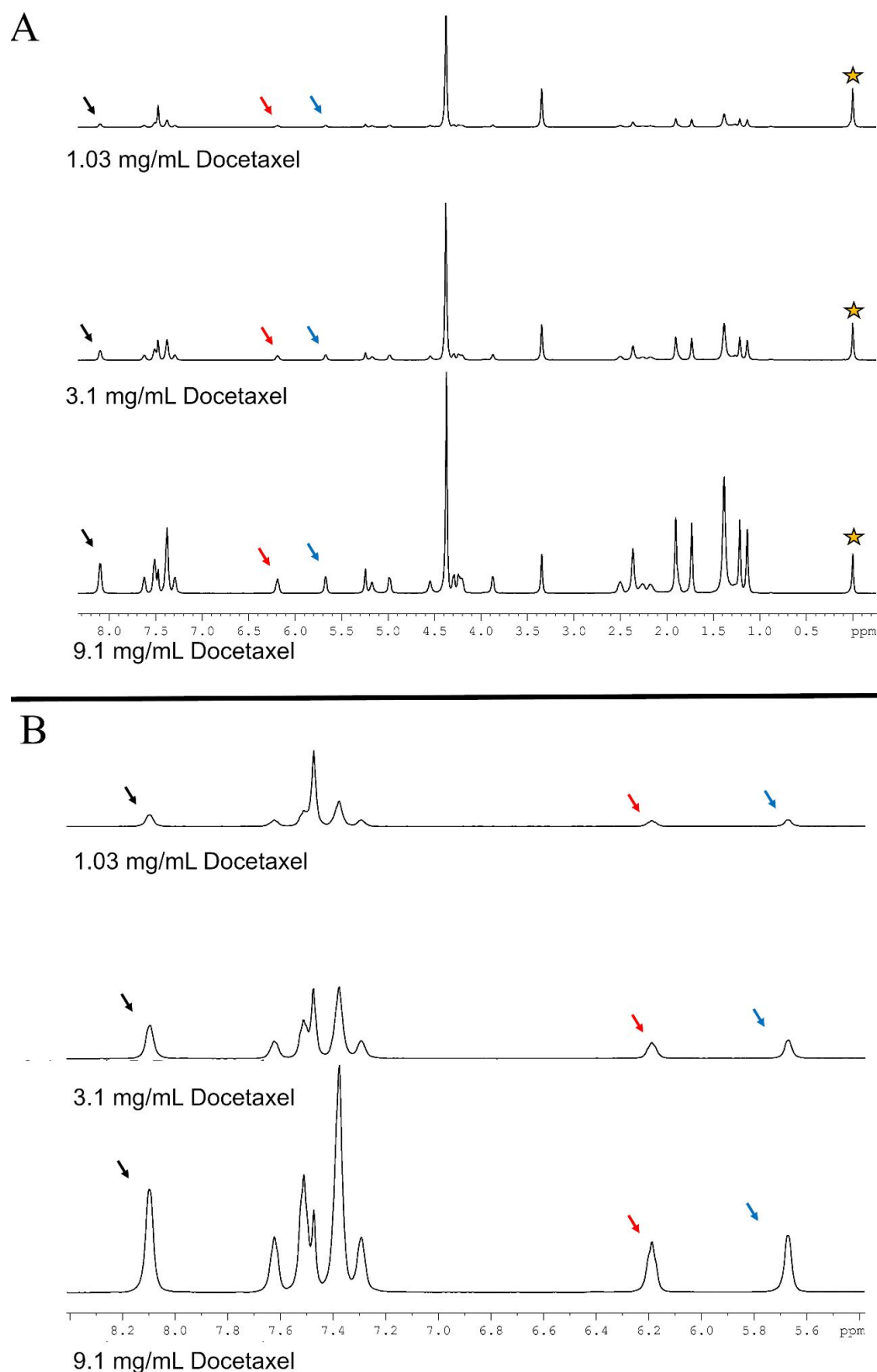
**Figure S2. Docetaxel calibration curve**

**Figure S3. NMR spectra of PLGA NPs.**

**Figure S4. MRI biodistribution of Ctrl\_PLGA or RGD\_PLGA NPs**

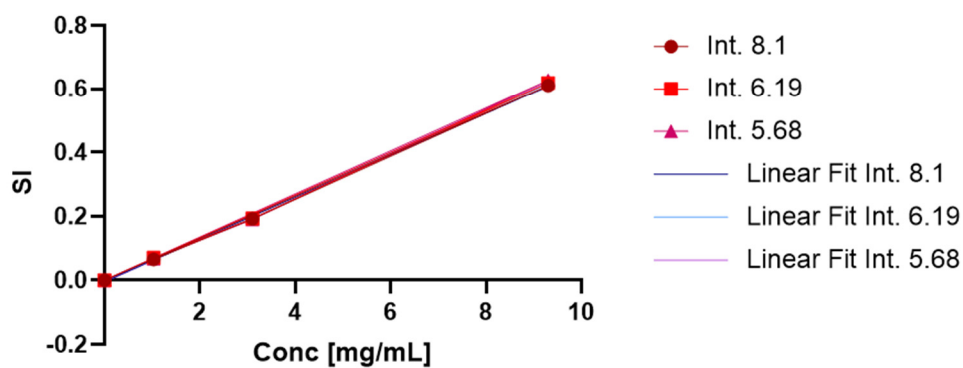
**Figure S5. ICP-MS quantification of Gd in organs upon administration of Ctrl\_PLGA or RGD\_PLGA NPs**

**Figure S6. Cardio-MR images**

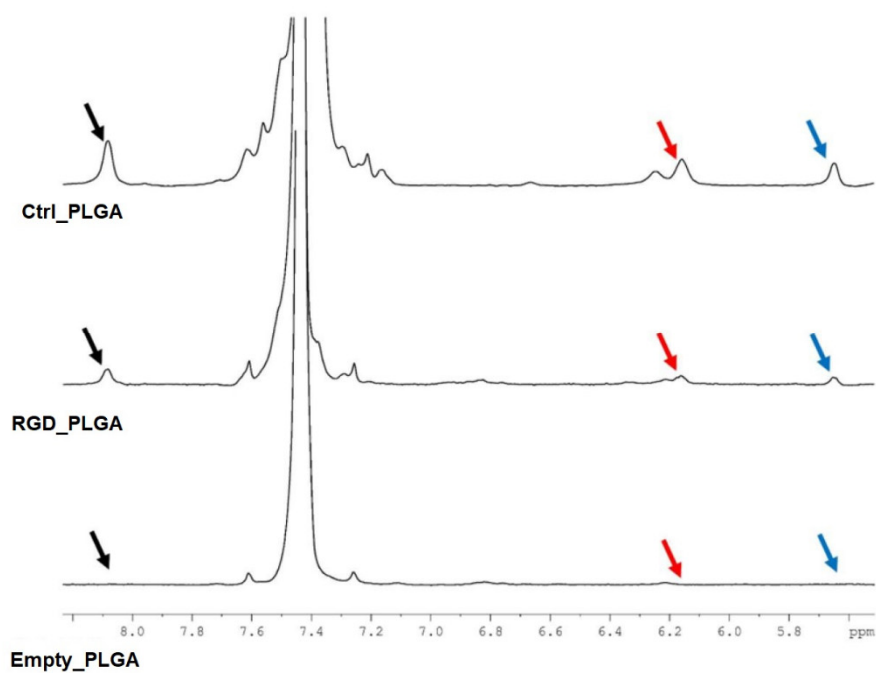


**Figure S1. (A) NMR spectra of Docetaxel at variable concentration in CDCl<sub>3</sub>/MetOD (2:1 vol/vol) in presence of 0.33 mg/mL standard TSP ( $B_0=14$  T,  $T=298$ K). (B) magnification of spectra reported in (A). Yellow stars indicate NMR resonance of TSP (3-Trimethylsilylpropanoic acid) standard; black, red and blue arrows indicate characteristic resonances of Docetaxel used for calibration curves reported in Figure S3 (8.1, 6.19, 5.68 ppm, respectively).**

	Int. 8.1	Int. 6.19	Int. 5.68
<b>Best-fit values</b>			
Slope	0.06576	0.06655	0.06760
Y-intercept	-0.004045	-0.002897	-0.005842
X-intercept	0.06152	0.04353	0.08643
1/slope	15.21	15.03	14.79
<b>Std. Error</b>			
Slope	0.0009047	0.001185	0.001560
Y-intercept	0.004459	0.005842	0.007688
<b>95% Confidence Intervals</b>			
Slope	0.06187 to 0.06965	0.06145 to 0.07165	0.06089 to 0.07431
Y-intercept	-0.02323 to 0.01514	-0.02803 to 0.02224	-0.03892 to 0.02724
X-intercept	-0.2401 to 0.3399	-0.3531 to 0.4010	-0.4332 to 0.5409
<b>Goodness of Fit</b>			
R square	0.9996	0.9994	0.9989
Sy.x	0.006528	0.008553	0.01126
<b>Is slope significantly non-zero?</b>			
F	5284	3152	1878
DFn, DFd	1, 2	1, 2	1, 2
P value	0.0002	0.0003	0.0005
Deviation from zero?	Significant	Significant	Significant
Equation	$Y = 0.06576 \cdot X - 0.004045$	$Y = 0.06655 \cdot X - 0.002897$	$Y = 0.06760 \cdot X - 0.005842$



**Figure S2. Docetaxel calibration curve obtained through NMR spectroscopy (spectra in Fig.S2)**



**Figure S3. NMR spectra of PLGA NPs in CDCl<sub>3</sub>/MetOD (2:1 vol/vol) in presence of 0.33 mg/mL standard TSP) ( B<sub>0</sub>=14 T, T=298K) normalised respect to the signal of standard TSP reference. Black, red and blue arrows indicate characteristic resonances of Docetaxel (8.1, 6.19, 5.68 ppm, respectively), used for the quantification of the drug content using the calibration curves reported in Figure S3.**

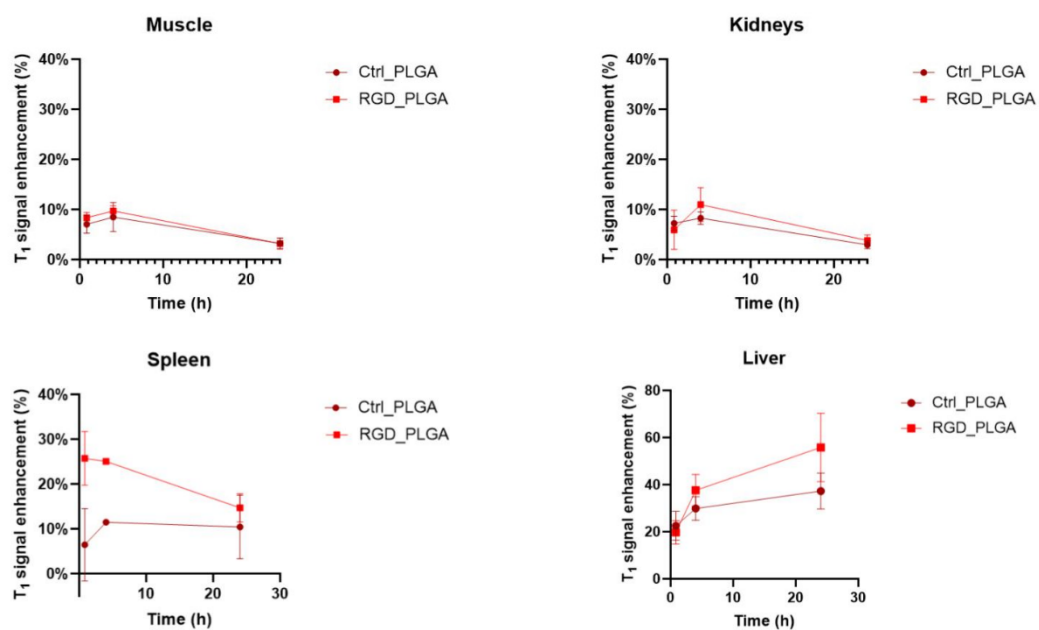


Figure S4.  $T_1$  MRI signal enhancement (%) in muscles, kidneys, spleen, and liver upon i.p. administration of RGD\_PLGA or Ctrl\_PLGA at  $t=5\text{min}$ , 4h or 24h.

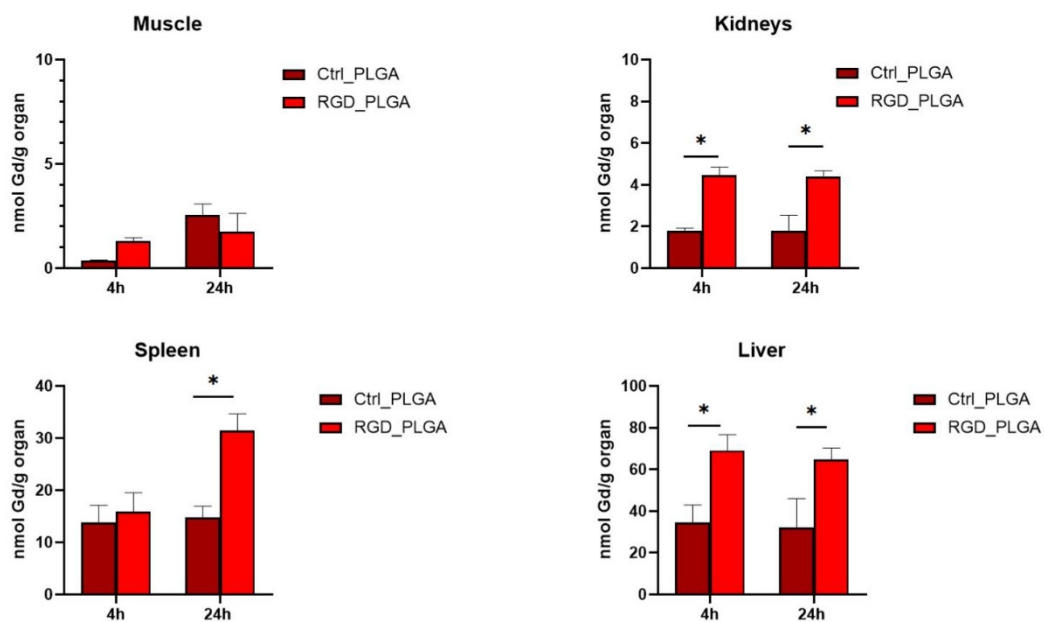
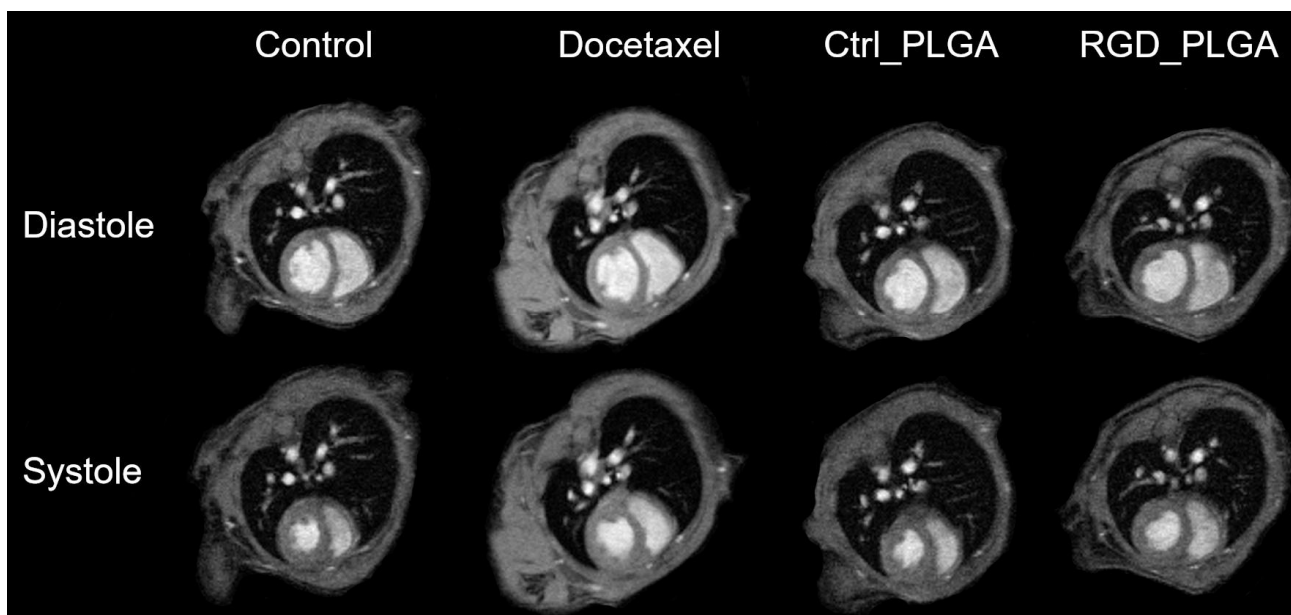


Figure S5. Quantification of Gd by ICP-MS in muscles, kidneys, spleen, and liver upon i.v. administration of RGD\_PLGA or Ctrl\_PLGA at  $t=4\text{h}$  or 24h.



**Figure S6. Representative diastolic or systolic axial MRI images of heart of BALB/c mice orthotopically challenged with  $1 \times 10^4$  4T1 cells and treated with physiological saline solution as a control, free Docetaxel, Ctrl\_PLGA or RGD\_PLGA, C (N = 6 per group) (Flash cine cardioMR images).**