

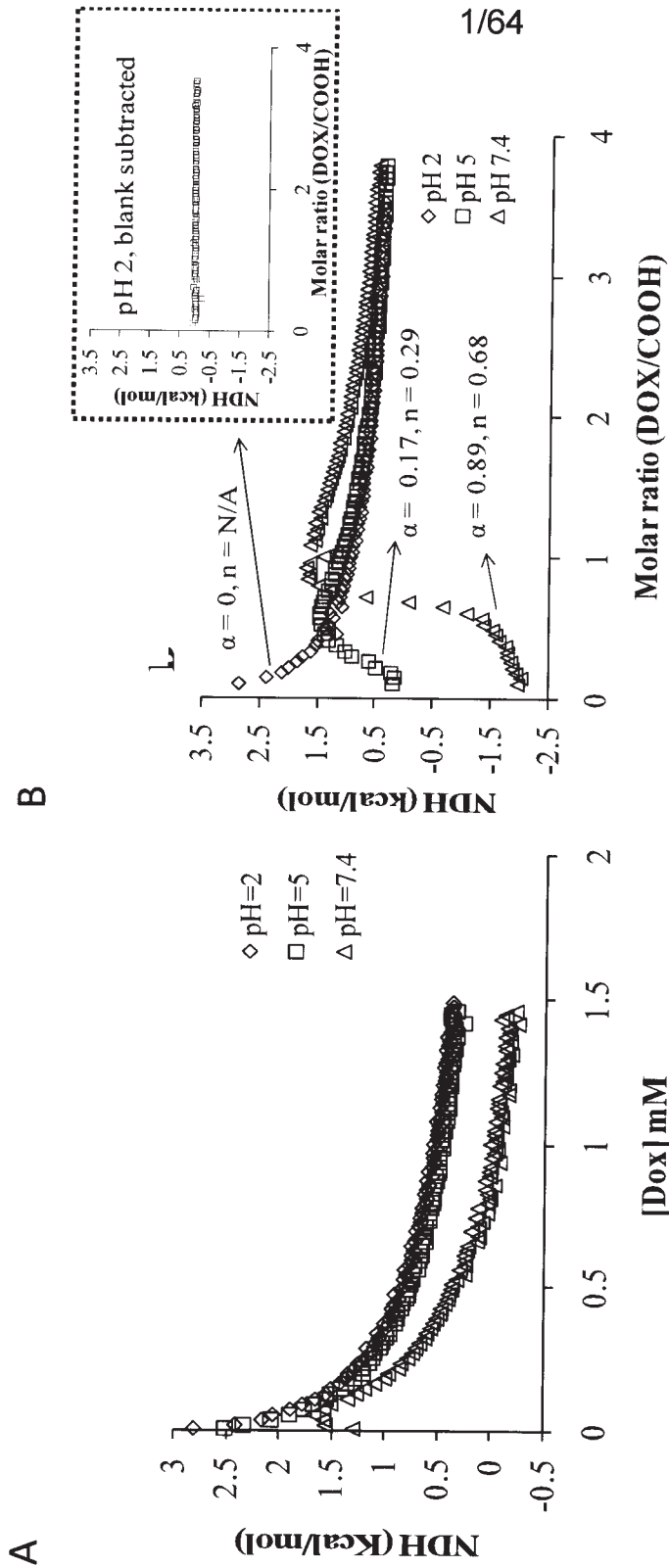


Figure 1

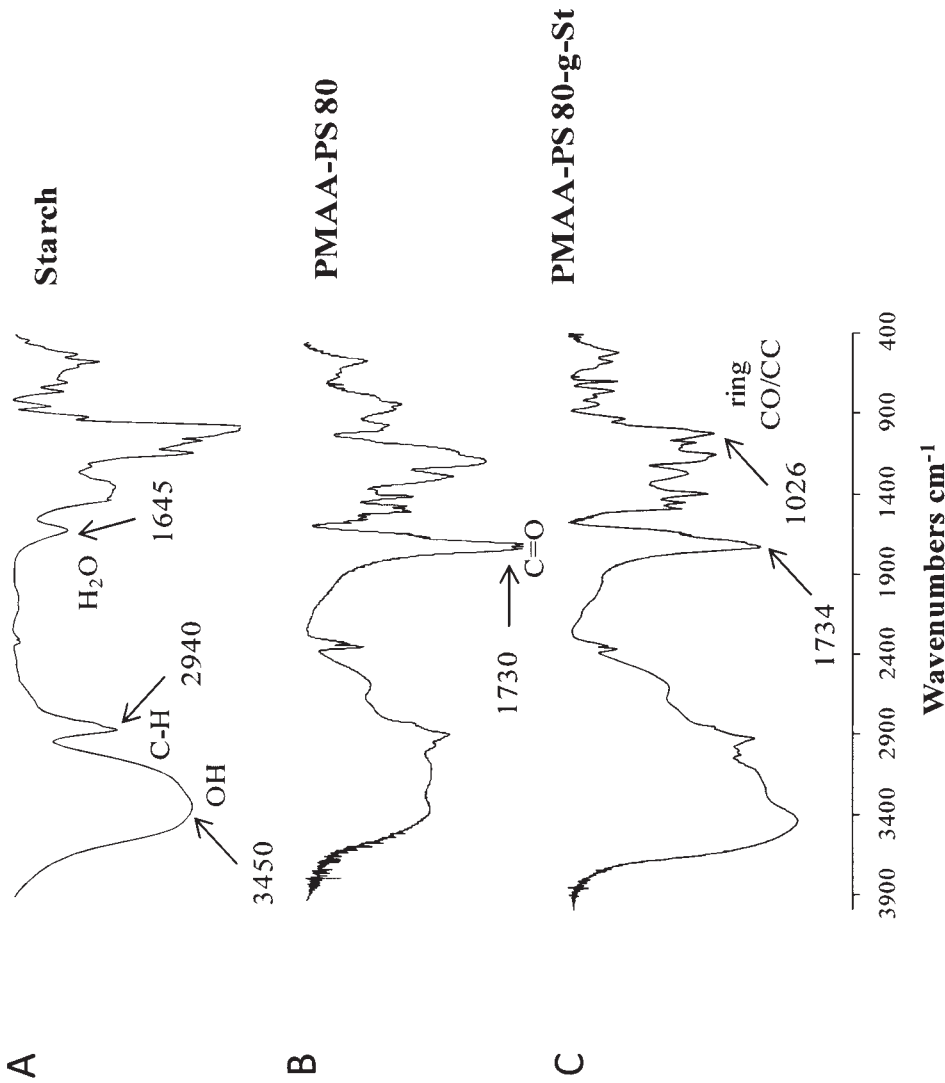
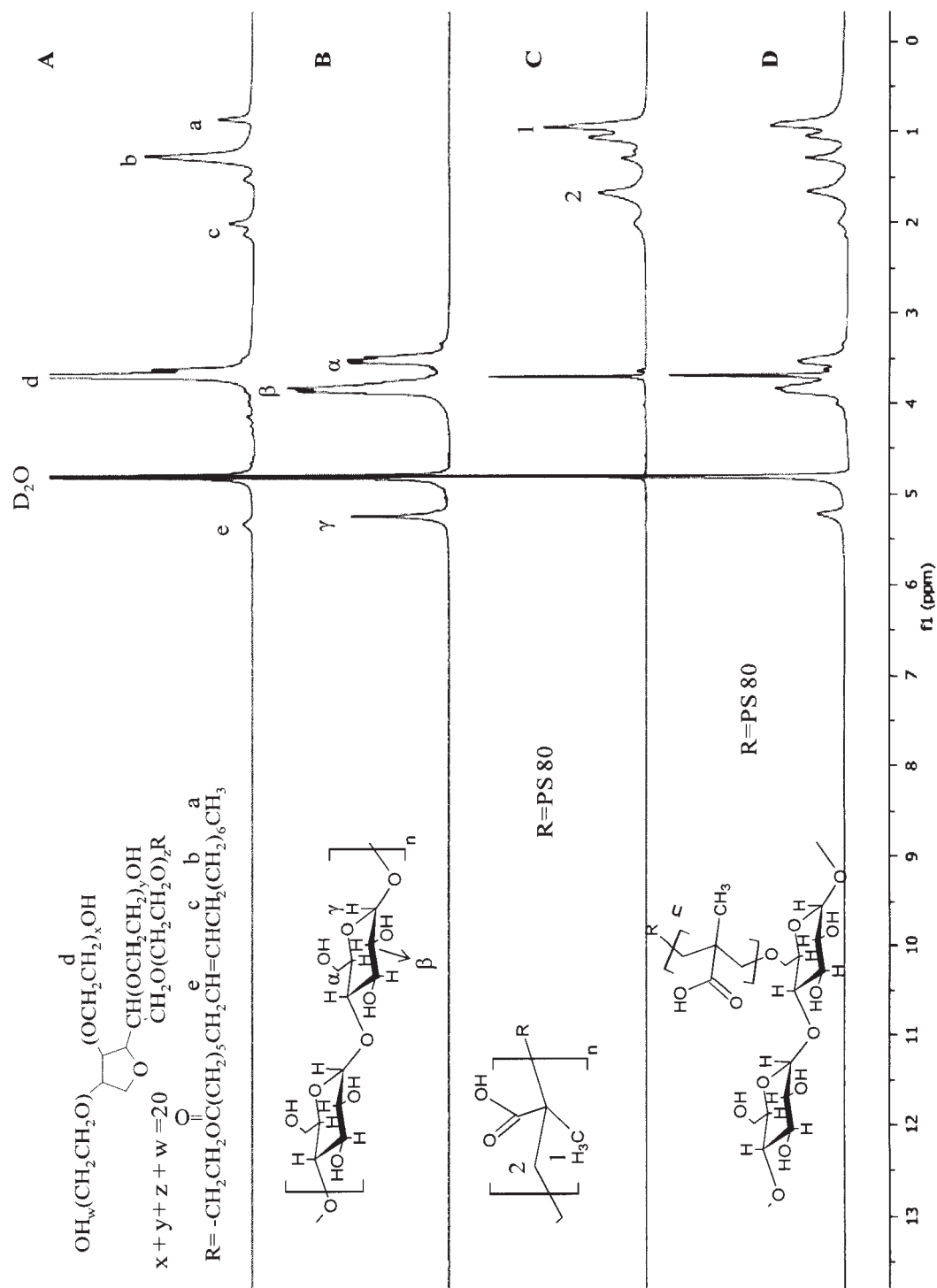


Figure 2

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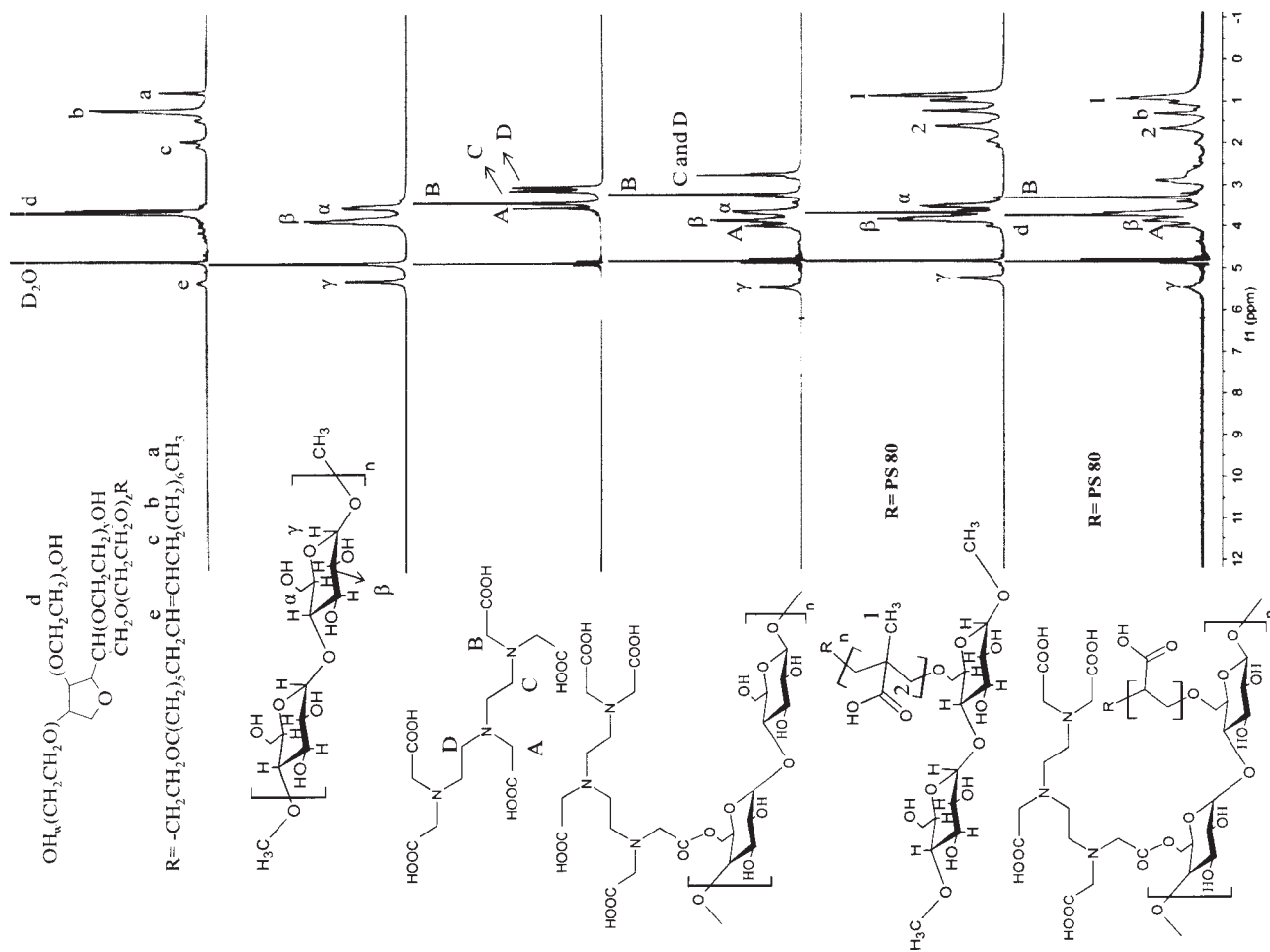
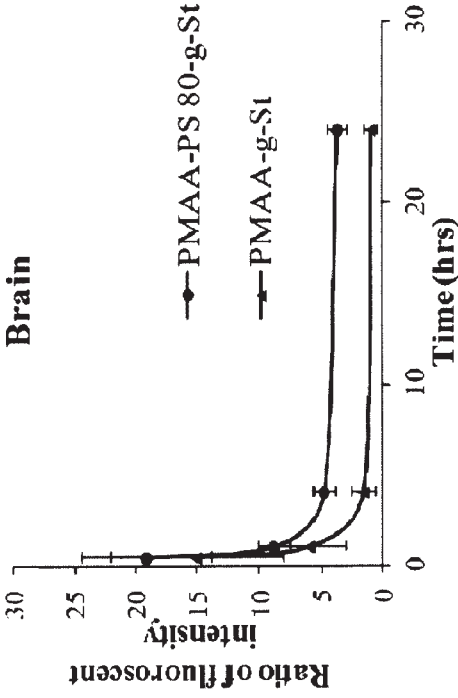


Figure 3



A

B

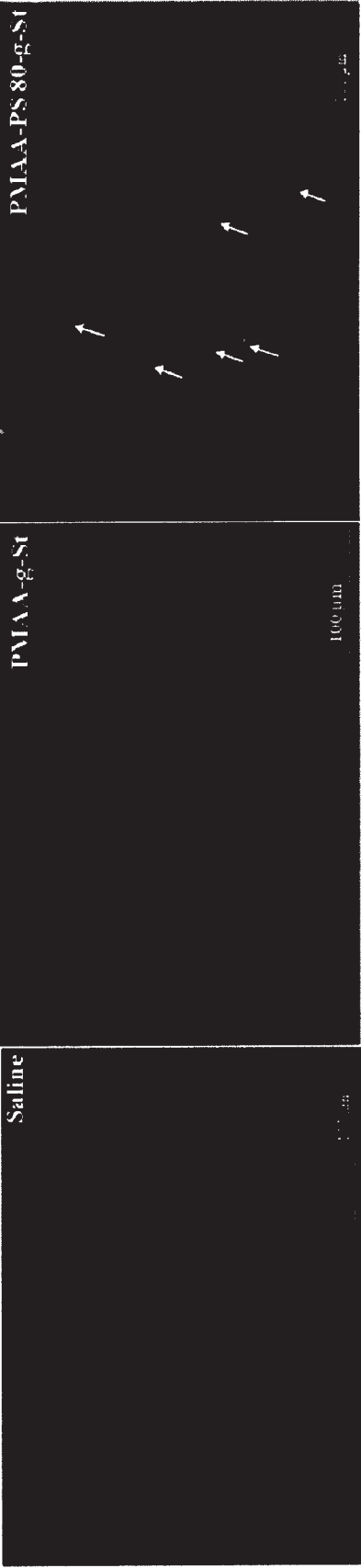


Figure 4

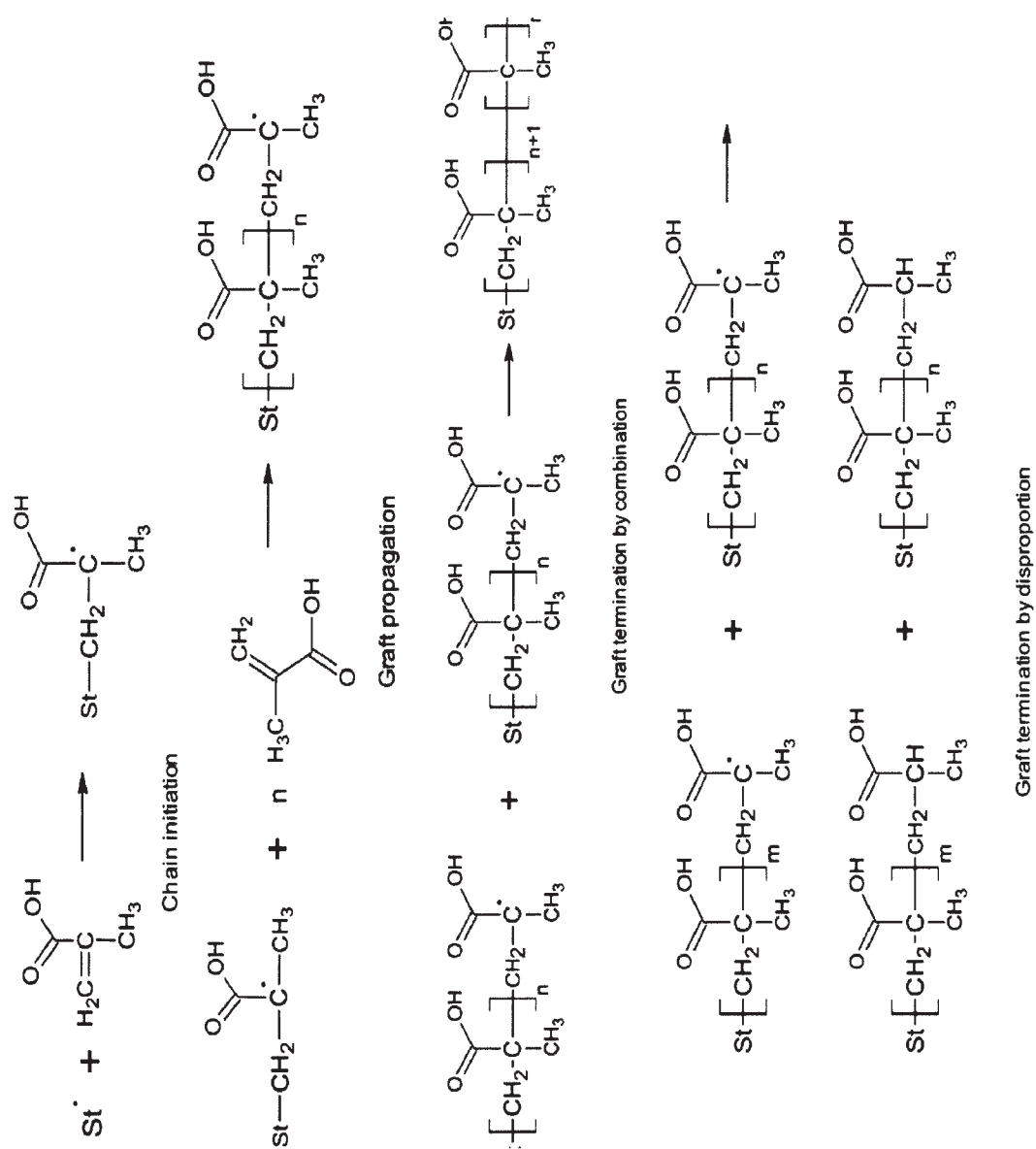


Figure 5

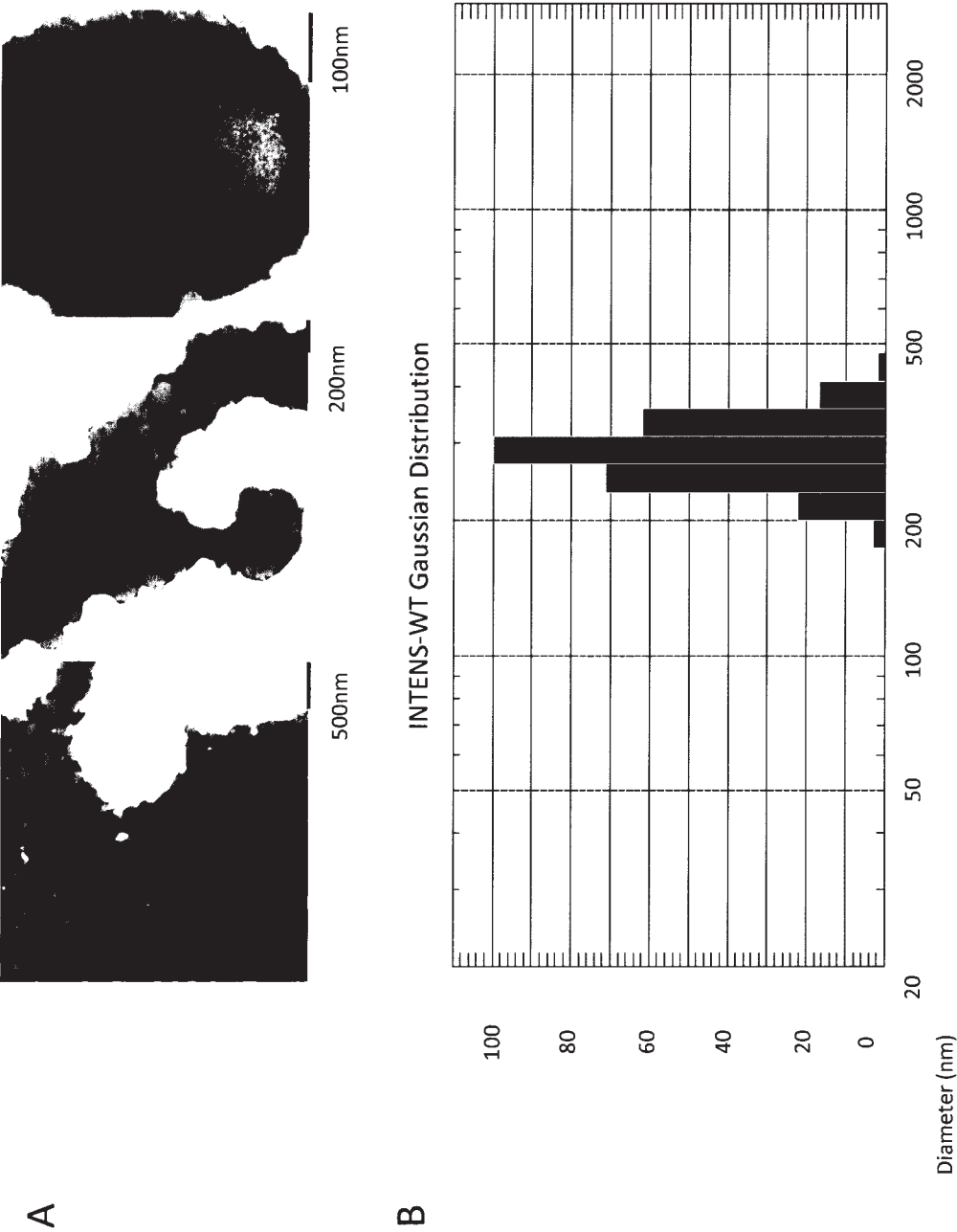


Figure 6

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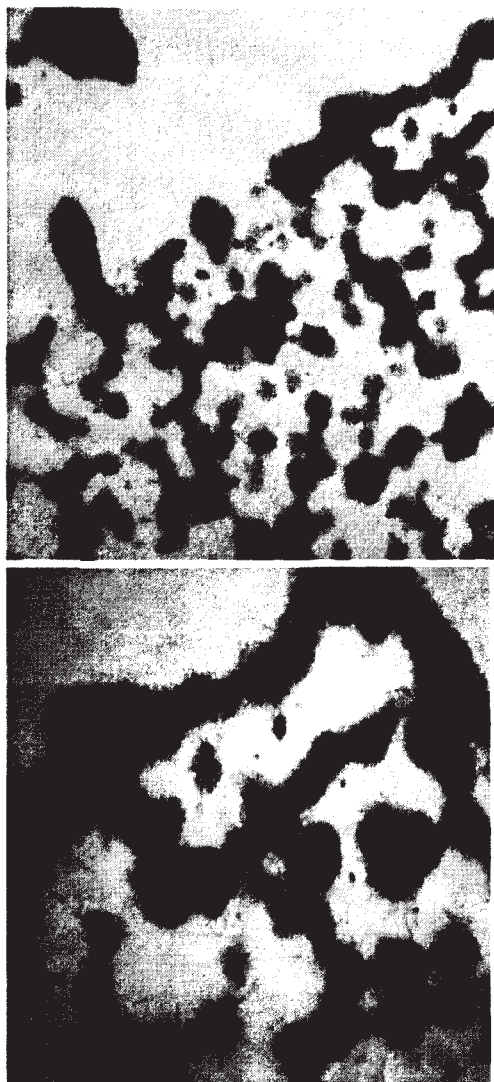


Figure 7

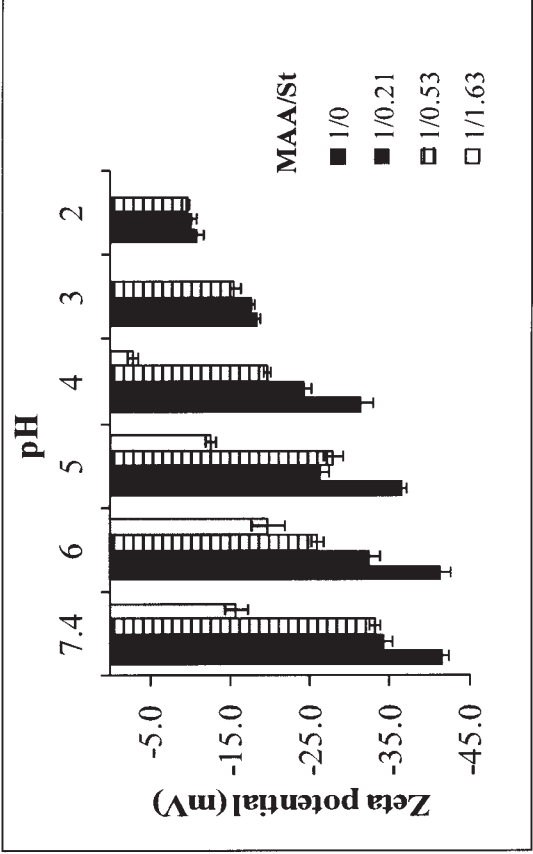
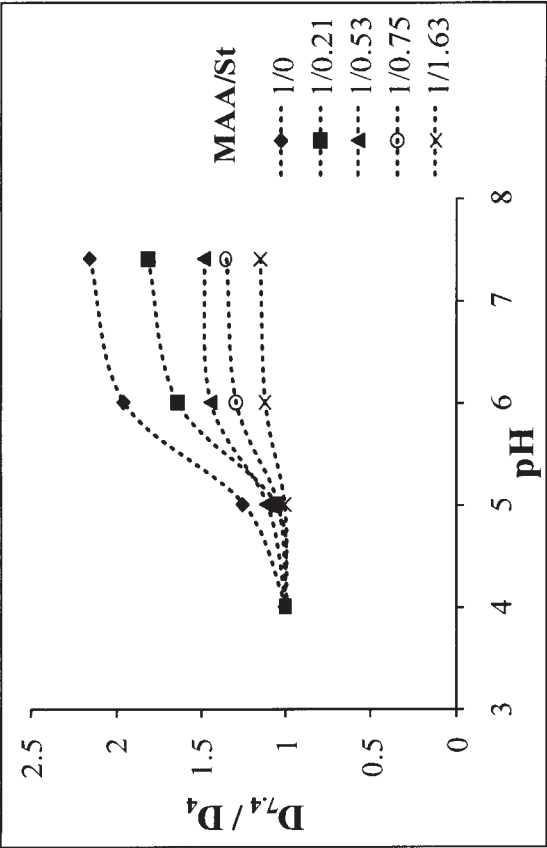


Figure 8

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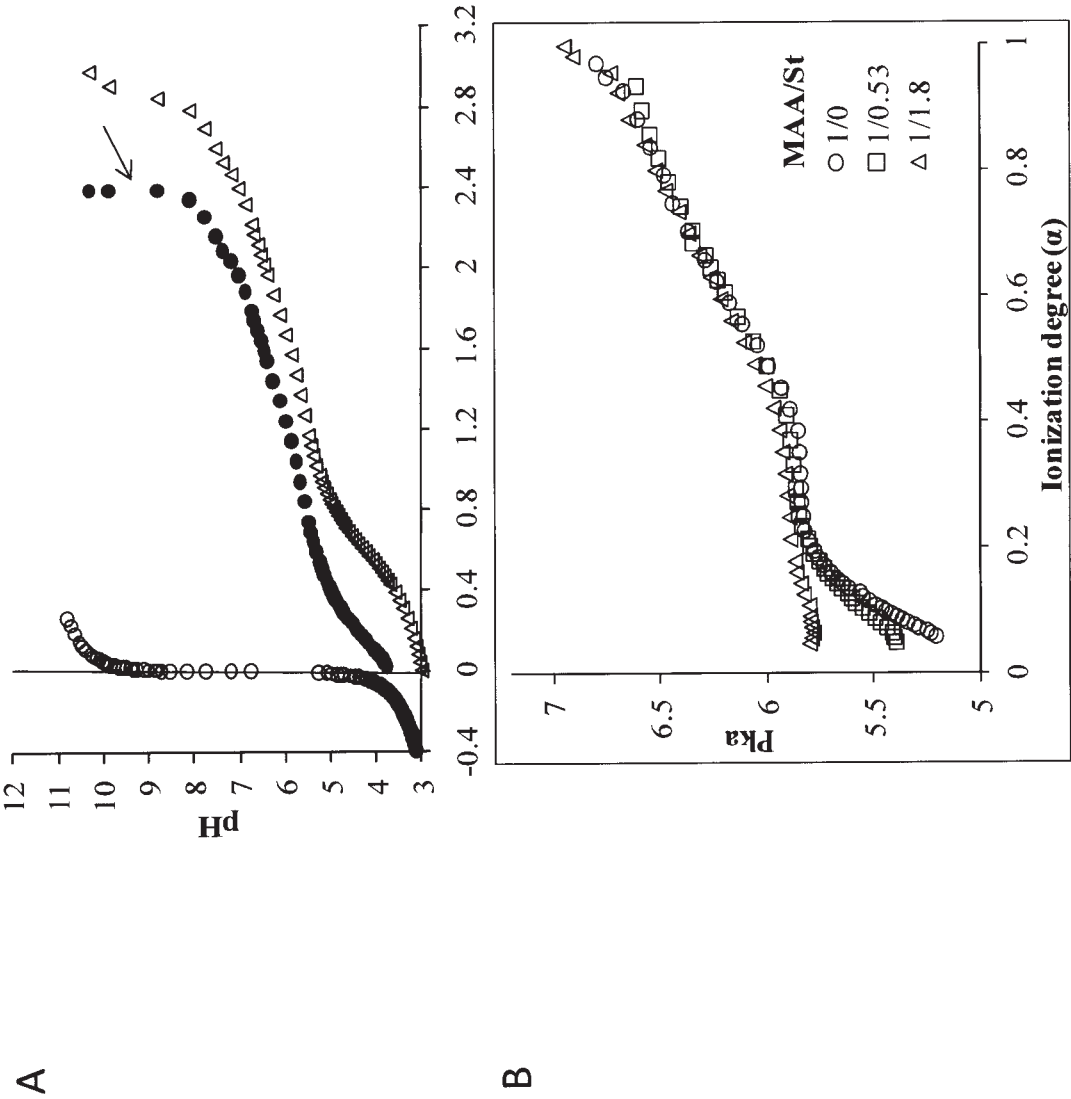


Figure 9

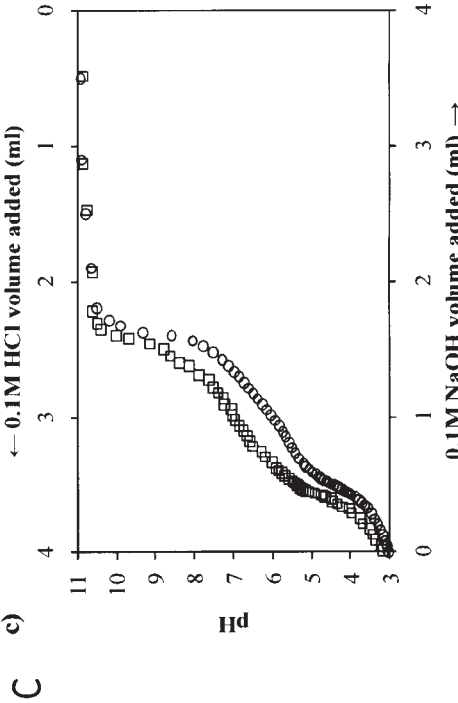
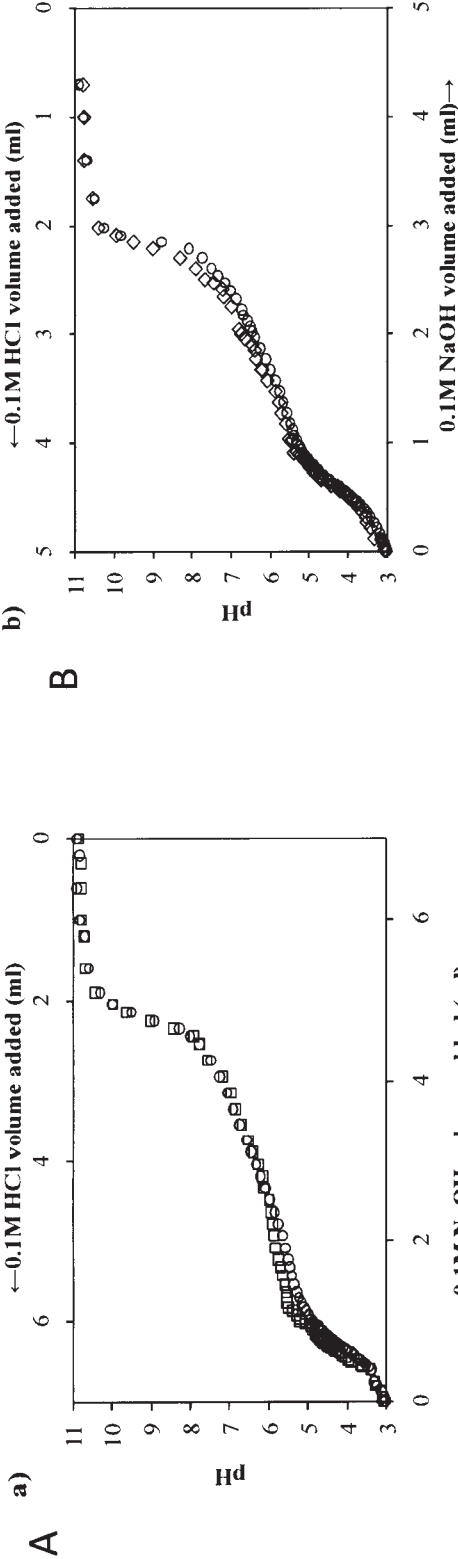


Figure 10

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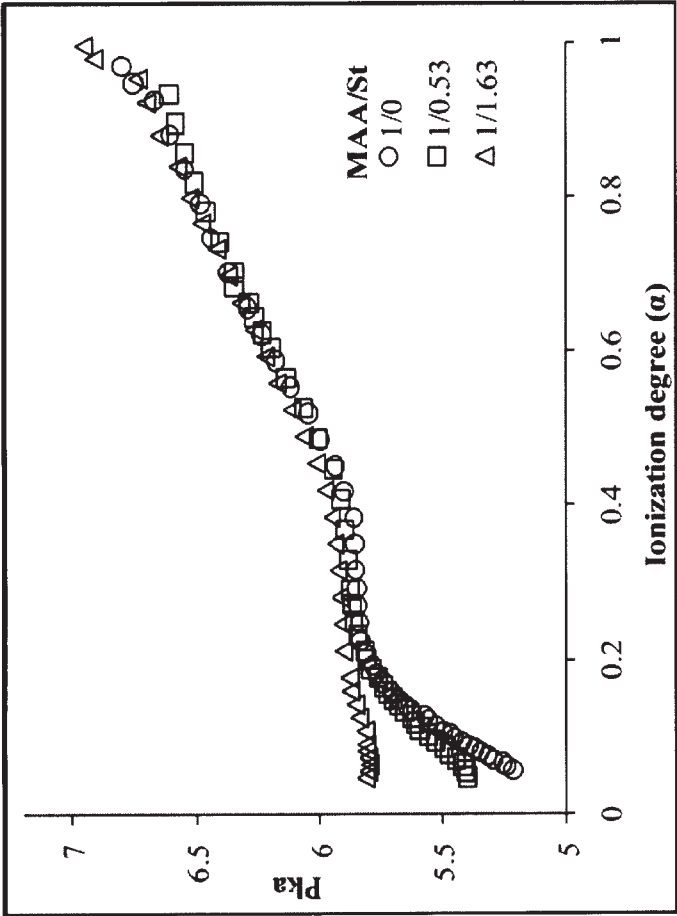


Figure 11

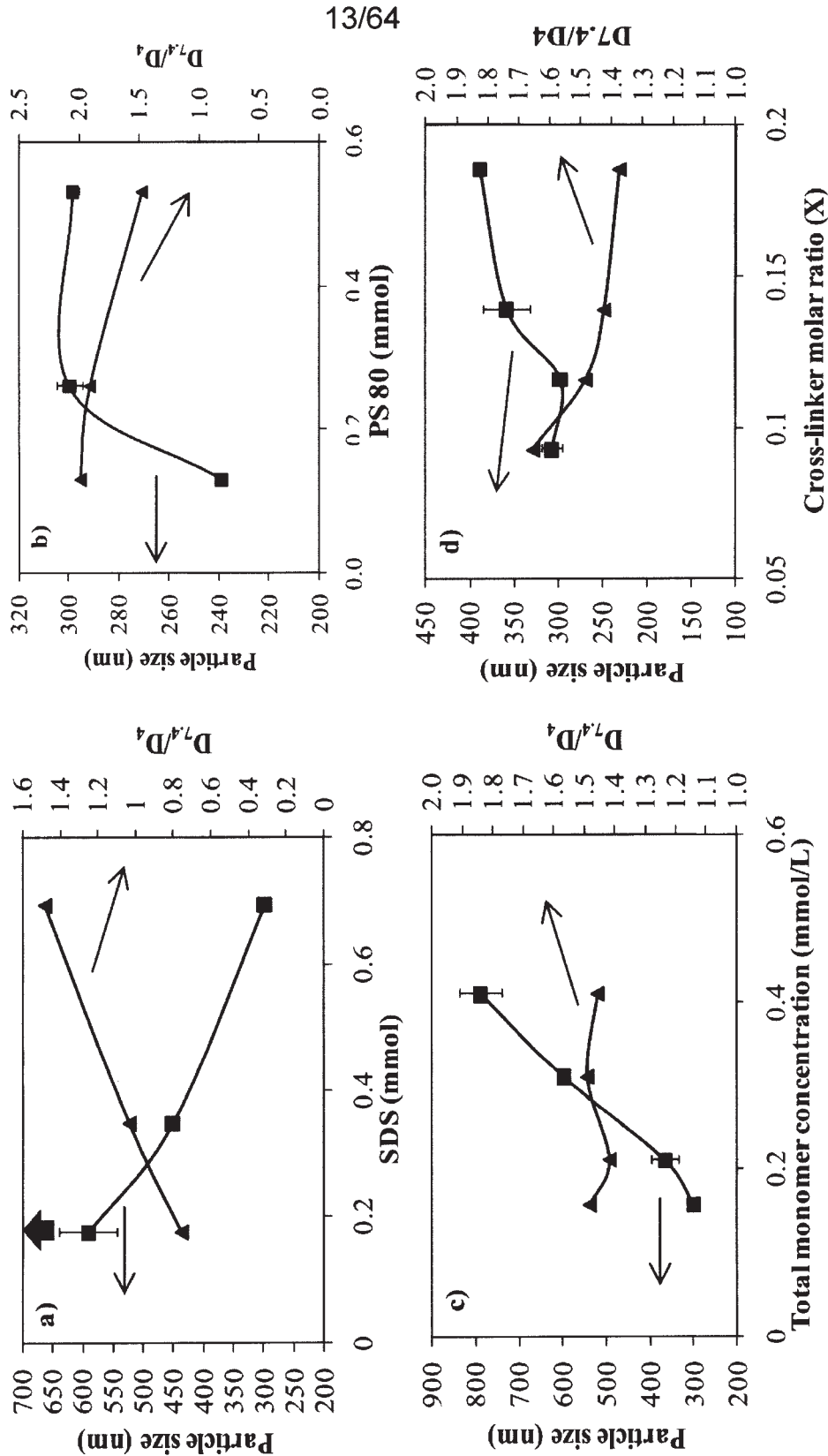


Figure 12

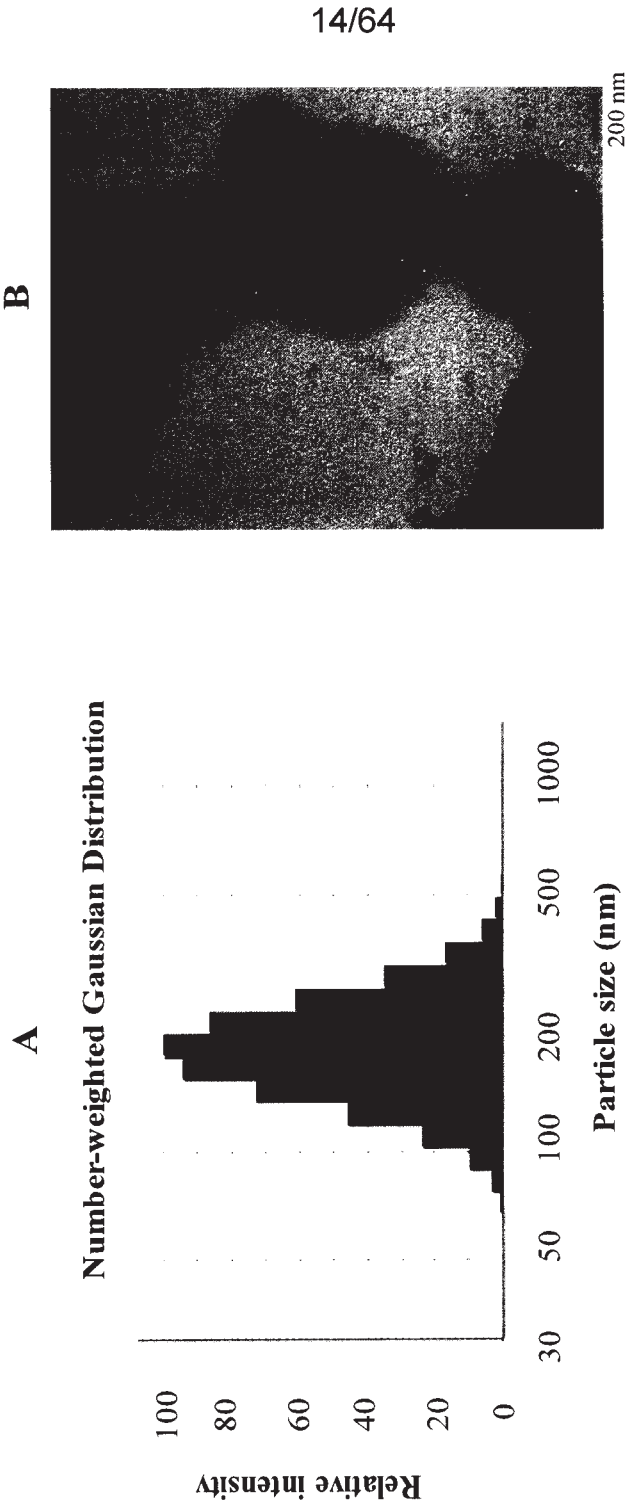


Figure 13

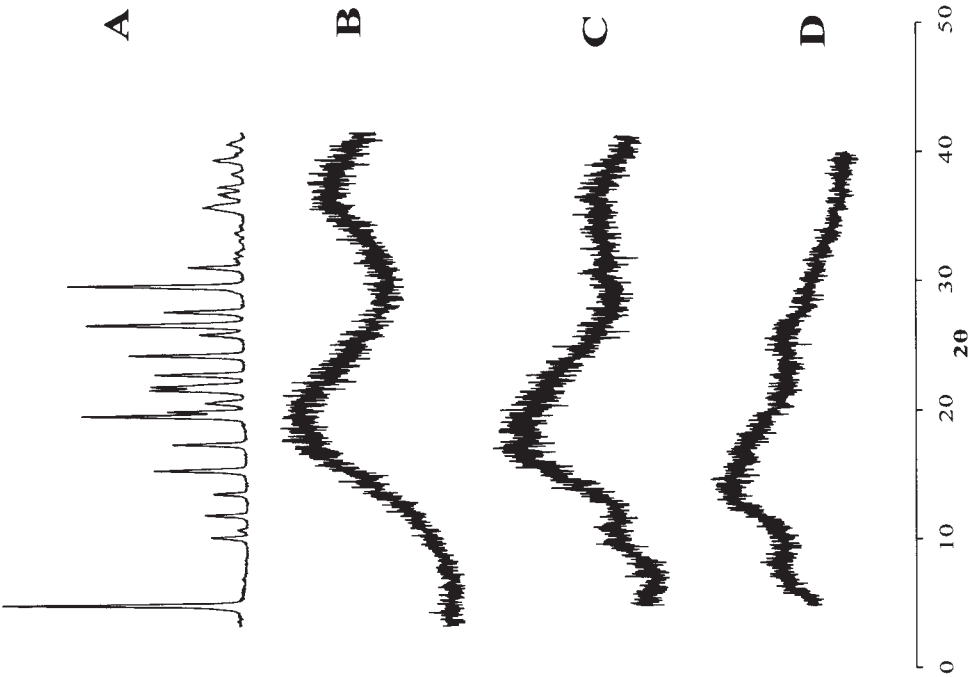


Figure 14

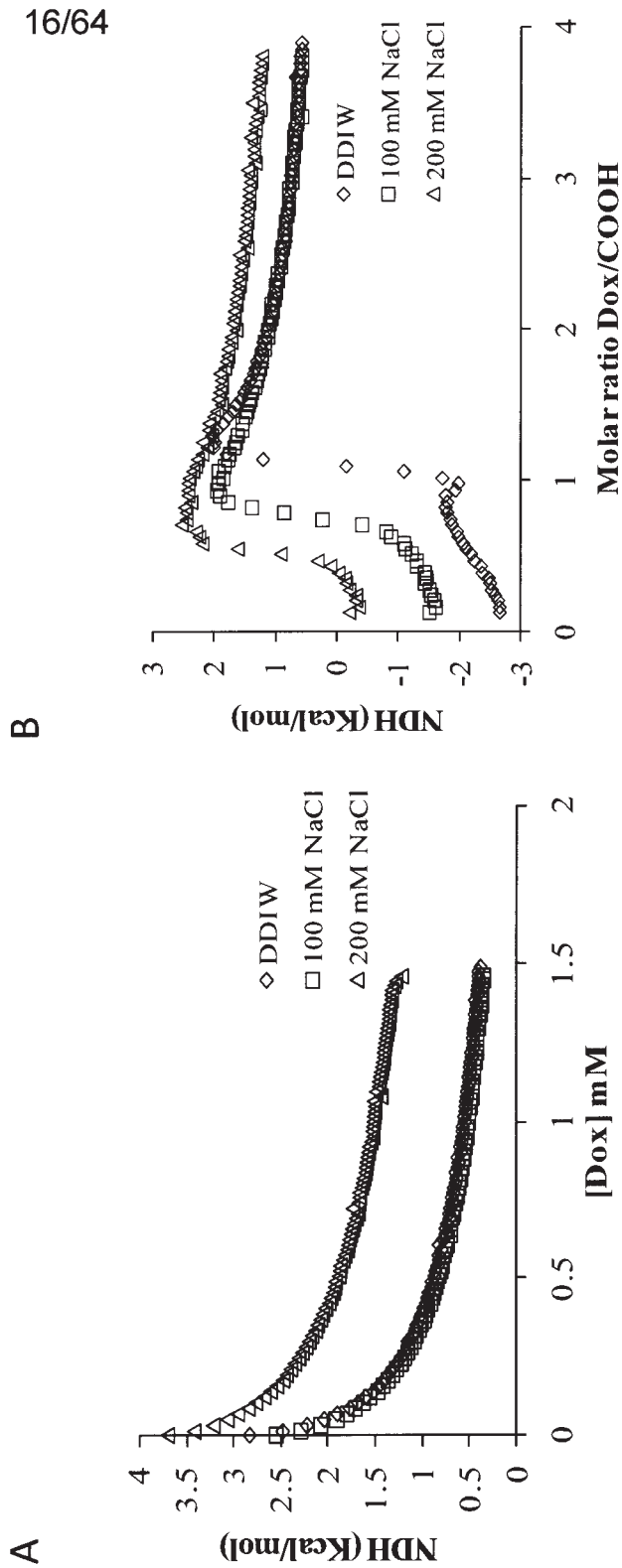


Figure 15

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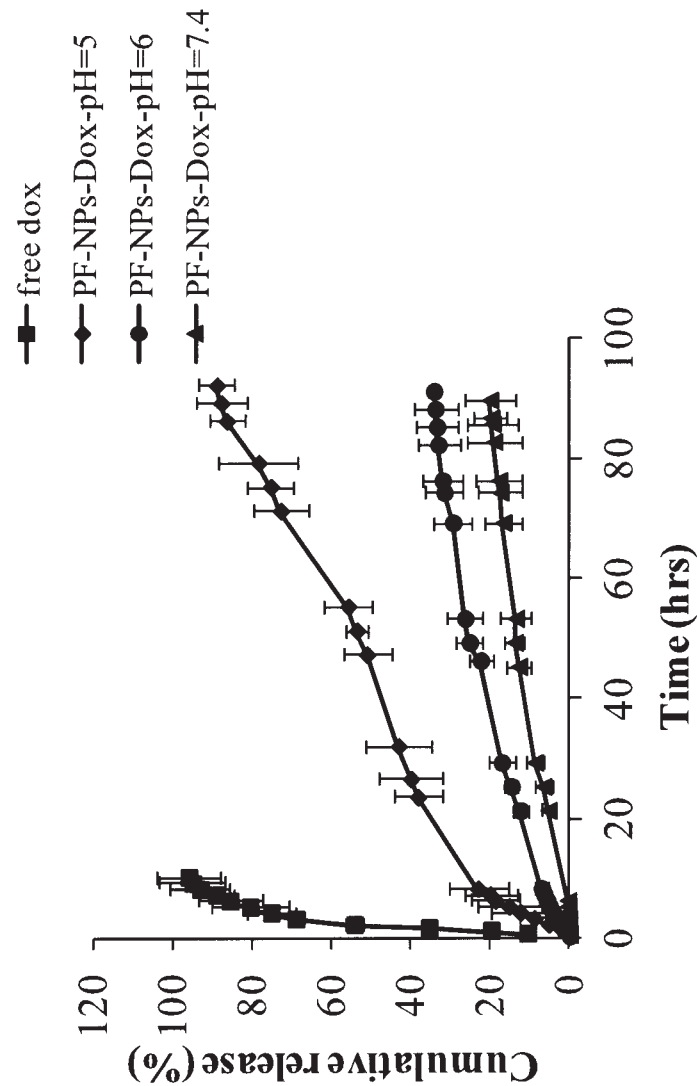
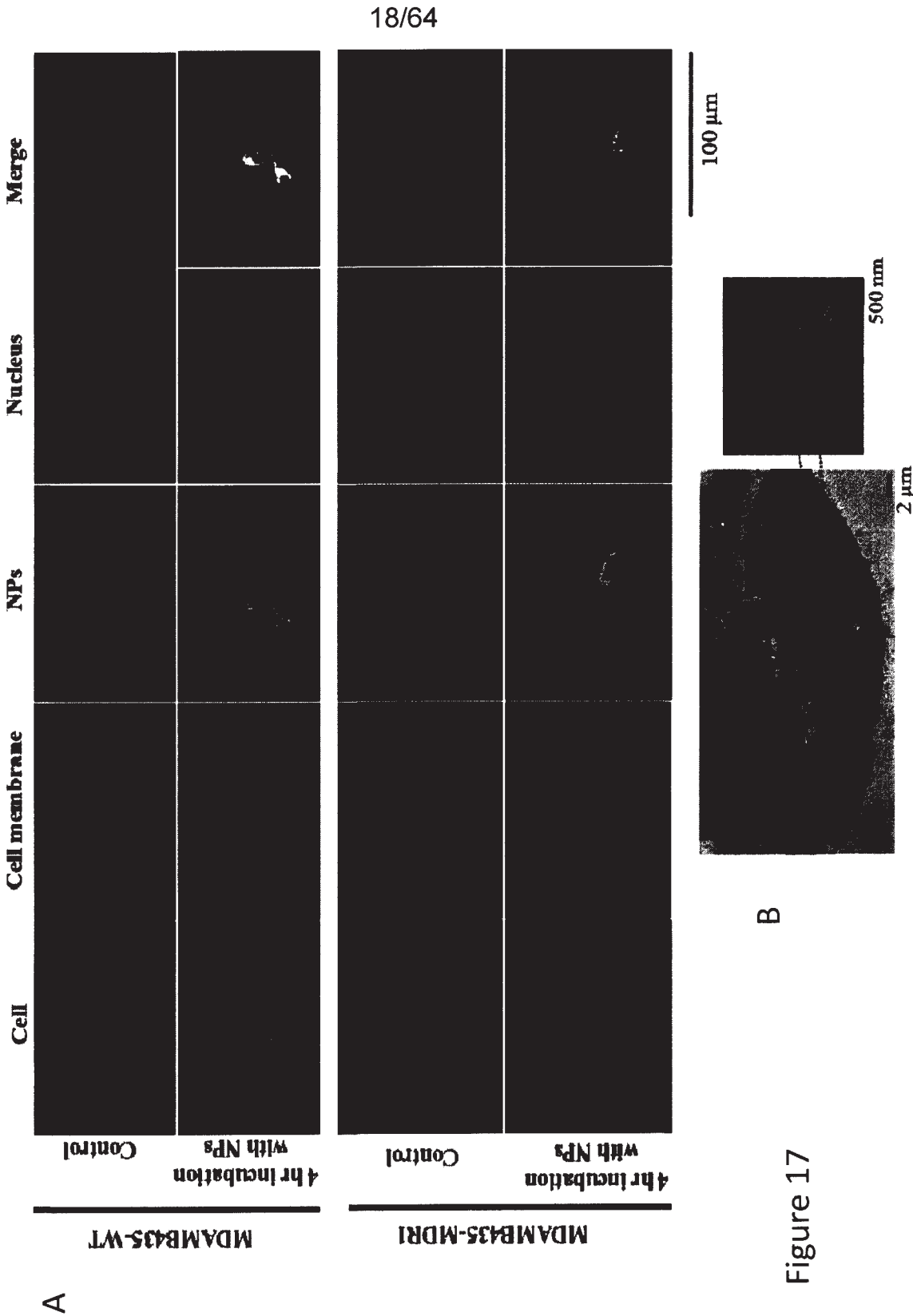


Figure 16



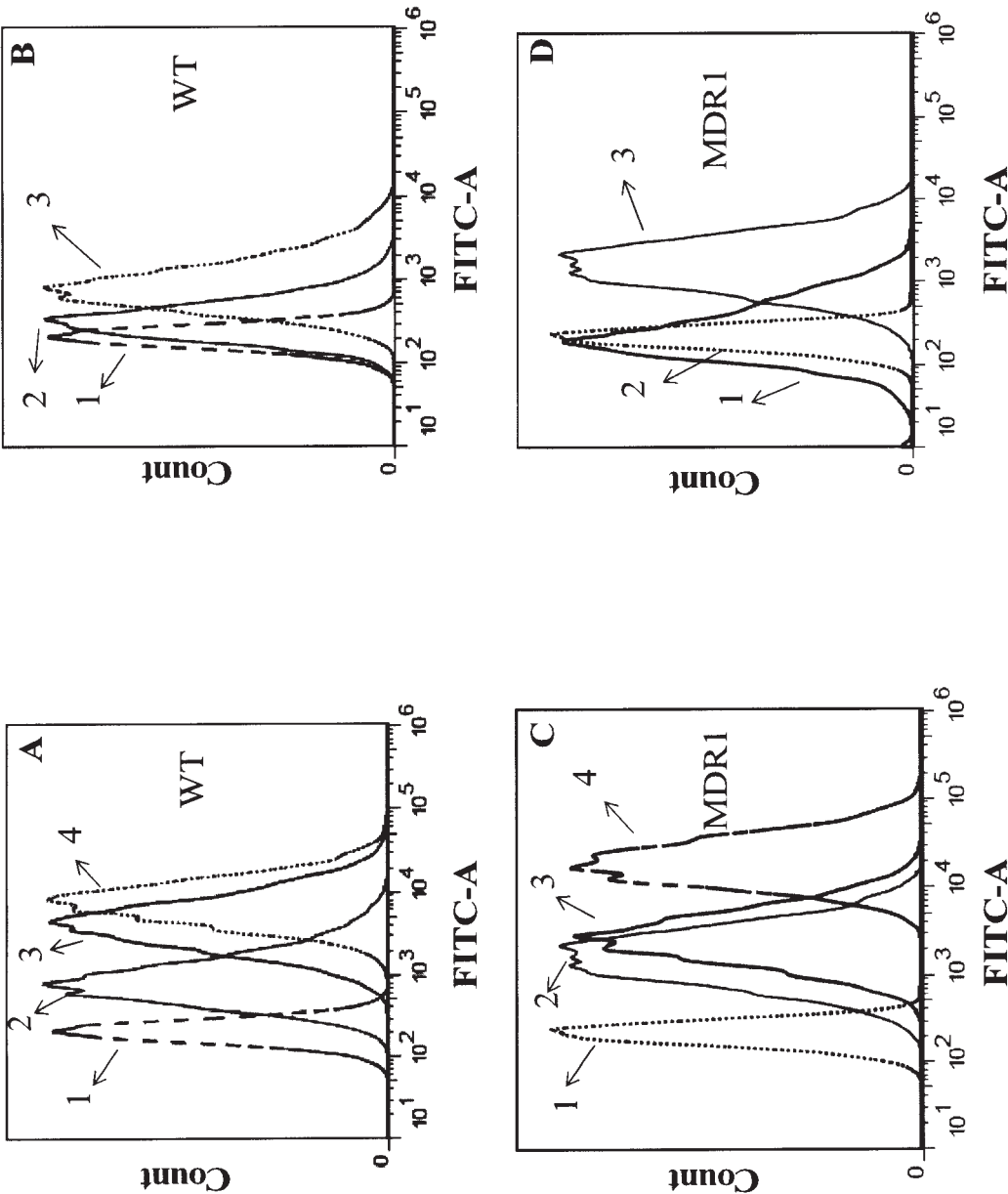


Figure 18

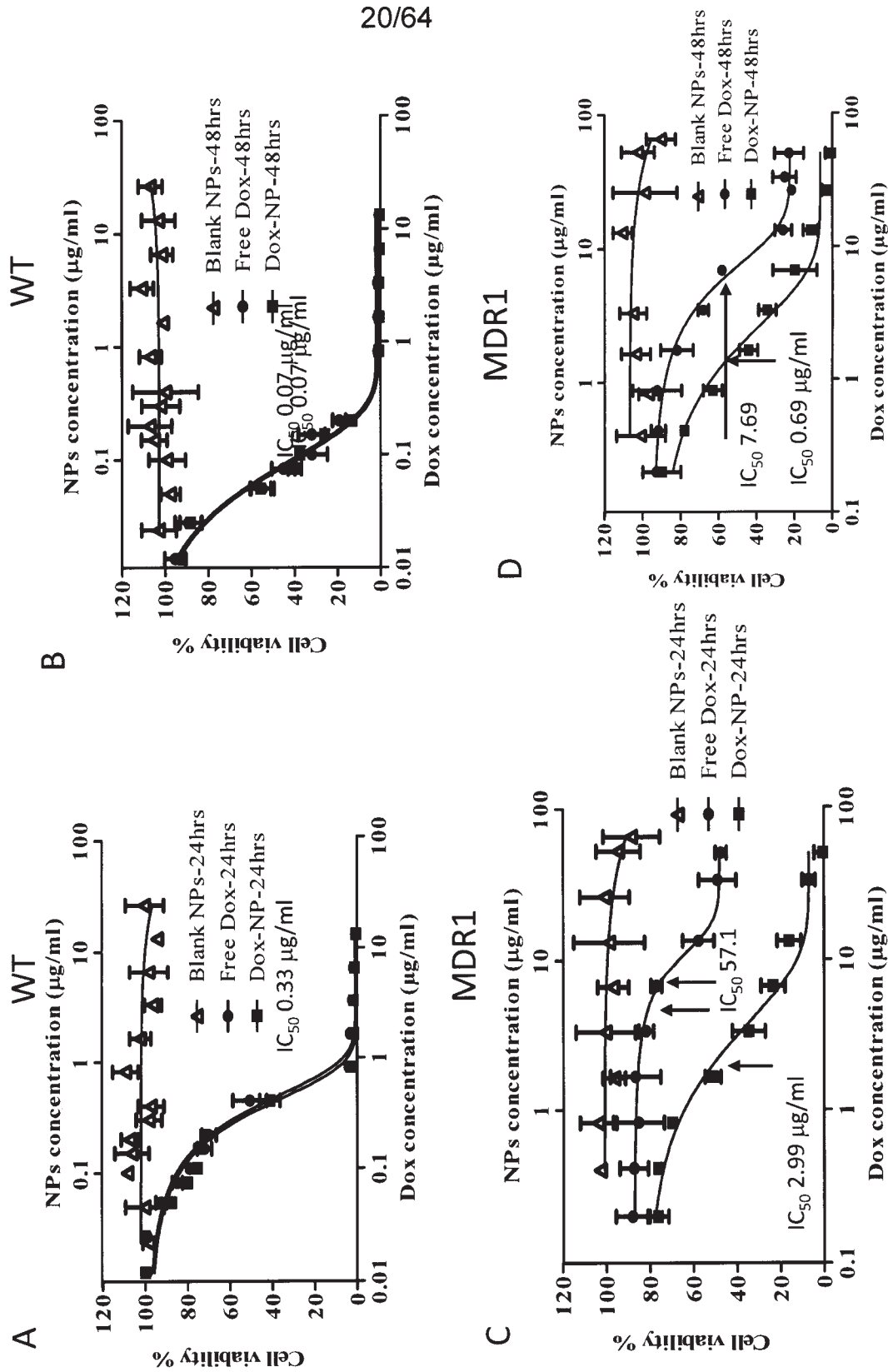


Figure 19

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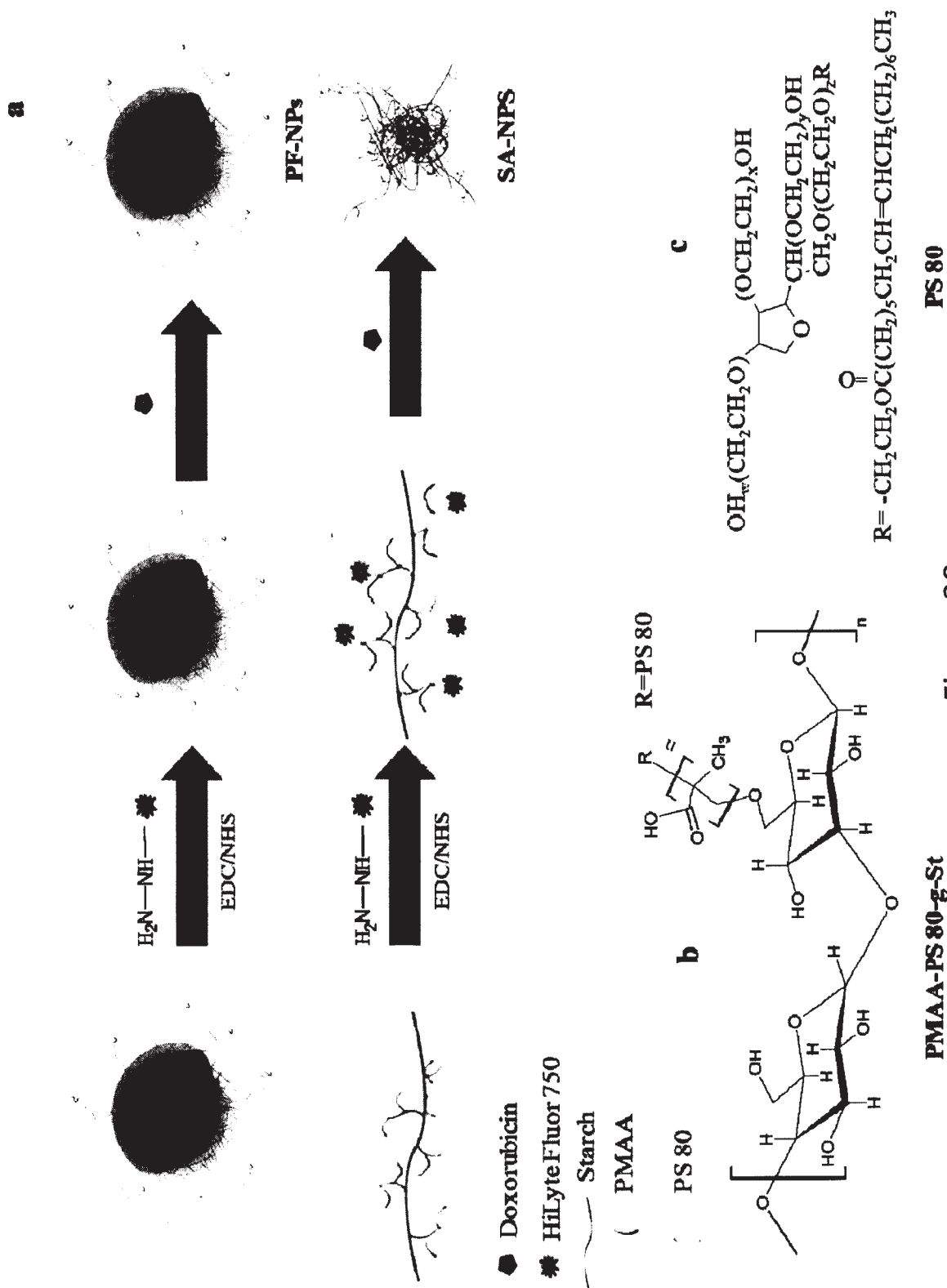


Figure 20

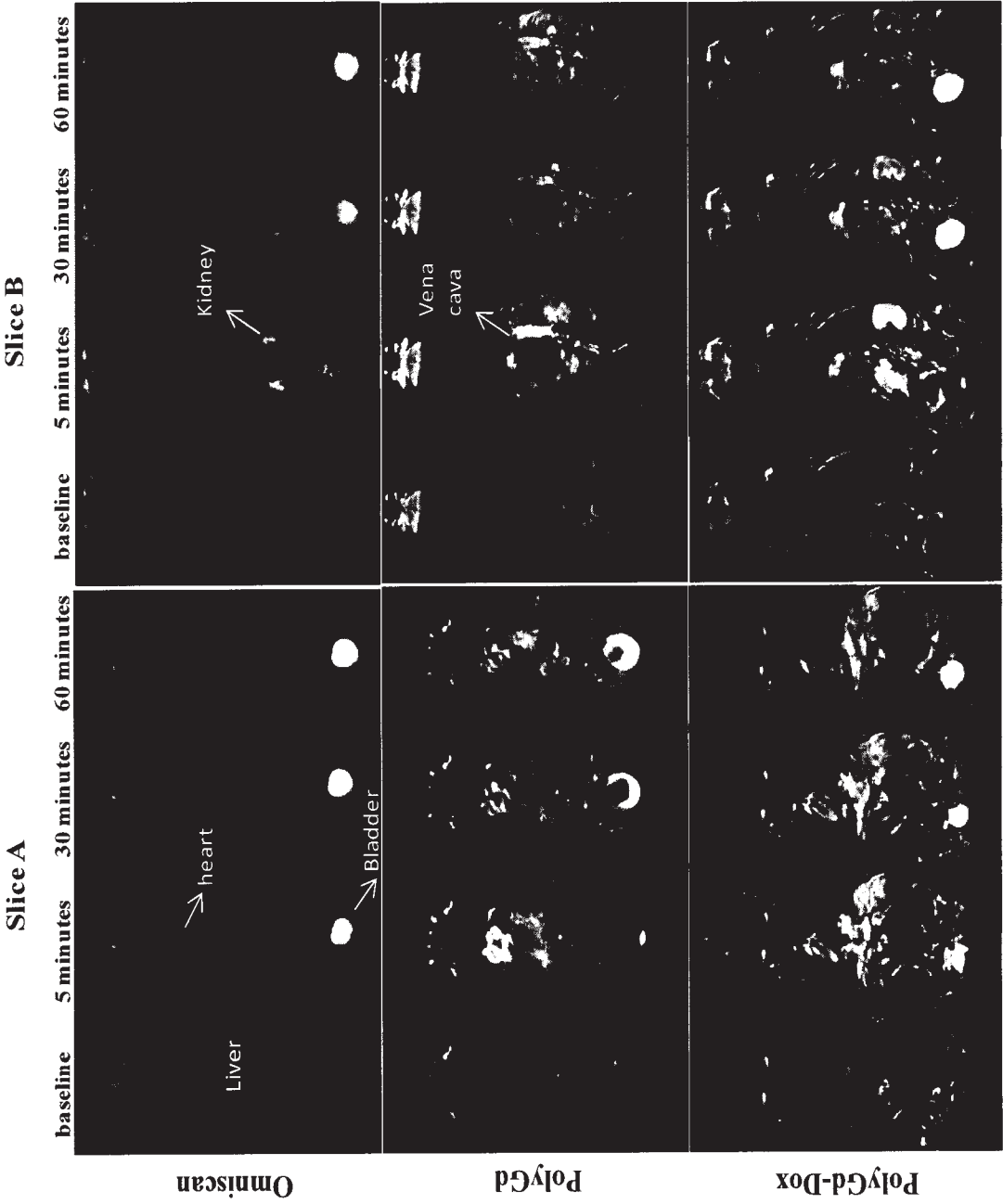


Figure 21

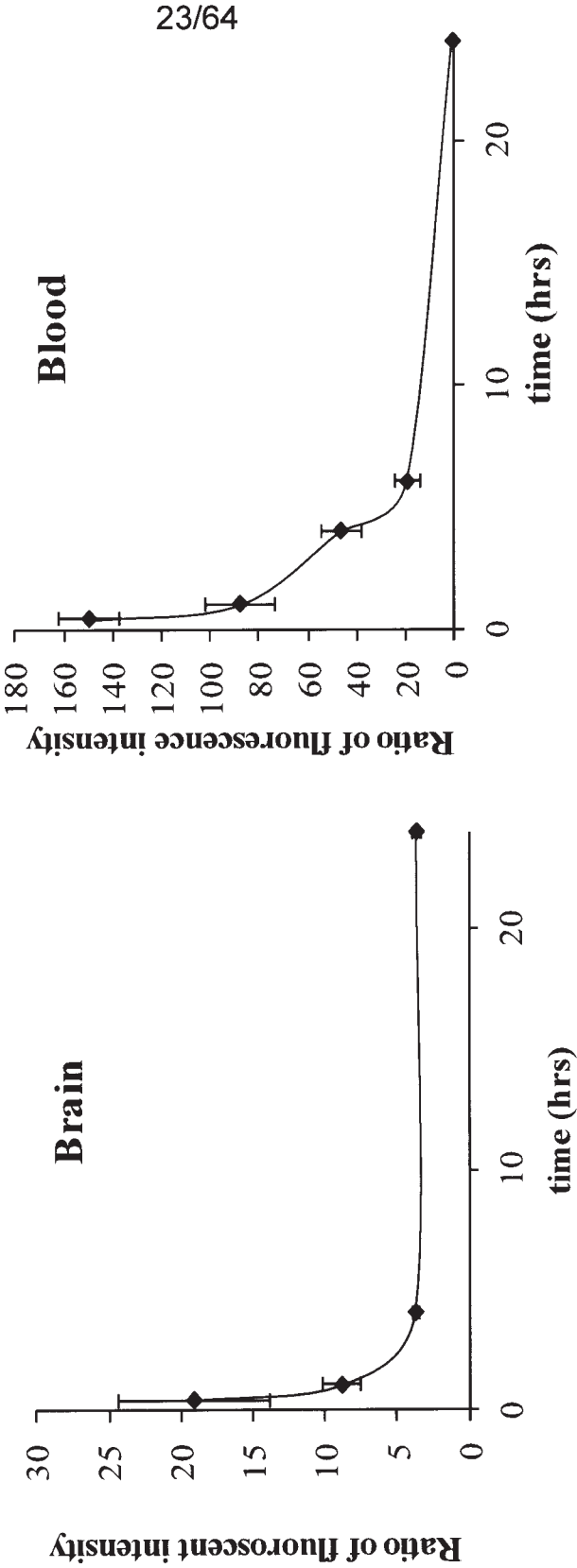


Figure 22



100 nm



100 nm

A

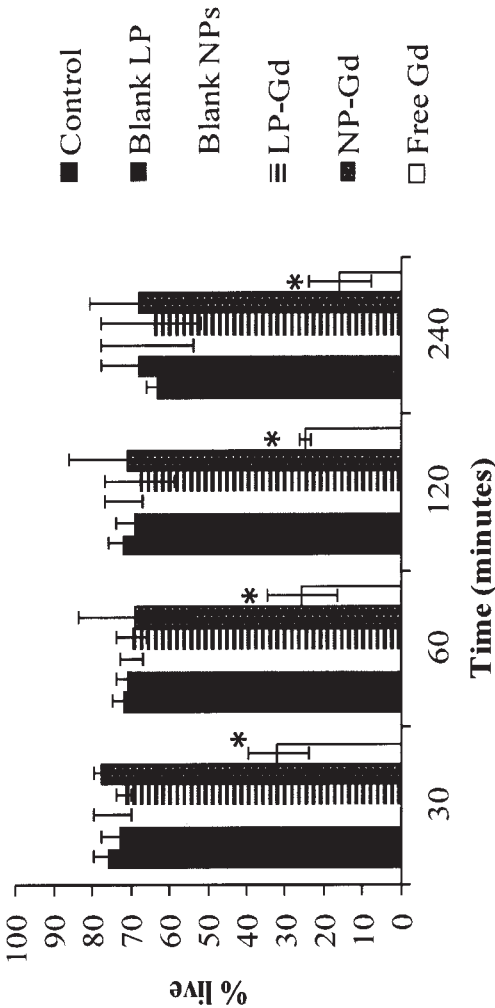
B

SA-NPs

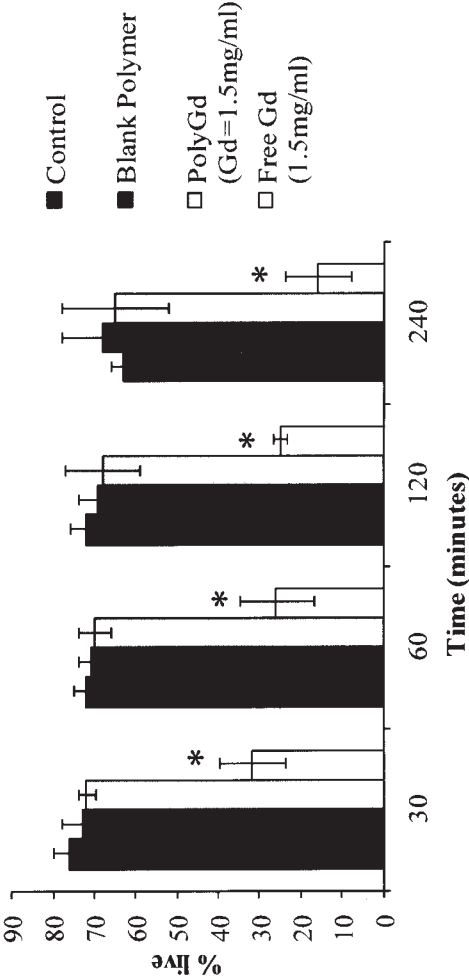
Formulation	LC %	EE %	HiLyte Fluor 750 μmol/g	Size nm	Zeta mv
SA-NPs	21.1 ± 0.3	88.2 ± 1.2	4.3 ± 0.01	62 ± 5	-38 ± 1
PF-NPs	49.7 ± 0.3	99.9 ± 0.1	3.9 ± 0.02	137 ± 3	-35 ± 5

Figure 23

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A



B

Figure 24

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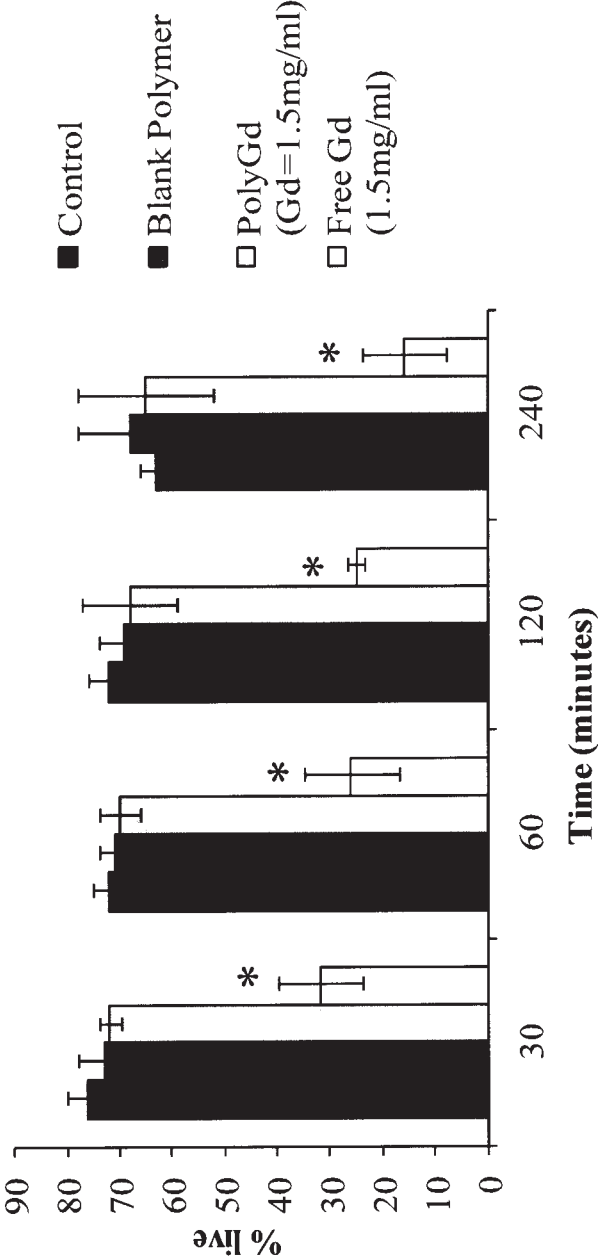


Figure 25

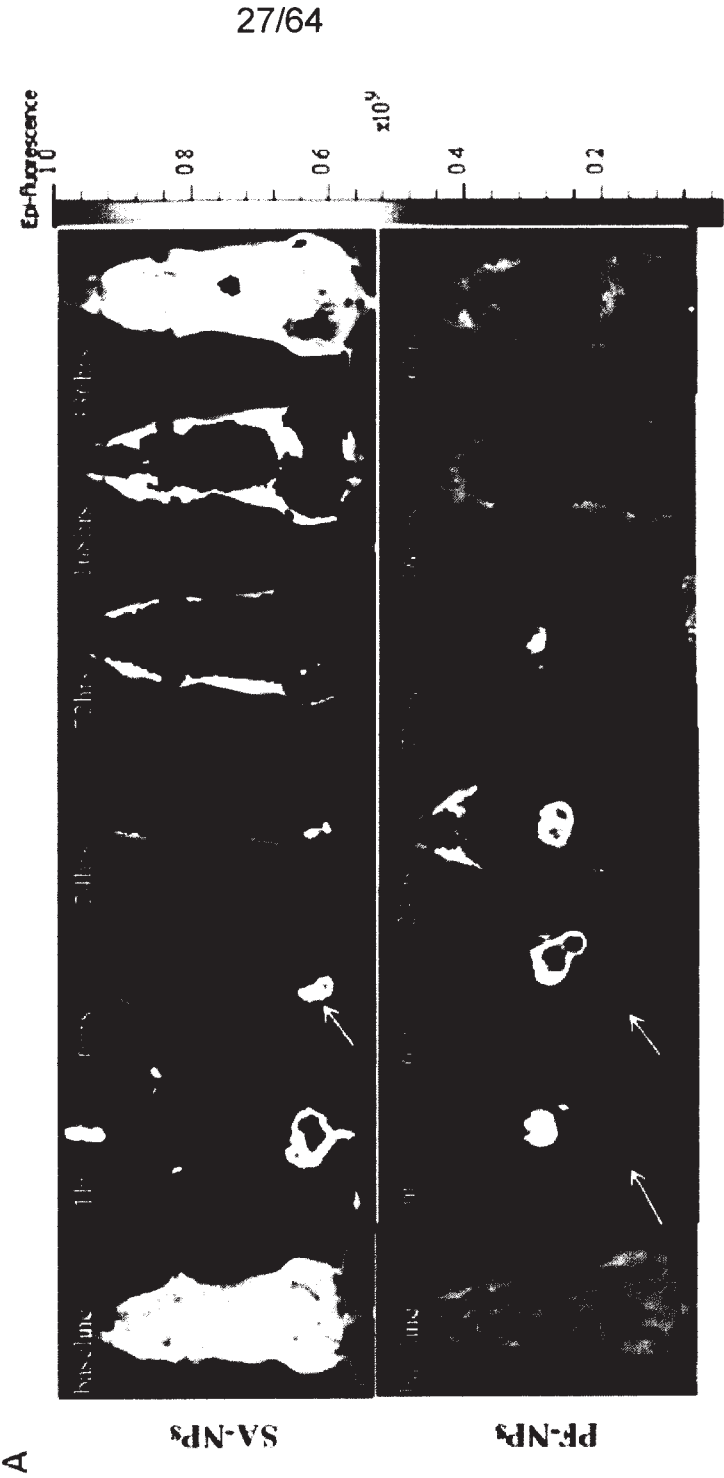


Figure 26

B

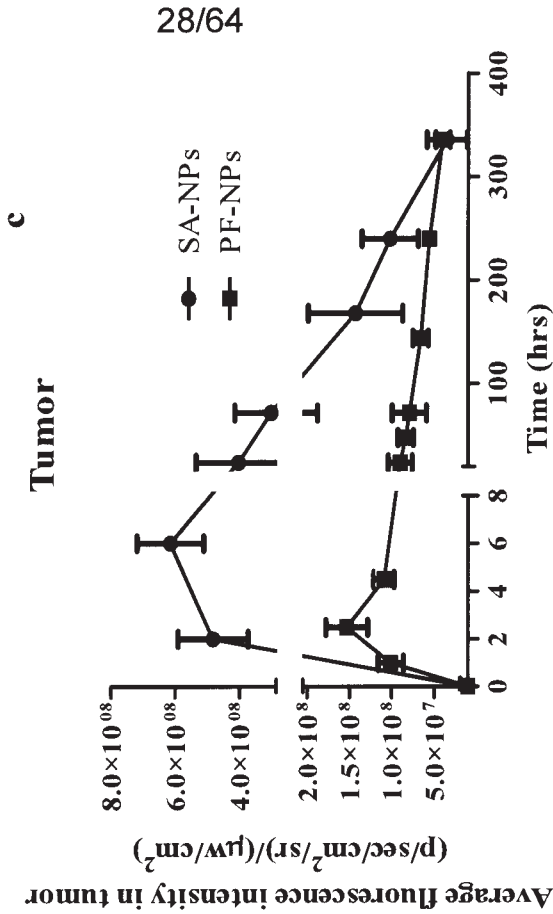
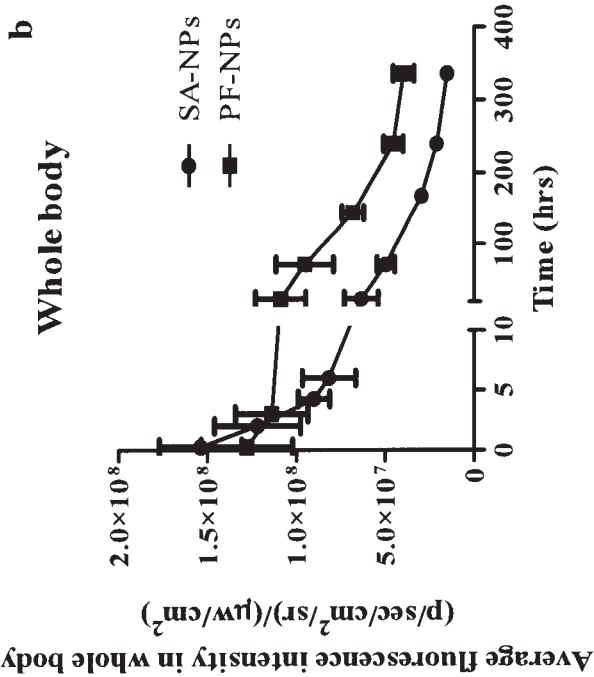


Figure 26

A

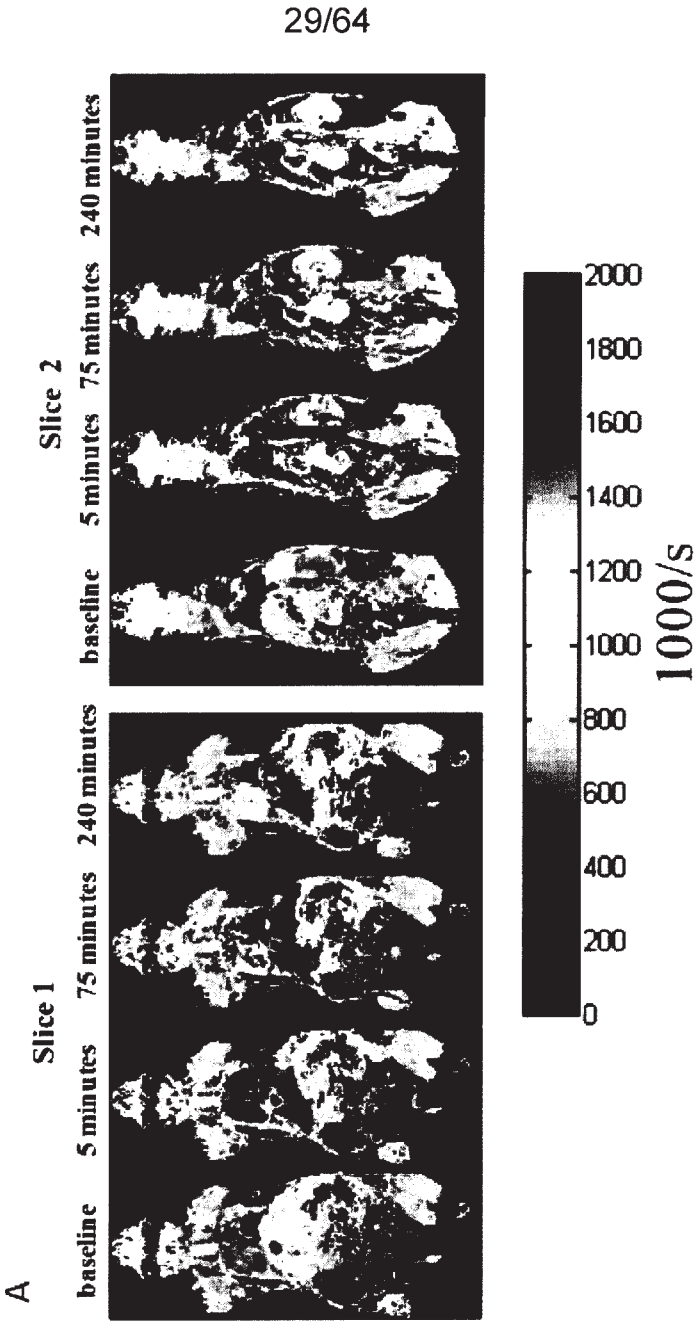


Figure 27

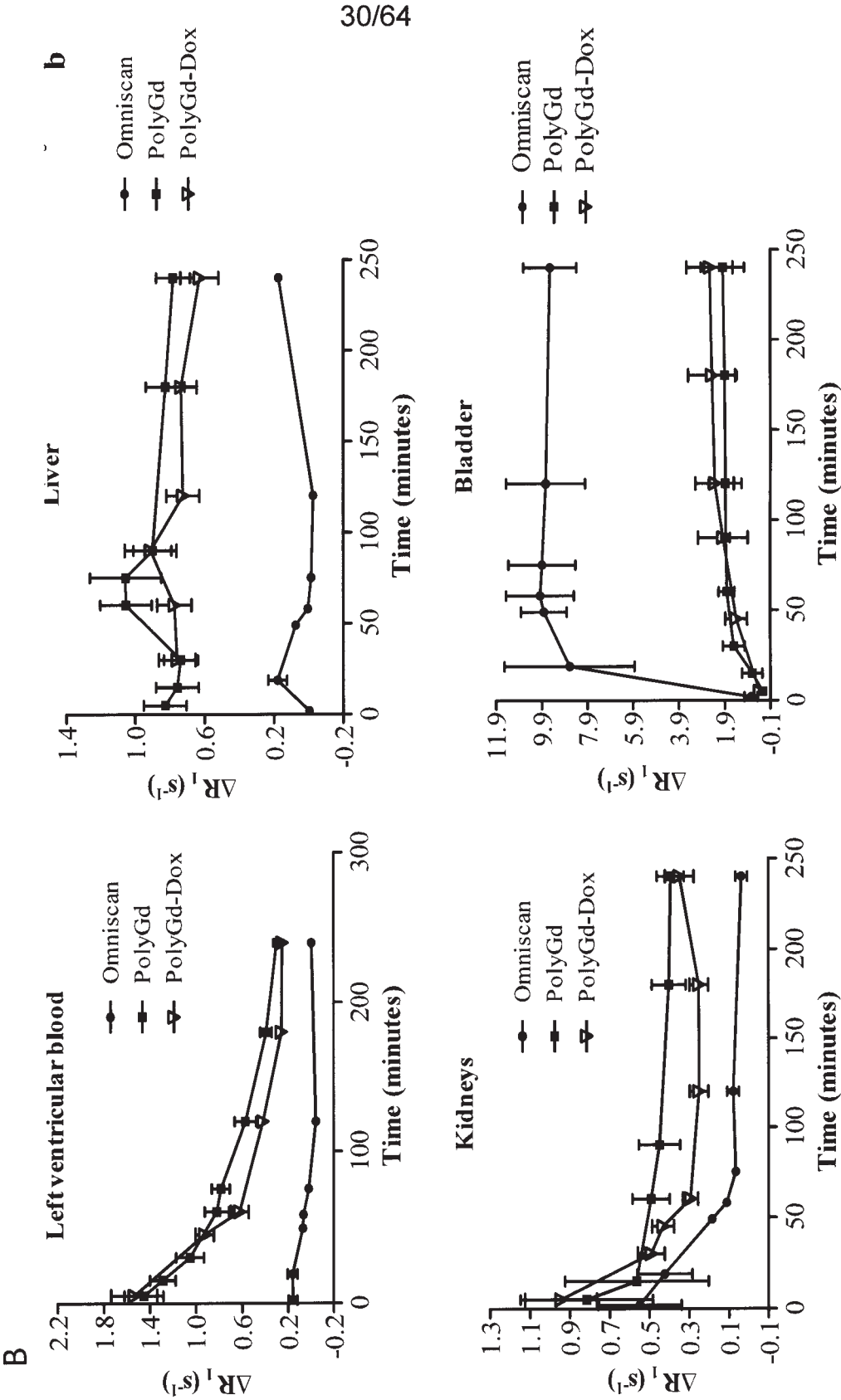


Figure 27

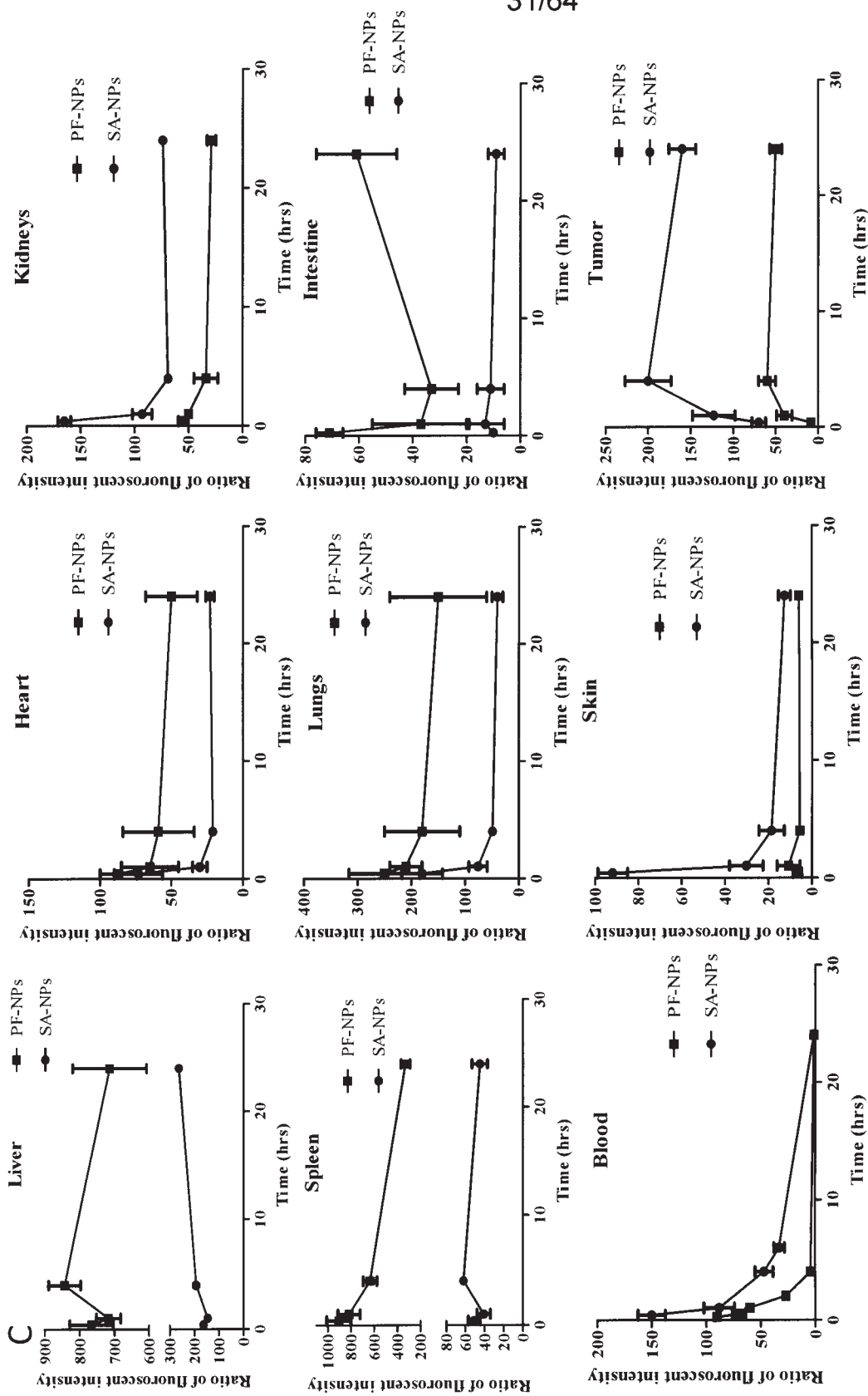


Figure 27

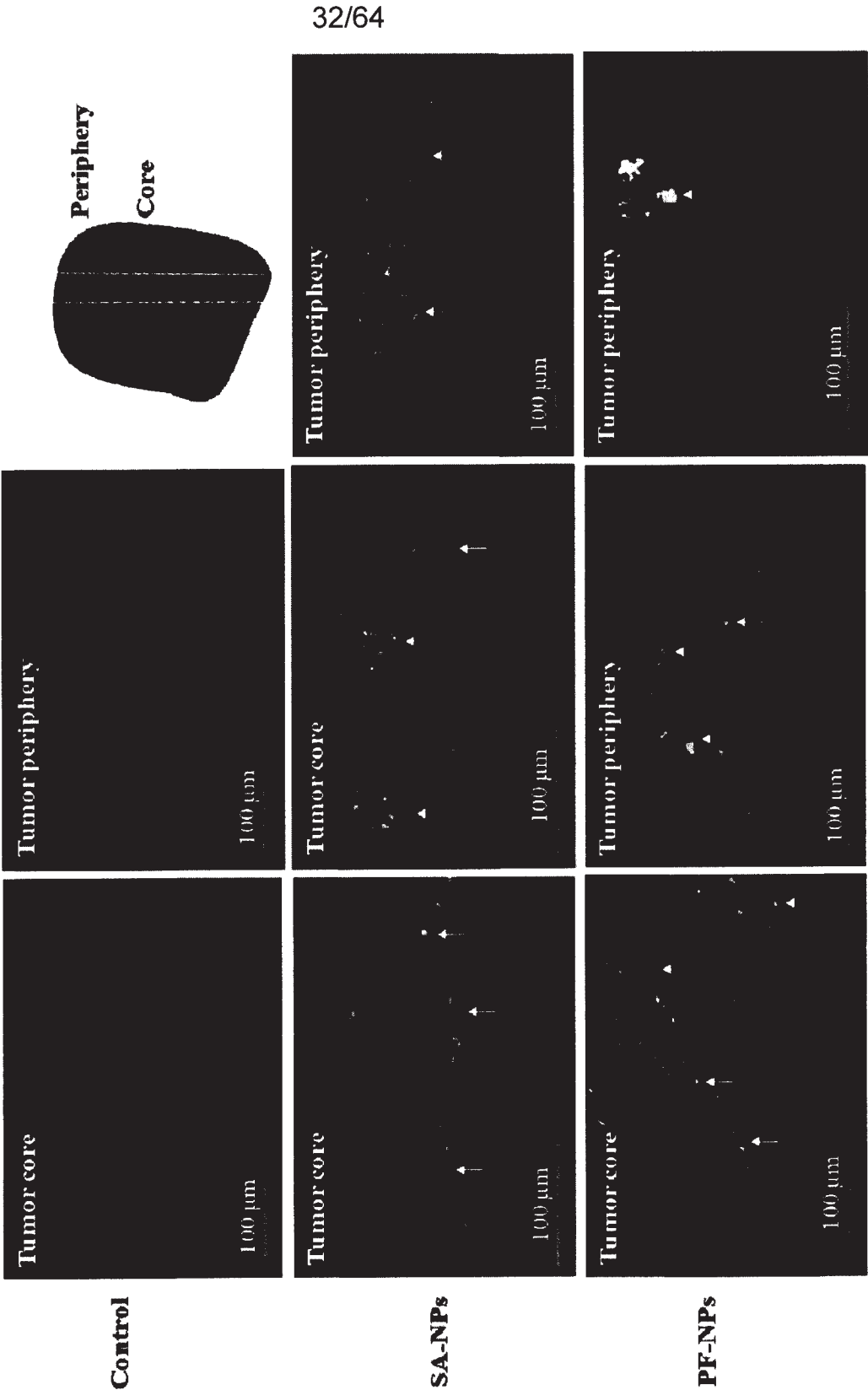


Figure 28

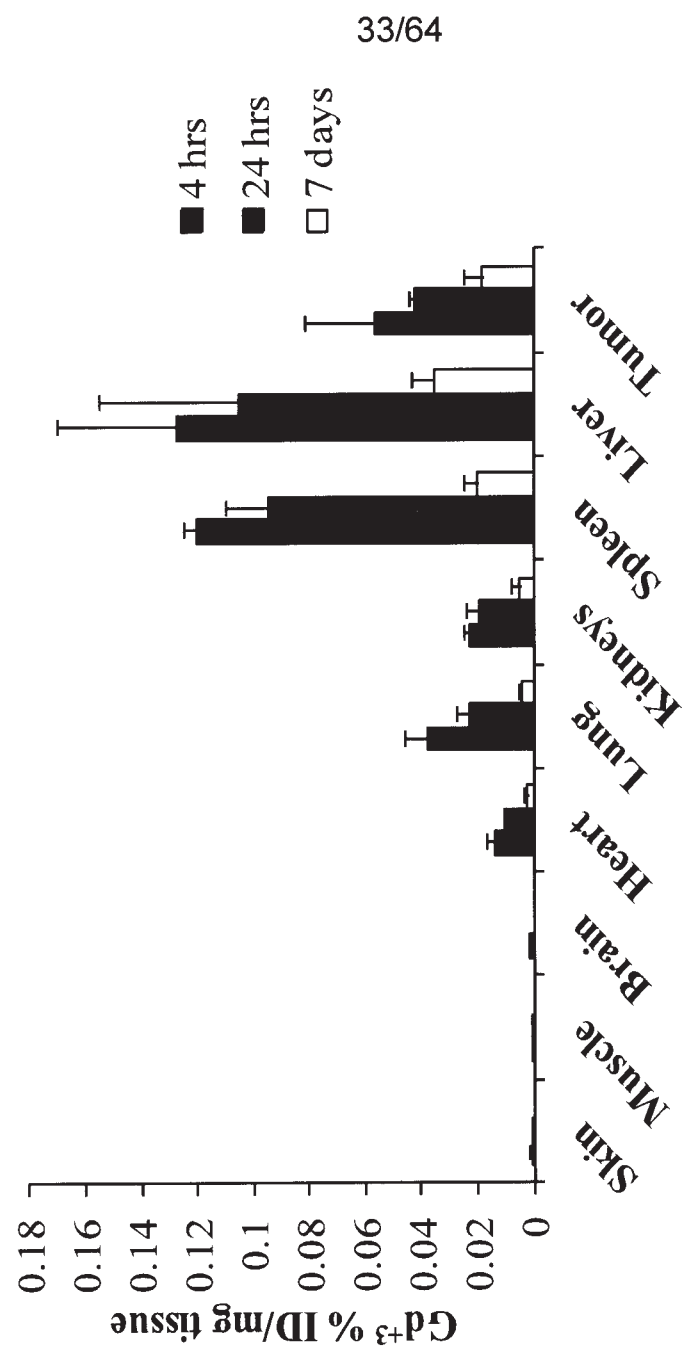


Figure 29

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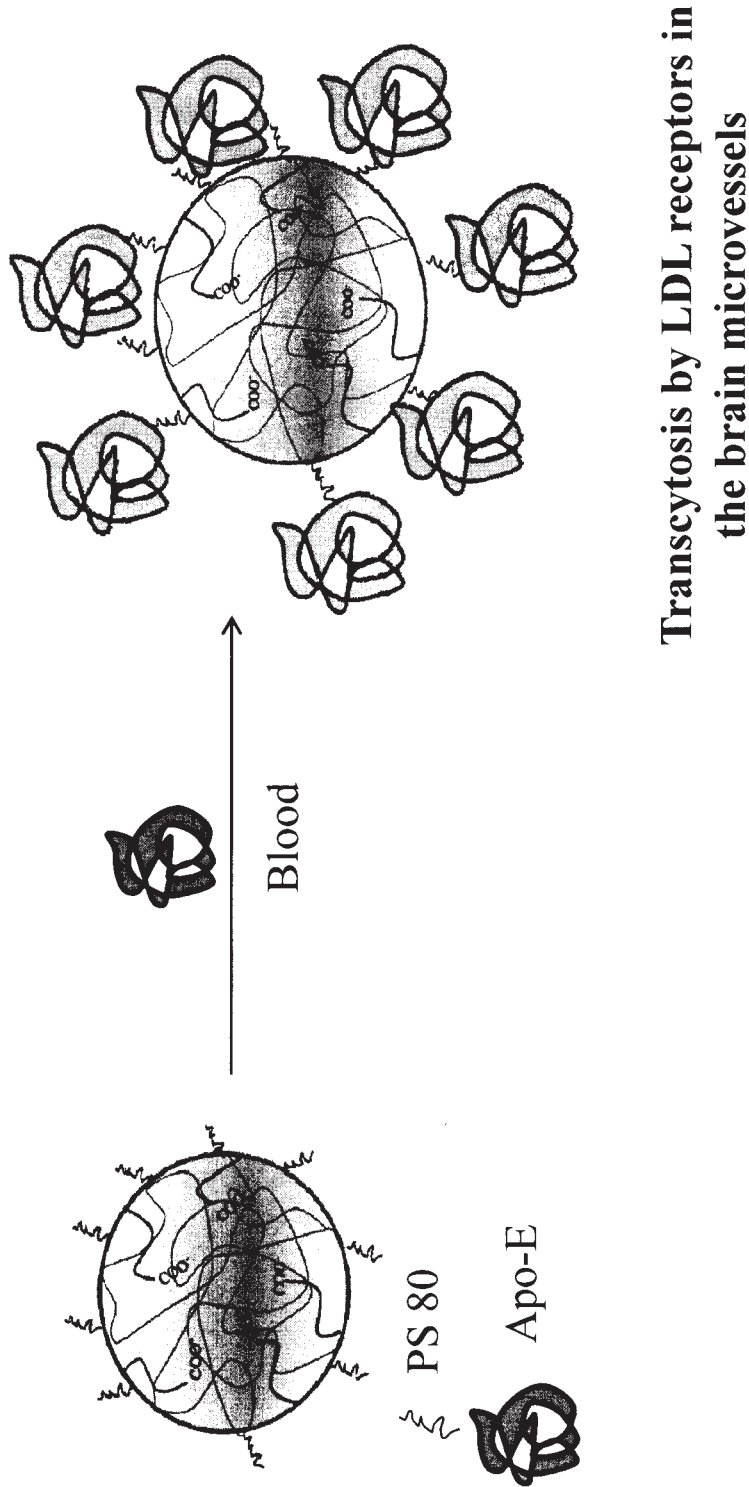


Figure 30

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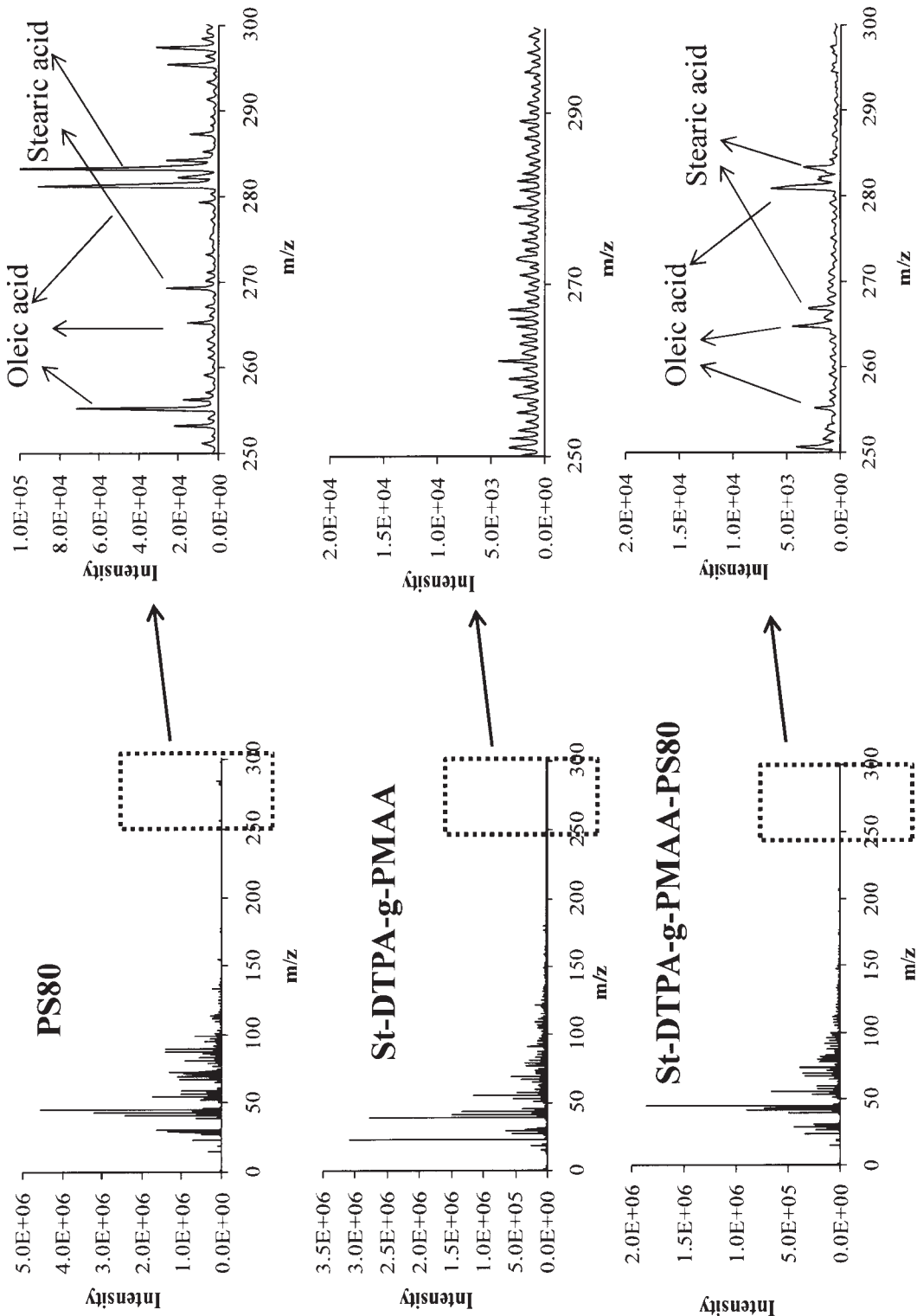


Figure 31

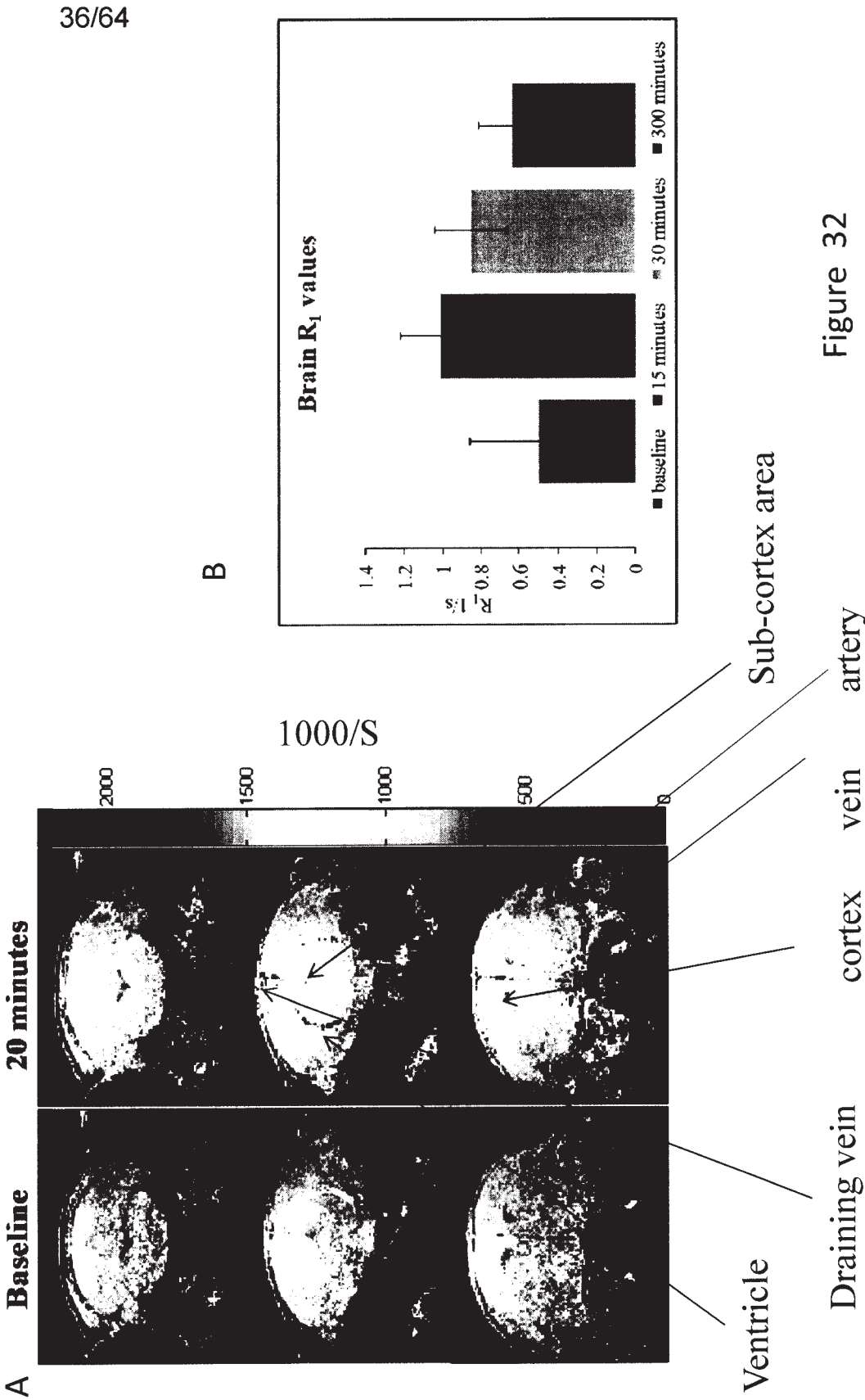


Figure 32

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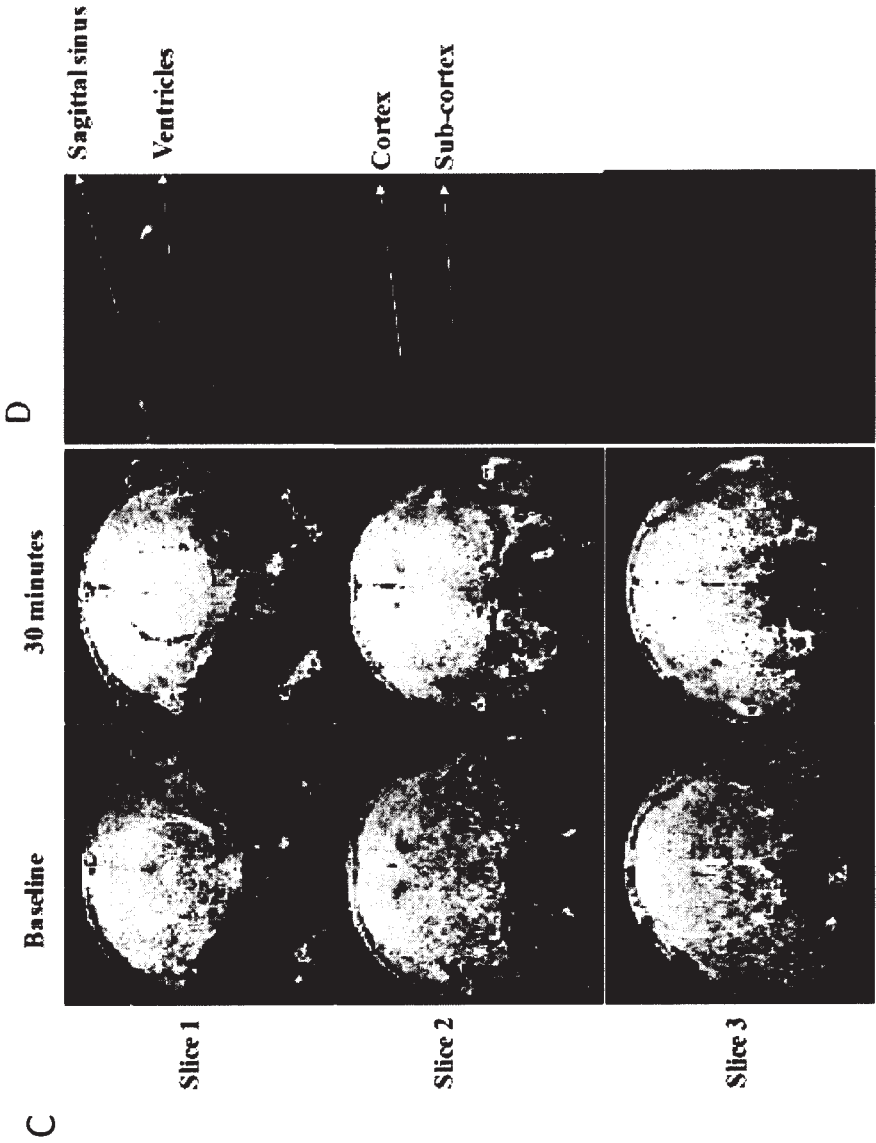


Figure 32

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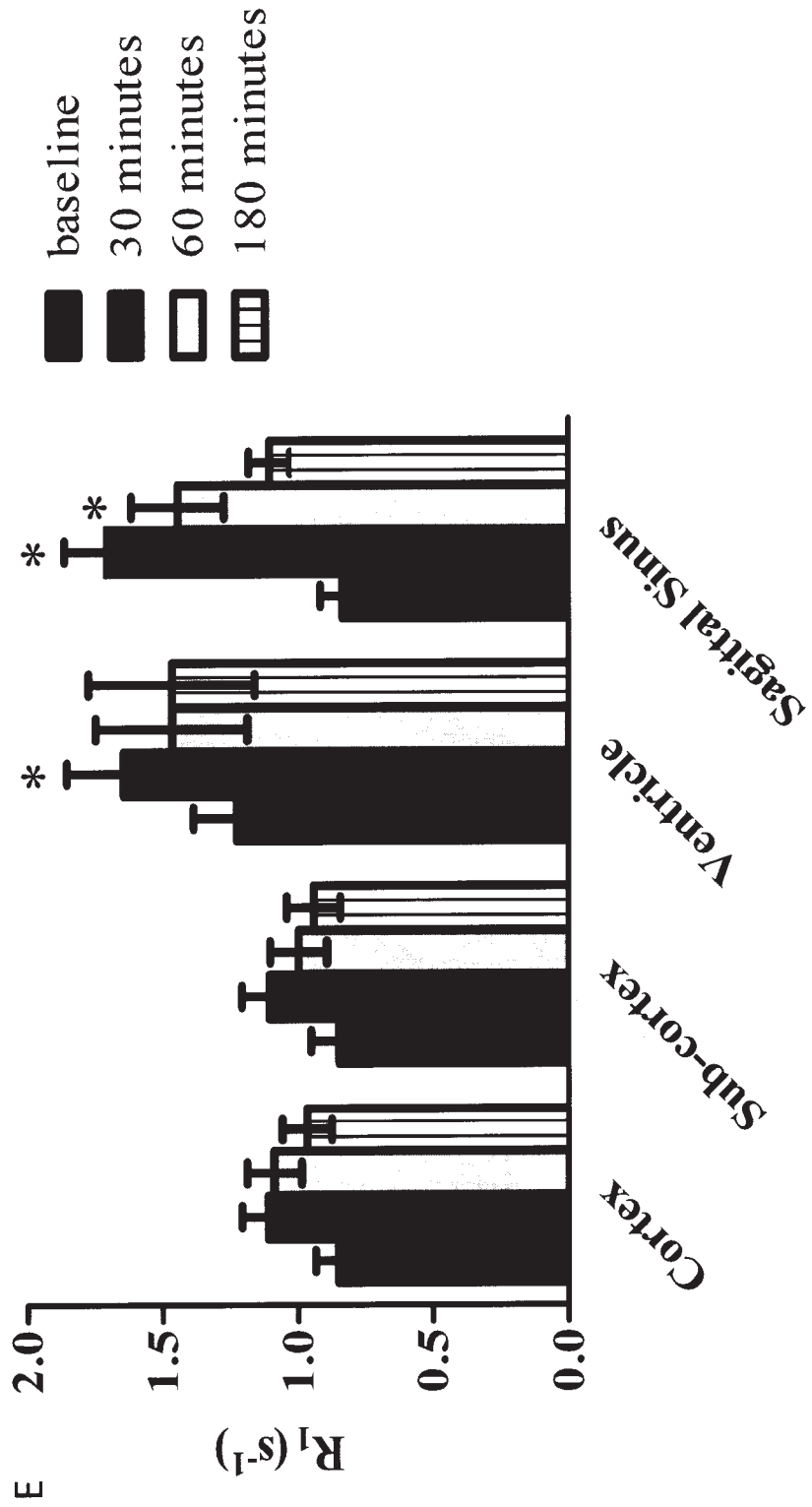


Figure 32

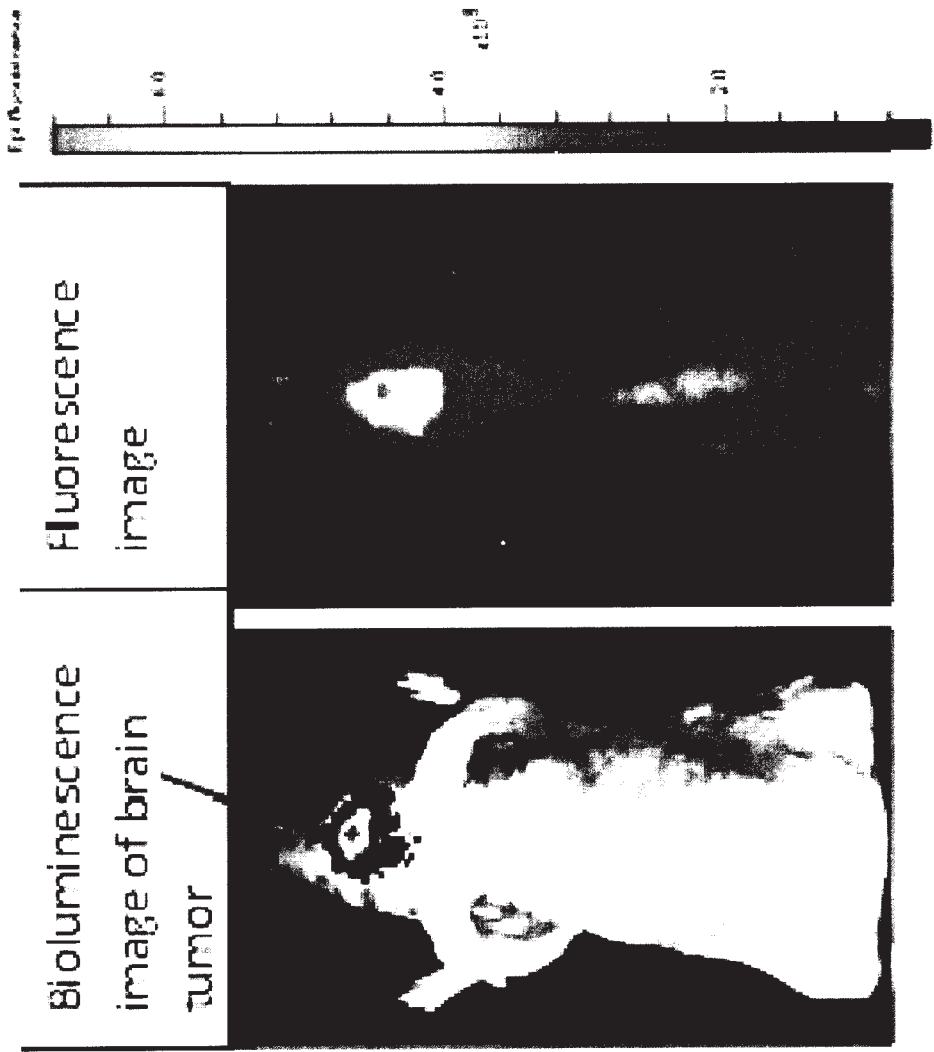


Figure 33

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Figure 33

B

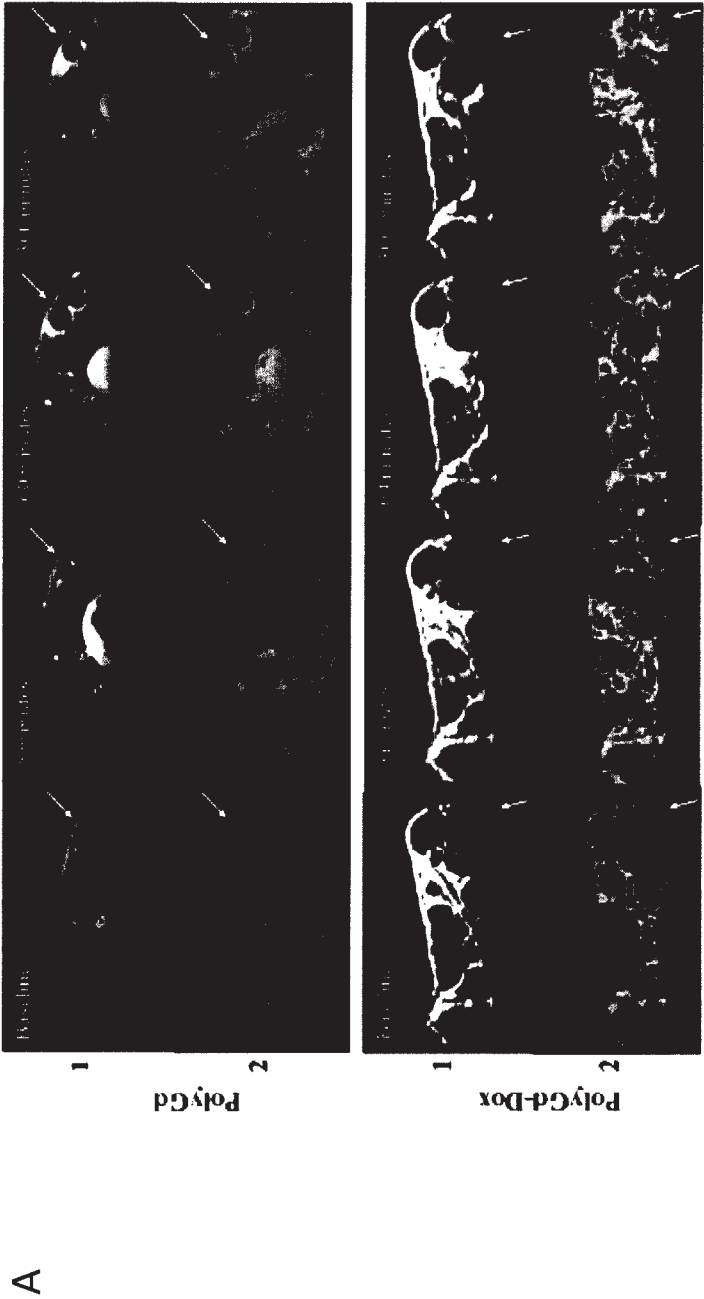


Figure 34

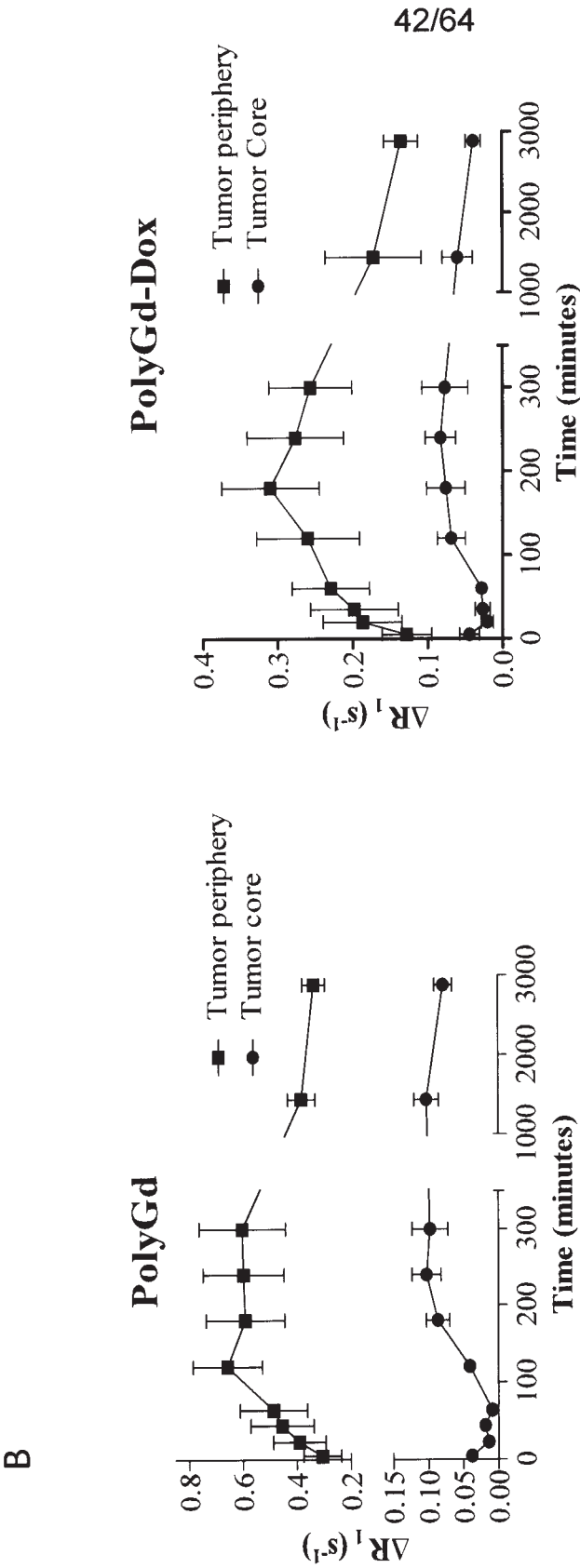
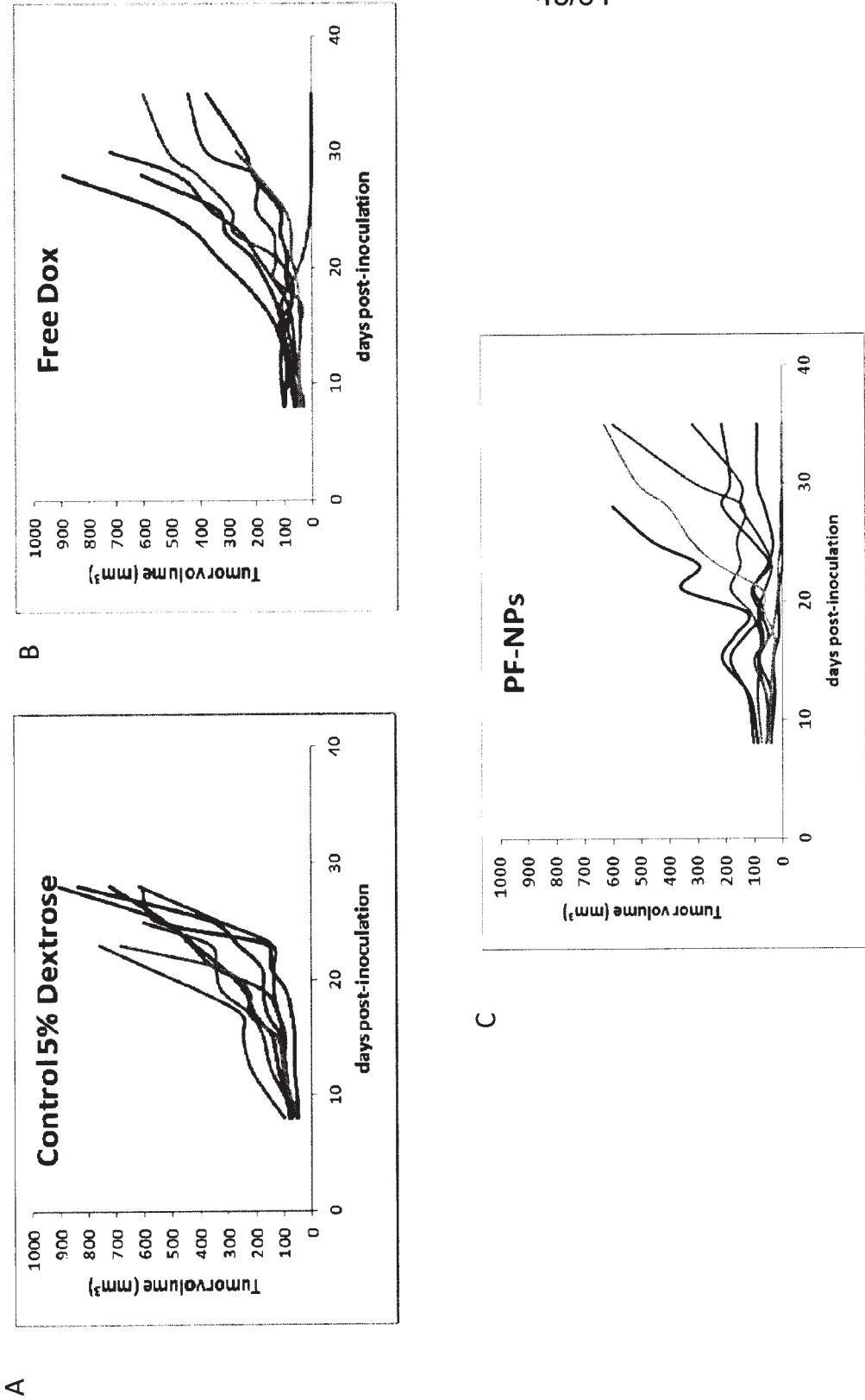


Figure 34



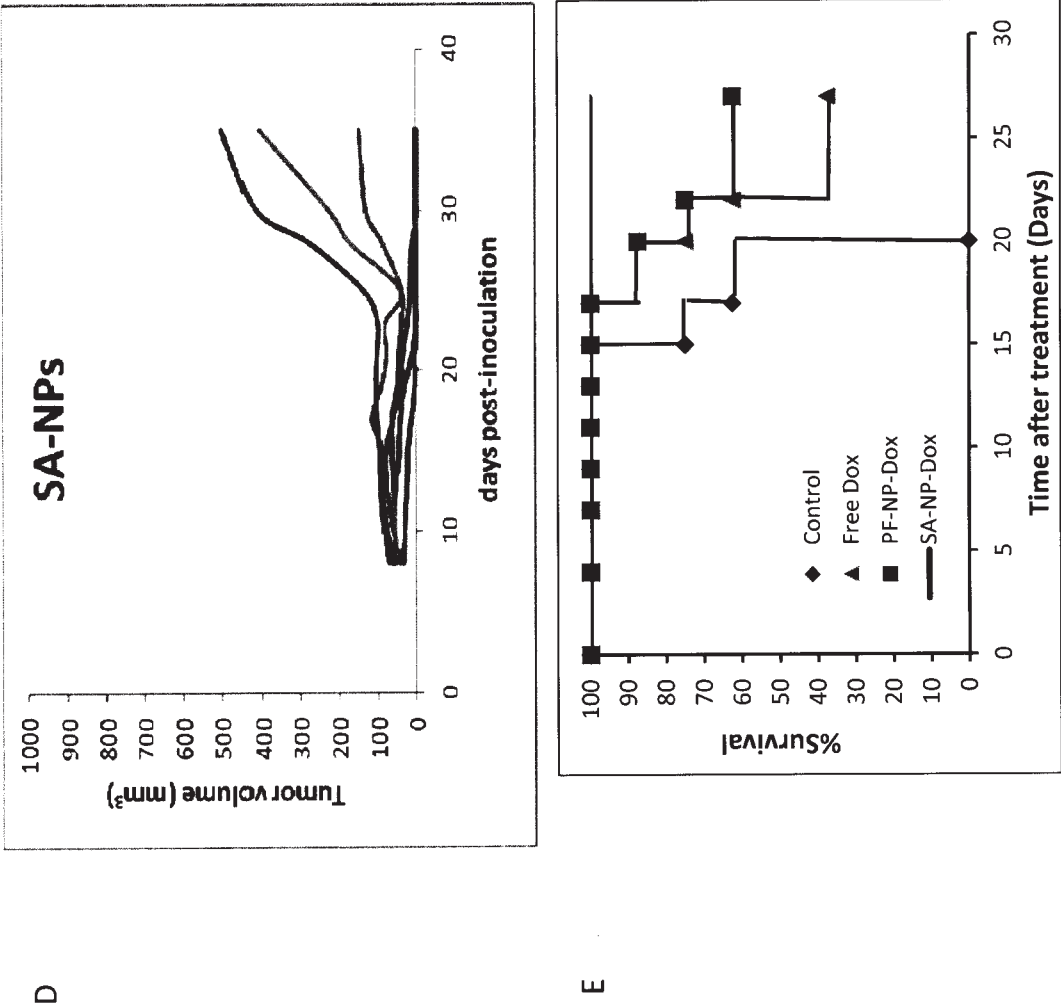


Figure 35

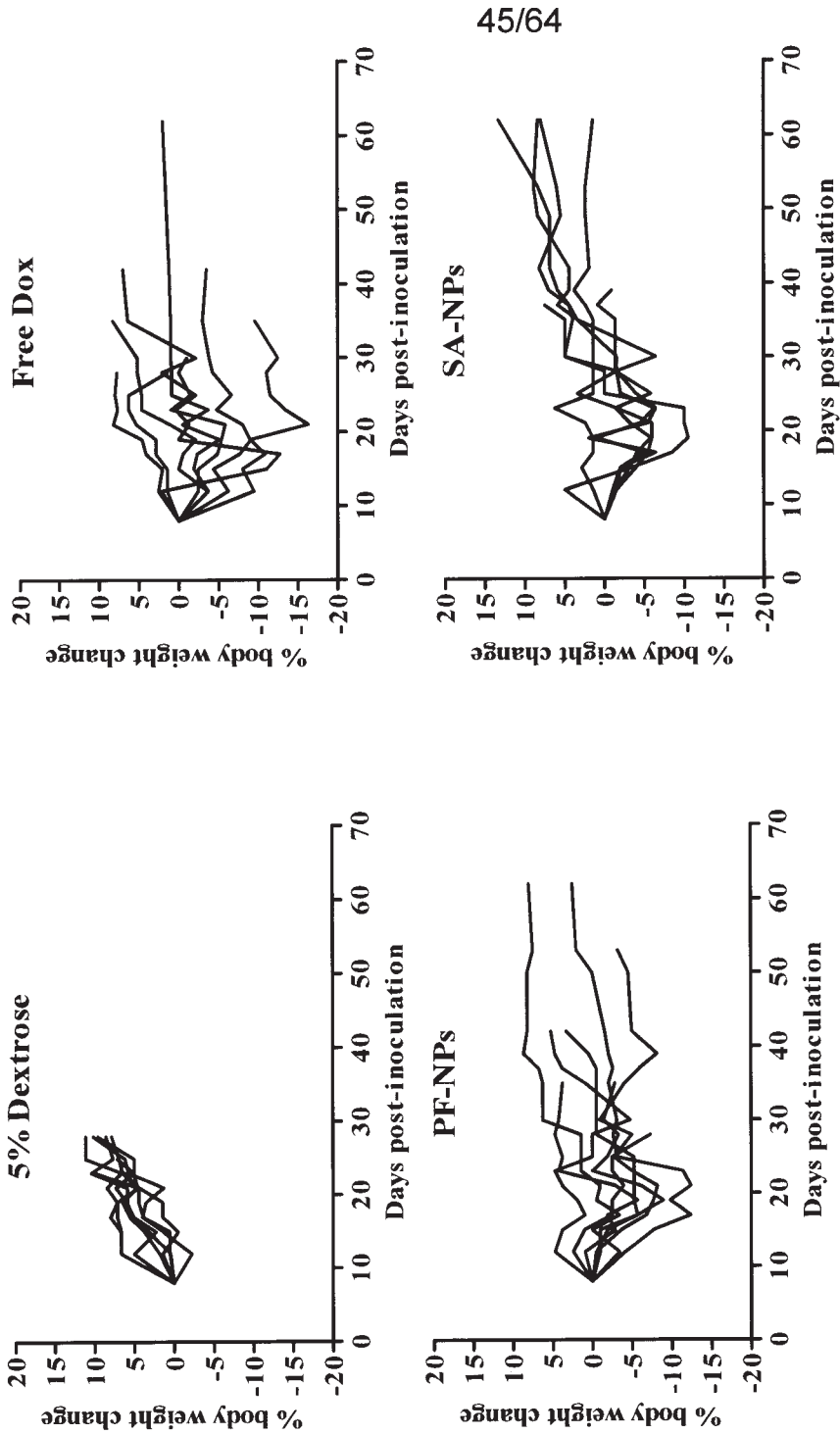


Figure 35

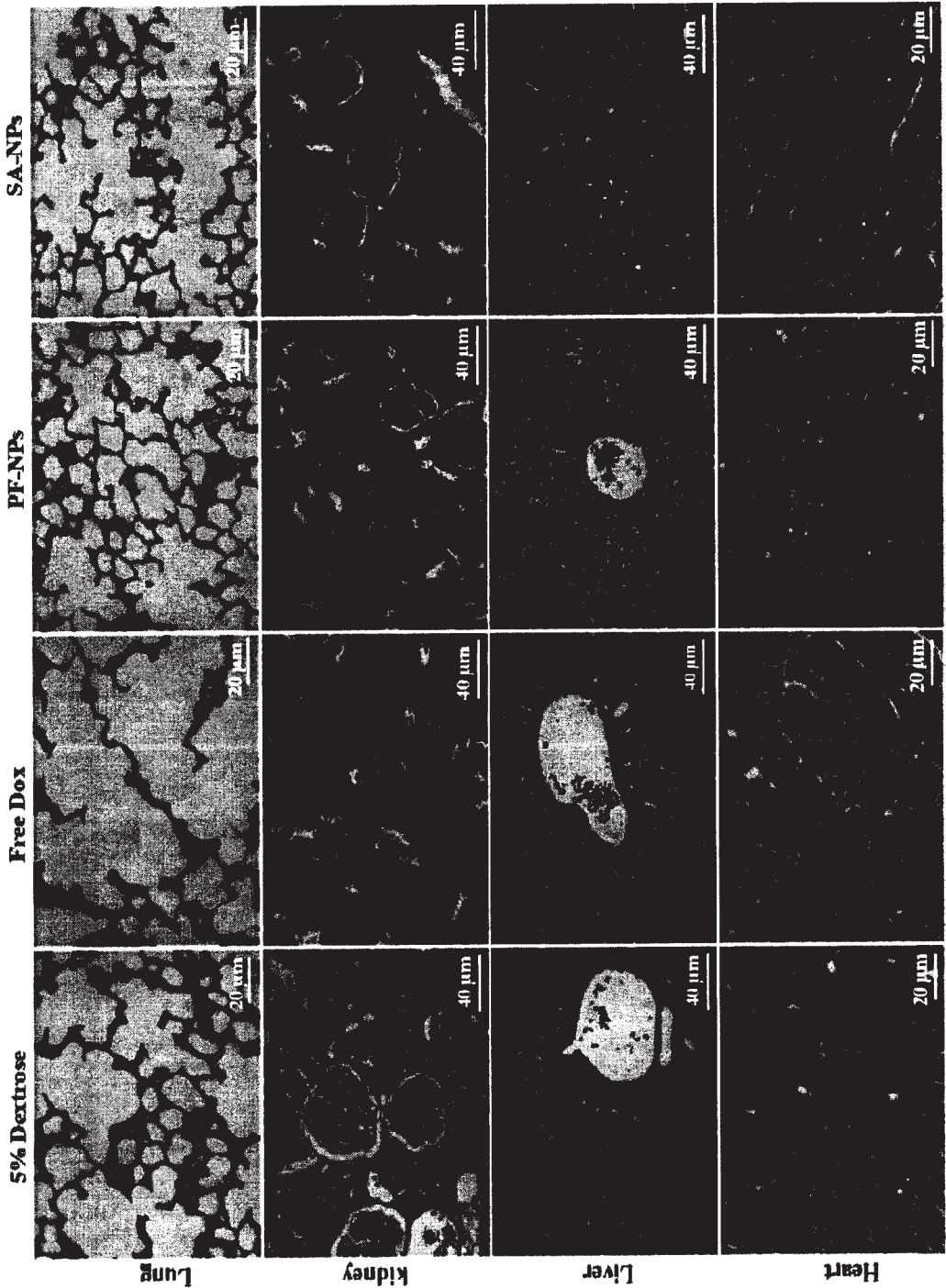


Figure 35

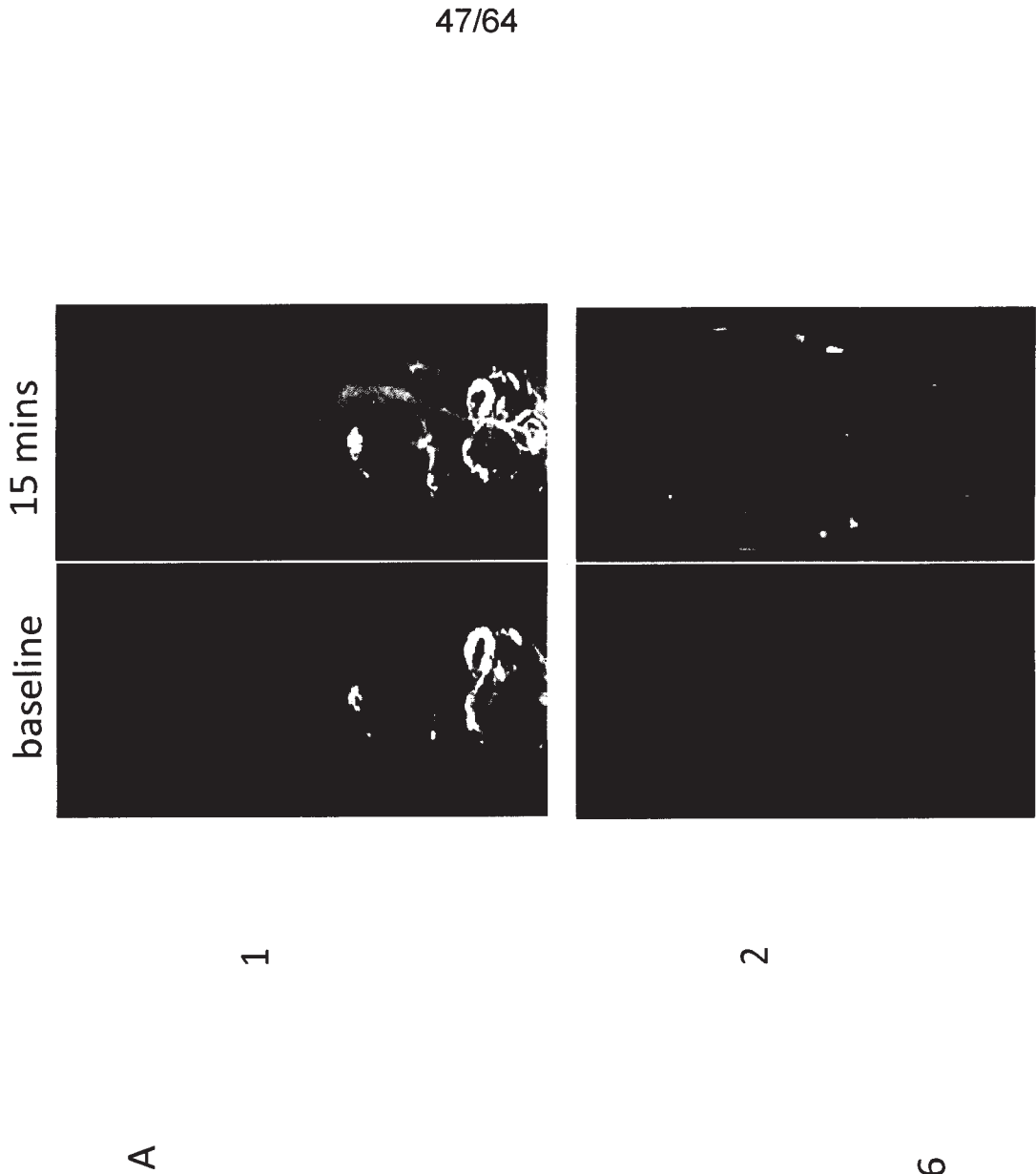


Figure 36

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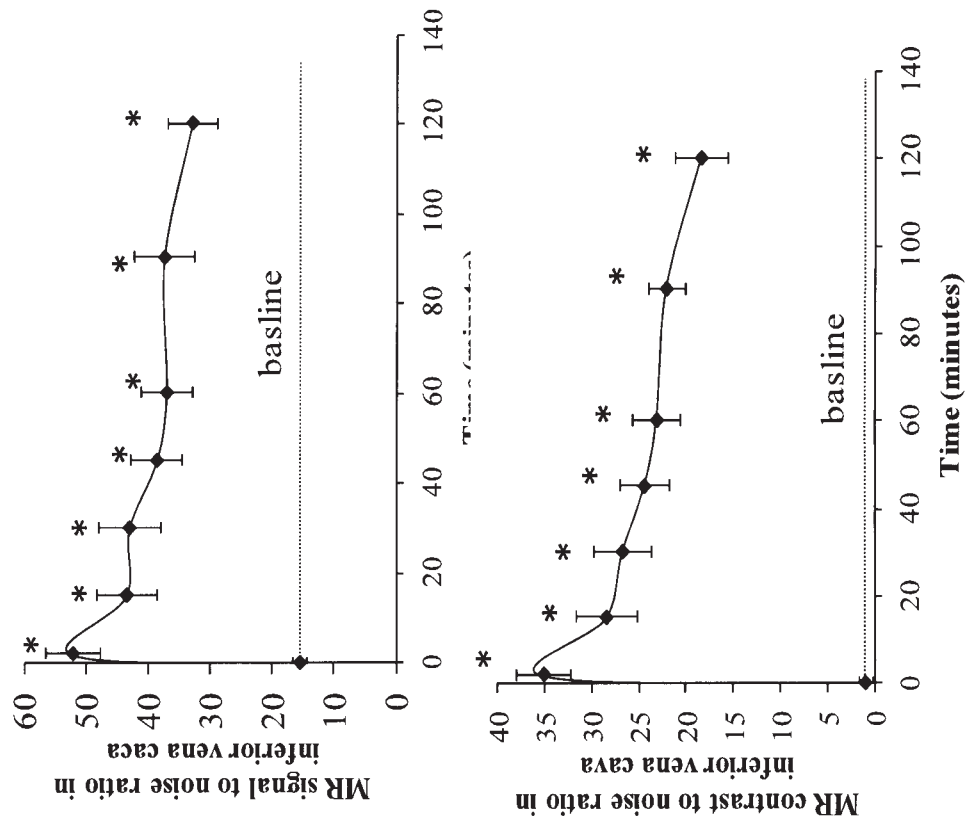


Figure 36

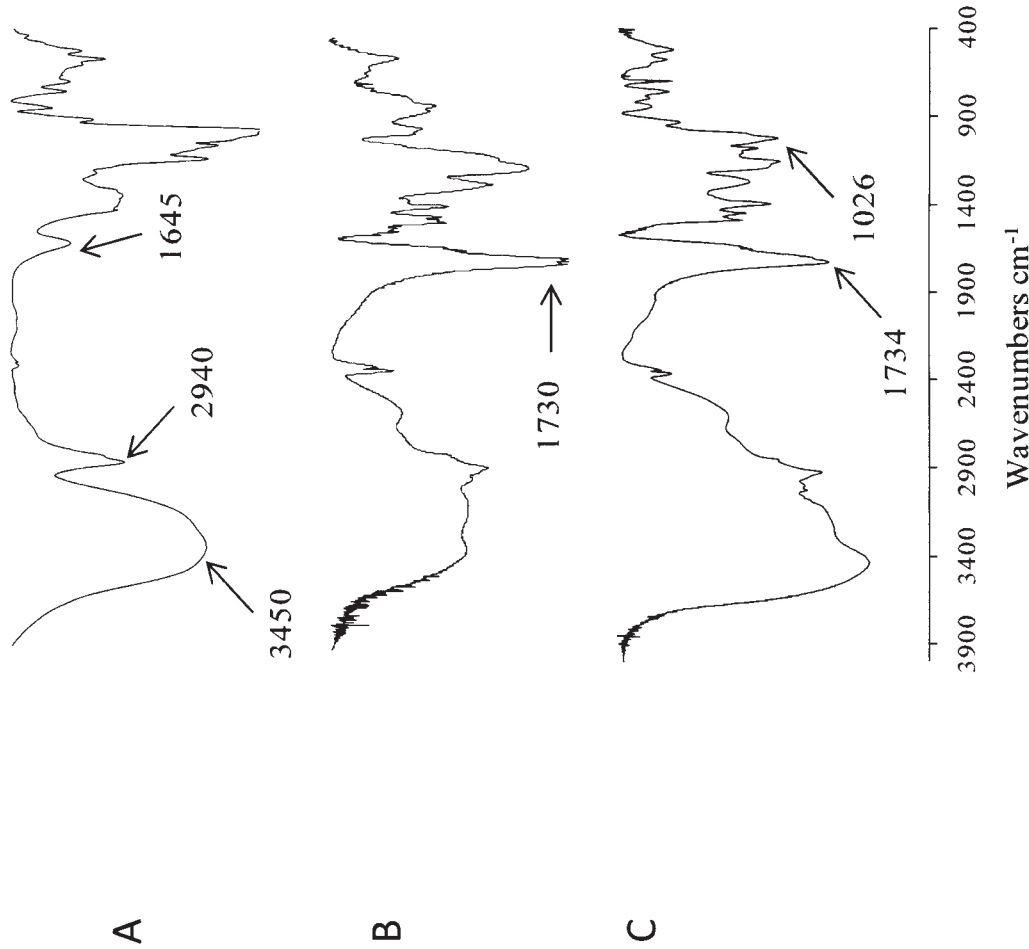
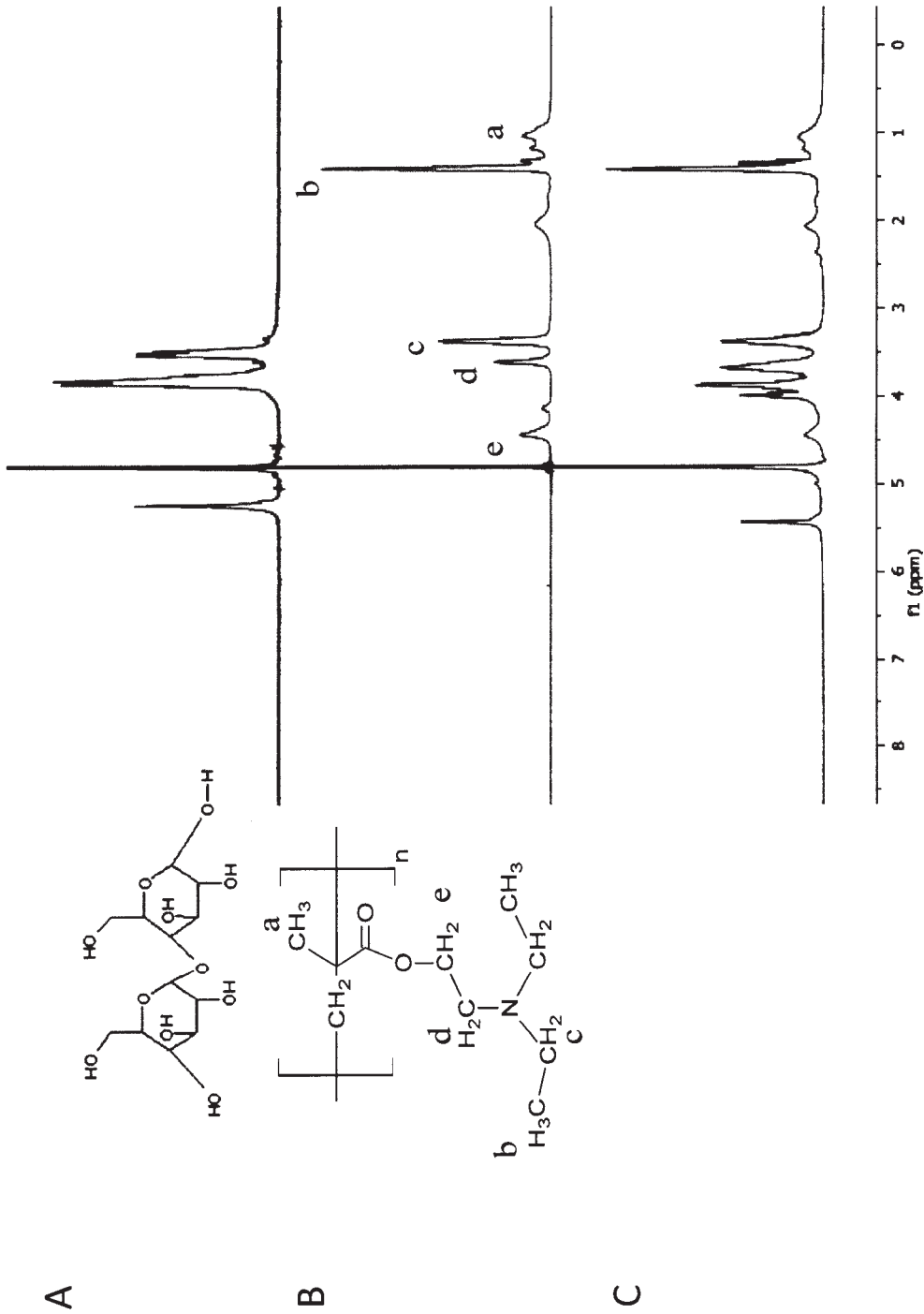


Figure 37

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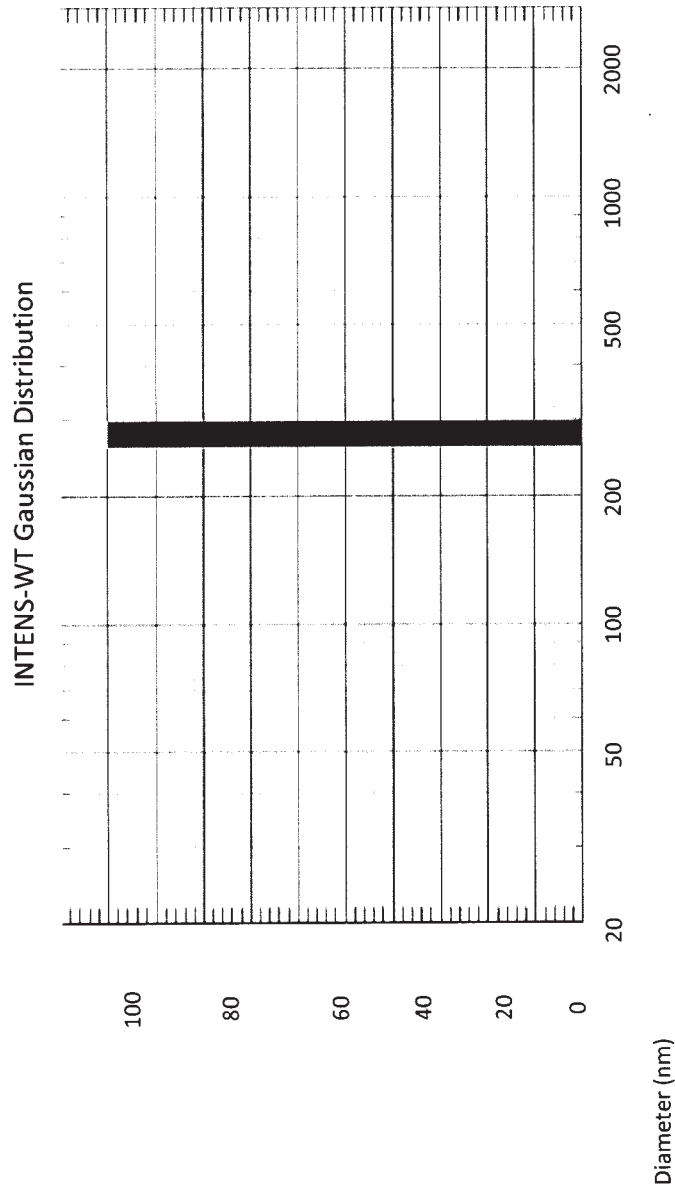


Figure 39

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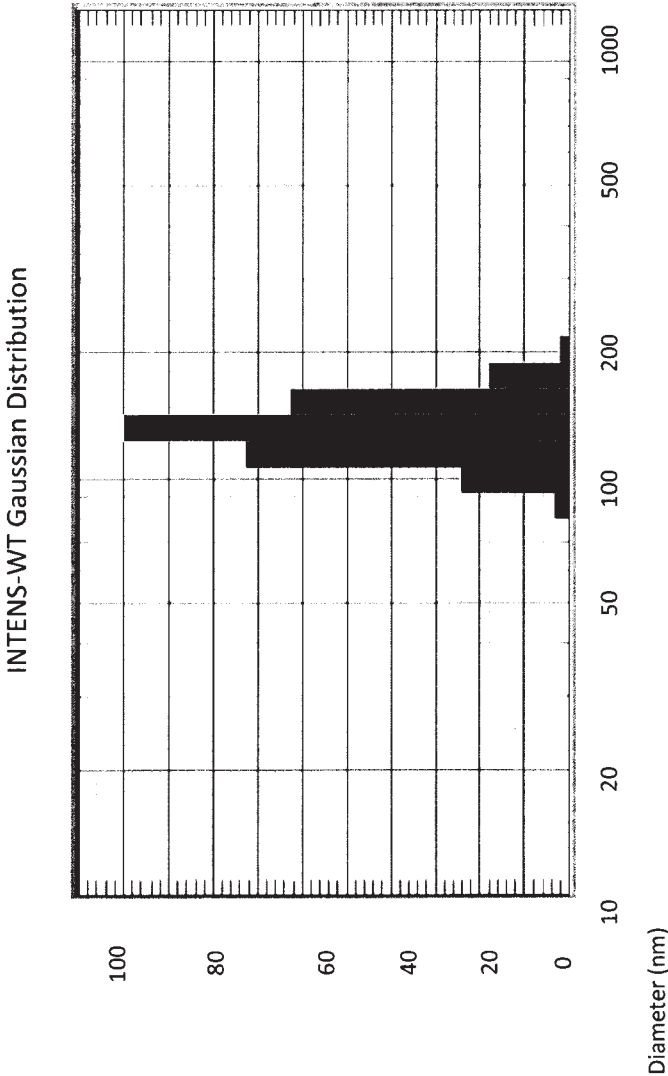


Figure 40

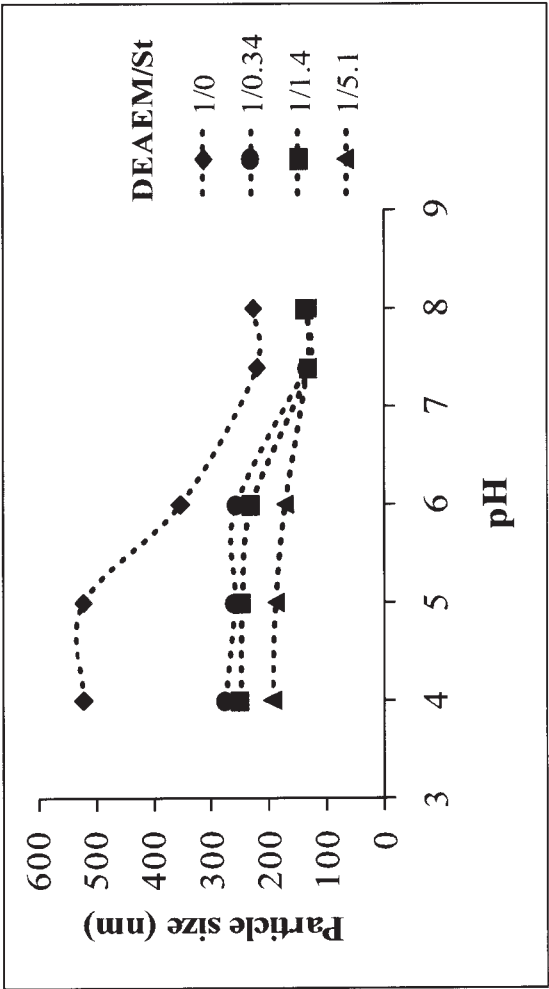


Figure 41

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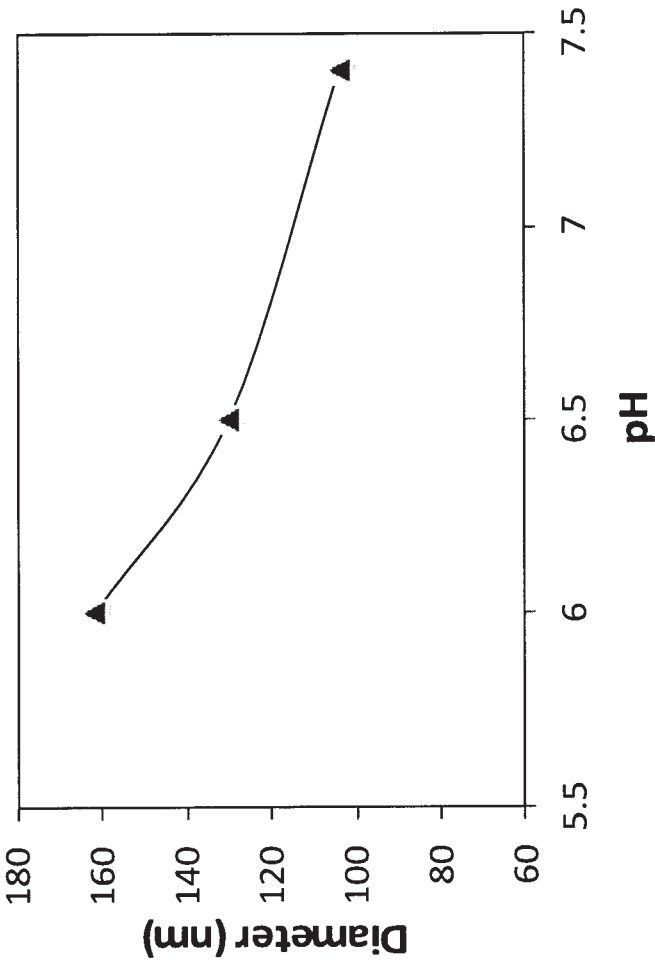
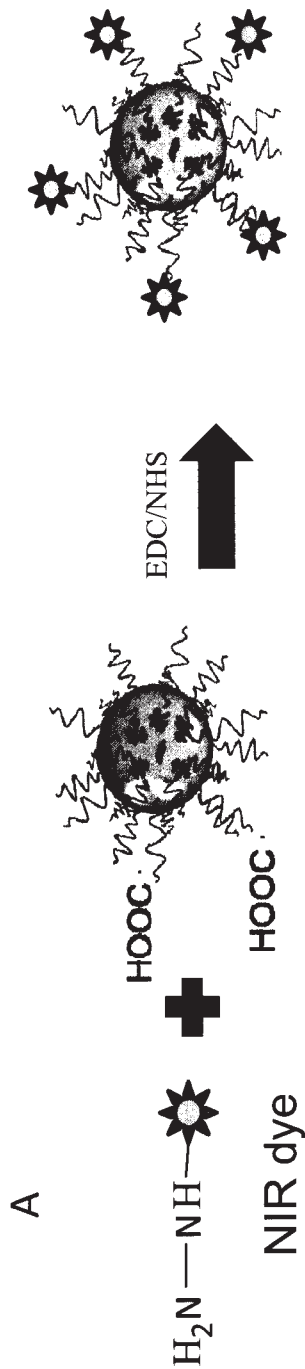
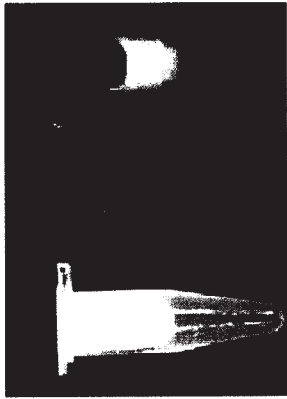


Figure 42



B



C Dye content: 4.3 $\mu\text{mol/g}$ NPs

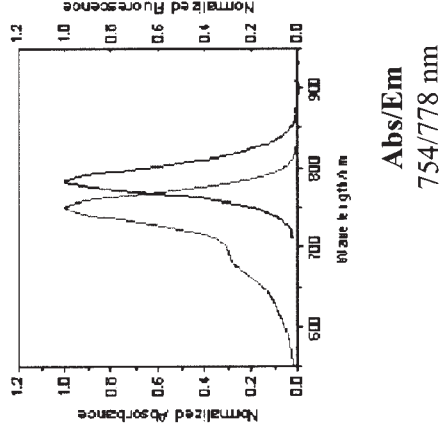


Figure 43

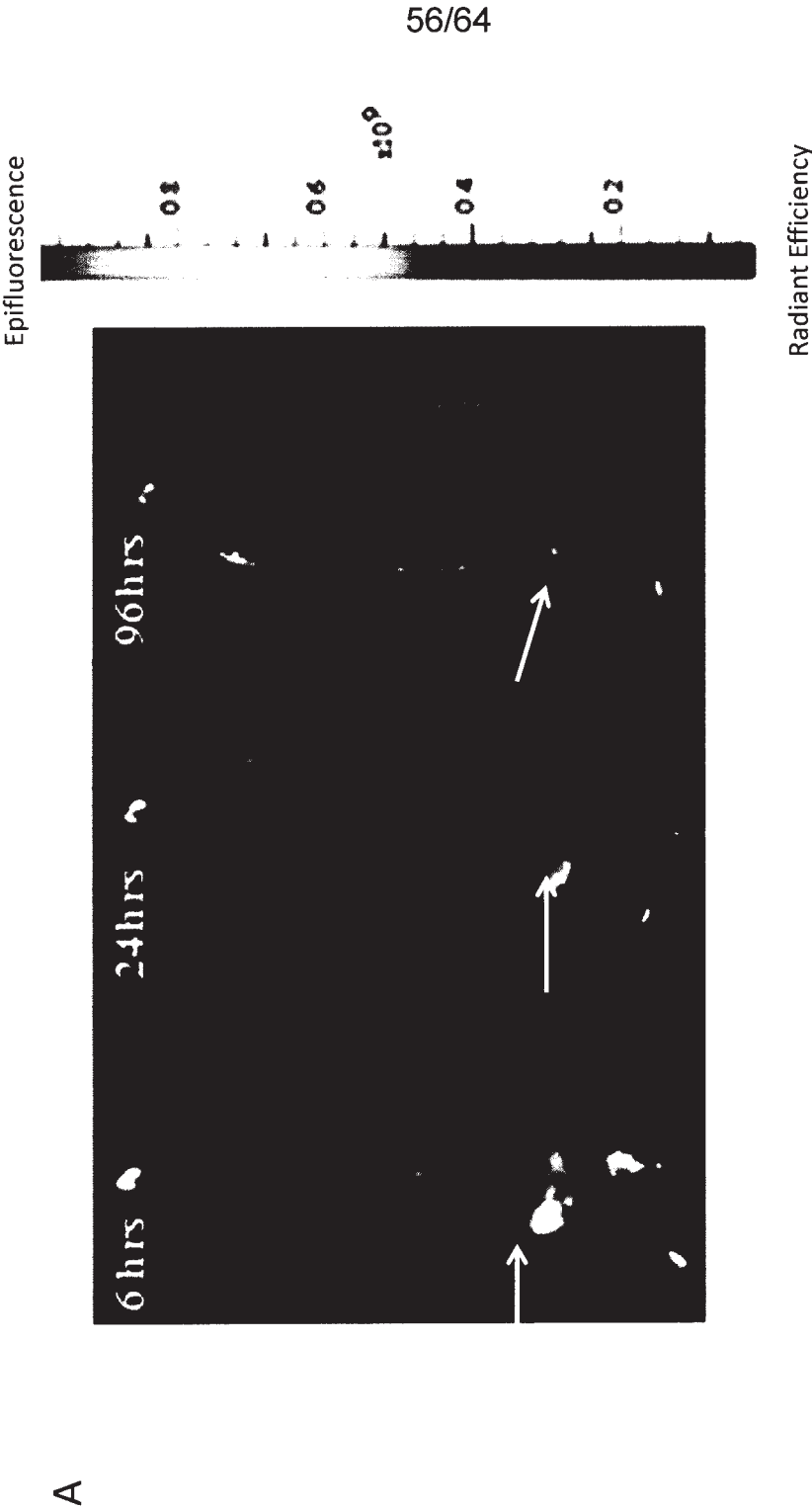


Figure 44

Sample code	Feed composition		Polymer composition* (molar ratio) MAA/PS 80/St	Grafting yield (GY %)
	St (mmol)	MAA (mmol)		
PMAA	0	28.0	1 / 0.0021 / 0	N/A
PMAA-g-St-1	4.9	23.1	1 / 0.0029 / 0.28	67
PMAA-g-St-2	9.6	18.4	1 / 0.0041 / 0.66	60
PMAA-g-St-3	12.0	16.0	1 / 0.0045 / 0.90	55
PMAA-g-St-4	18.0	10.0	1 / 0.011 / 2.12	52

Table 1

Sample code	Feed composition		Polymer composition*		MAA content** (mmol/g)	Reaction yield (RY %)
	MAA (mmol)	St (mmol)	(molar ratio)			
PMAA-PS 80	28.0	0	1 / 0.0075 / 0		8.34	50
PMAA-PS 80-g-St-1	23.1	4.9	1 / 0.015 / 0.34		6.23	67
PMAA-PS 80-g-St-2	18.4	9.6	1 / 0.019 / 0.66		4.58	60
PMAA-PS-80-g-St-3	16.0	12.0	1 / 0.024 / 0.86		3.36	55
PMAA-PS-80-g-St-4	10.0	18.0	1 / 0.039 / 2.16		2.01	52

KPS = 0.45 mmol, STS = 1.36 mmol, PS 80 = 0.57 mmol, SDS = 0.69 mmol, MBA = 3.2 mmol, water = 200 ml, Temp = 65 °C.
* calculated using ¹H NMR
** calculated using titration

Table 2

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Sample code	MAA : St		Size (nm)					PdI
	molar ratio (feed)		pH=4	pH=5	pH=6	pH=7.4	$V_{7.4}/V_4$	
'MAA	N/A		70.5 ± 0.4	88.2 ± 0.8	138.0 ± 1.0	152.2 ± 1.1	10.1	0.26
'MAA-g-St-1	4.7		110.4 ± 0.4	116.5 ± 1.4	180.9 ± 0.4	200.4 ± 0.9	6.0	0.14
'MAA-g-St-2	1.9		201.2 ± 0.5	223.8 ± 1.2	290.2 ± 21.5	298.4 ± 2.6	3.3	0.09
'MAA-g-St-3	1.3		229.0 ± 5.2	240.2 ± 1.9	297.1 ± 1.4	310.0 ± 3.1	2.48	0.11
'MAA-g-St-4	0.6		235.1 ± 3.4	237.7 ± 2.1	264.3 ± 4.0	271.7 ± 3.3	1.5	0.12

* ratio of particle diameter at pH = 7.4 to pH = 4 to the power of 3.

Table 3

Sample code	Feed MAA content (mmol/g)	Equivalent point (ml)	Product MAA content (mmol/g)	Zeta potential (mV)	
				pH=7.4	pH=4
PMAA	9.25	4.2	8.34	-41.7 ± 0.6	-31.5 ± 1.3
PMAA-g-St-1	6.92	3.1	6.23	-34.3 ± 0.9	-24.3 ± 0.8
PMAA-g-St-2	5.0	2.39	4.58	-33.0 ± 0.8	-19.5 ± 0.4
PMAA-g-St-3	4.10	1.7	3.36	-31.9 ± 0.7	-19.1 ± 0.2
PMAA-g-St-4	2.57	1.0	2.01	-15.6 ± 1.4	-2.7 ± 0.7

Table 4

Formulation	Gd content (wt%)	r_1 (mM ⁻¹ s ⁻¹)		Size (nm)	Zeta potential (mV)
		3T	7T		
Omniscan	26.7	4.04	3.9	N/A	N/A
St-DTPA-g-PMAA -LP	9.3	21.8	16.7	soluble	N/A
St-DTPA-g-PMAA -NP	17.2	29.2	23.1	205 ± 9	-28.5 ± 0.7

Table 5A

Formulation	Gd content (wt%)	Dox loading content (wt%)	r_1 (mM ⁻¹ s ⁻¹)		Molecular weight (kDa)	Particle size (nm)	Zeta potential (mV)
			3 T	7 T			
Omniscan®	26.7 ± 1.0	N/A	4.0 ± 0.1	3.9 ± 0.1	0.57	soluble	N/A
PolyGd	9.3 ± 0.7	N/A	21.8 ± 0.2	16.7 ± 0.3	47 ± 5 ^a	soluble	N/A
PolyGd-Dox	8.2 ± 0.5	10.1 ± 0.8	19.2 ± 0.7	13.5 ± 0.4	N/A	67 ± 10	-28 ± 5

Table 5B

Pharmacokinetic parameters	SA-NPs	PF-NPs
$t_{1/2}(\text{hr})$	92.5 ± 11.9	277.2 ± 33.3
$K_e(\text{hr}^{-1})$	0.0075 ± 0.0006	0.0025 ± 0.0003
$\text{AUC (p/sec/cm}^2\text{/sr)/(\mu\text{w/cm}^2\text{)/hr} \times 10^{10}$	8.03 ± 1.60	2.24 ± 0.50

Table 6

Sample Code	Feed Composition (mol/l)			Grafting Yield %
	Starch	DEAEM	EGDM	
PDEAEM	0	0.43	0.0026	N/A
PDEAEM-g-St-1	0.11	0.32	0.0026	25
PDEAEM-g-St-2	0.25	0.18	0.02	22
PDEAEM-g-St-3	0.36	0.07	0.02	16

Table 7