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Biodistribution and fate of core-labeled ^{125}I polymeric nanocarriers prepared by Flash NanoPrecipitation (FNP)

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Supplementary Information

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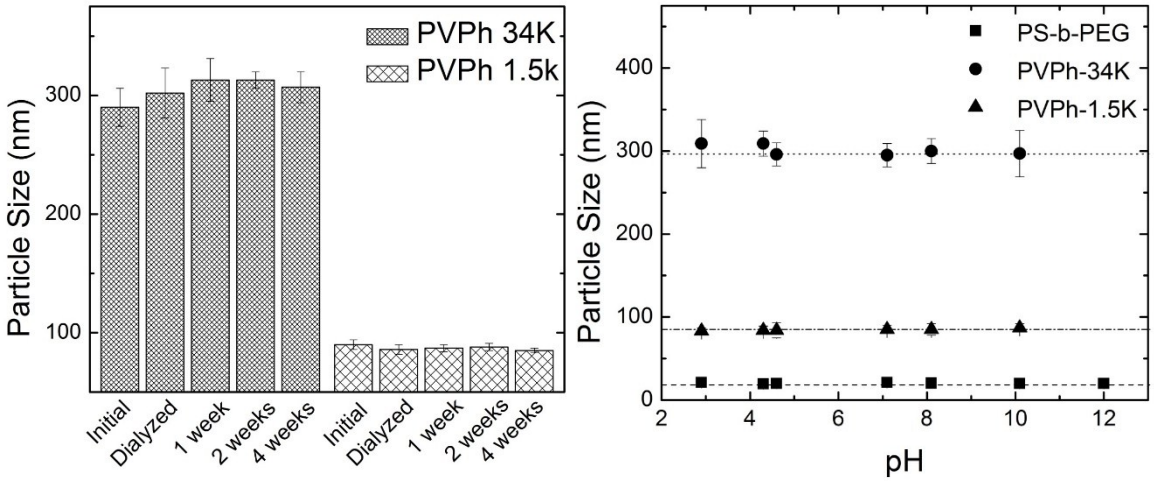
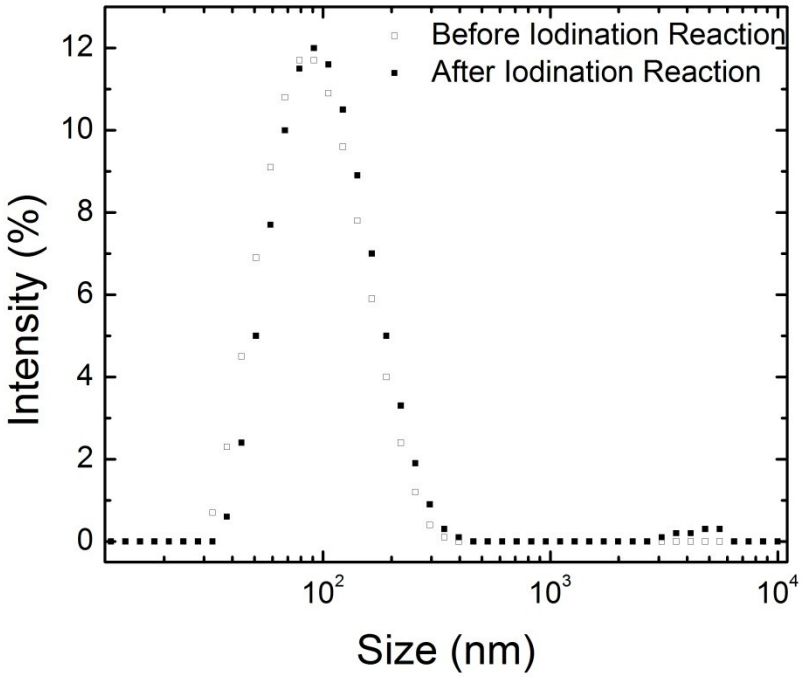
Supplementary Table 1. Comparison of circulation half-lives and biodistribution data at 24 h post-injection to previous studies. Some of the date was estimated according to the figures in the references.

Construct	HD (nm)	$t_{1/2\,\alpha}$ (h)	$t_{1/2\,\beta}$ (h)	Blood	Kidney	Liver	Spleen	Thyroid	Lung	Brain	Study
PEGylated [^{125}I]PVPh nanocarriers	110	2.9	34.9	18 ± 2* 31 ± 2[2]	5.2 ± 0.4* 1.8 ± 0.3	16 ± 2* 16.9 ± 0.8	10 ± 1* 1.2 ± 0.2	20 ± 18* 0.11 ± 0.09	8.0 ± 1.0* 1.5 ± 0.30	0.61 ± 0.090[1] 0.25 ± 0.05	
PEGylated [^{64}Cu]CuS nanocarriers	31.6	0.7	6.06	2%*	6*	22*	8*		4*	<0.5*	[31]*
PEGylated [^{64}Cu]PAA-*b*-PMA nanocarriers	20 ± 3			3.1 ± 0.3* 4.8 ± 0.2**	10.8 ± 1.1* 1.7 ± 0.1**	26.9 ± 3.9* 26.1 ± 1.0**	4.5 ± 0.6* 0.4 ± 0.1**		12.7 ± 0.8* 1.8 ± 0.1**		[52][3]
[^{64}C]PEGylated phospholipids with superparamagnetic iron oxide core	20.3 ± 1.9	2.38		1.01* 2**	6.2* 0.5**	31* 26**	18* 1**		5* <0.5**	~0* ~0**	[53]
PEGylated [^{125}I]PLA	150 ± 2			8.29 ± 1.13**	0.55 ± 0.07**	2.89 ± 0.14**	0.27 ± 0.05**	3.67 ± 1.67**	0.18 ± 0.02**	0.02 ± 0.01**	[54]
[^{125}I]Tyr-PEG-PDLLA micelles	38.9	0.24	18.8	25**	1.0**	8.0**	1.1**		0.4**		[55]
PEGylated [^{64}Cu]Au nanocarriers	27 ± 3.2			6*	4*	42*	200*		2*	<0.5*	[56][3]
PEGylated [^{111}In]Au nanoshells	37			5*	13.63 ± 1.98*	33.07 ± 3.40*	17.49 ± 4.55*		4*		[57][3]
PEGylated [^{64}Cu]Au nanocages	96 ± 12			1.5*	5*	60*	18*		4*		[58][3]
PEGylated [^{111}In]Au nanocarriers	45.4	0.49	22.5								[59]

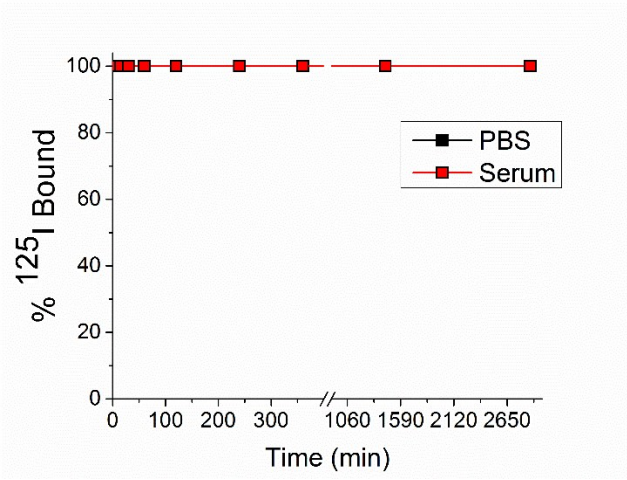
* % ID/g
** % ID
[3] tumor-bearing mice



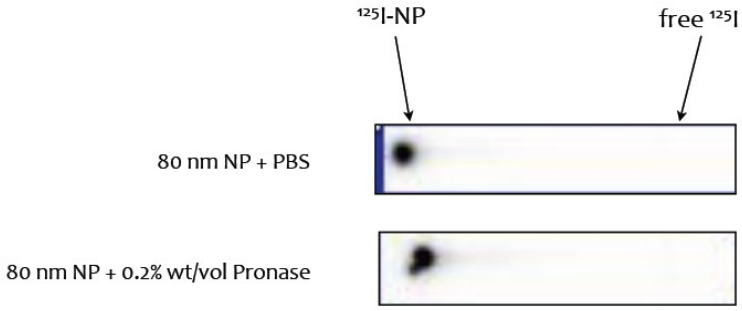
Supplementary Figure 1. Stability of nanocarriers loaded only with PVPh.



Supplementary Figure 2. DLS size distributions before and after iodination.



Supplementary Figure 3. Radiochemical stability of radiolabeled nanocarriers in PBS and human serum at 37 °C.



Supplementary Figure 4. Representative radio-TLC of radiolabeled nanocarriers in PBS and human serum at 37 °C. No evidence of free ^{125}I is observed indicating indicating the radiolabel is stable. The stability of the nanoparticle to Pronase digestion, and the complete stability of the radioactive assay in Fig. S3, indicates the tagged particle is stable for extended periods. The stable C-C bond of the polyvinylphenol polymer backbone does not present a degradation pathway. Twelve week fate studies in mice with similar C-C polystyrene nanoparticles showed no degradation of the particle or its polymer components. This is longer than the lifetime of the ^{125}I which might be used for imaging.

Supplementary Table 2. Biodistribution of radiolabeled nanocarriers in healthy mice reported as mean ± standard deviation % ID (n=3).

	5 min	**4 h**	**10 h**	**24 h**	**96 h**
Blood	90. ± 2	57 ± 5	43 ± 1	31 ± 2	7 ± 1
Bone	5.0 ± 1.0	5.0 ± 2.0	5.0 ± 1.0	8.0 ± 1.0	4.9 ± 0.03
Brain	0.43 ± 0.02	0.50 ± 0.15	0.30 ± 0.08	0.25 ± 0.05	0.075 ± 0.01
Heart	0.44 ± 0.01	0.40 ± 0.05	0.37 ± 0.05	0.32 ± 0.04	0.18 ± 0.01
Kidney	2.0 ± 1.0	2.0 ± 0.03	2.3 ± 0.3	1.8 ± 0.3	1.3 ± 0.2
Liver	13 ± 1	14 ± 0.4	15 ± 0.8	17 ± 0.8	19 ± 0.7
Lung	3.4 ± 0.8	2.5 ± 0.3	1.6 ± 0.06	1.5 ± 0.3	0.70 ± 0.10
Spleen	0.70 ± 0.20	1.0 ± 0.3	1.1 ± 0.2	1.2 ± 0.2	1.4 ± 0.08
Thyroid	0.10 ± 0.0	0.090 ± 0.02	0.20 ± 0.2	0.11 ± 0.09	0.16 ± 0.05

Supplementary Table 3. Biodistribution of radiolabeled nanocarriers in healthy mice reported as mean ± standard deviation % ID/g (n=3).

	5 min	**4 h**	**10 h**	**24 h**	**96 h**
Blood	53 ± 6	40. ± 2	28 ± 2	18 ± 2	4.8 ± 0.7
Bone	1.6 ± 0.4	1.9 ± 0.7	1.6 ± 0.5	2.2 ± 0.5	1.6 ± 0.03
Brain	1.3 ± 0.02	1.3 ± 0.3	0.7 ± 0.2	0.61 ± 0.09	0.18 ± 0.02
Heart	4.6 ± 0.5	4.4 ± 0.2	3.8 ± 0.5	3.1 ± 0.3	1.8 ± 0.08
Kidney	7.2 ± 0.7	7.1 ± 0.8	7.0 ± 1.0	5.2 ± 0.4	3.8 ± 0.3
Liver	11 ± 0.7	14 ± 0.7	16 ± 2	16 ± 2	20. ± 0.5
Lung	20. ± 3	15 ± 0.6	12 ± 1	8.0 ± 1	3.7 ± 0.4
Spleen	5.2 ± 0.9	9.0 ± 2.0	9.5 ± 0.8	10. ± 1	12 ± 2