SUPPORTING INFORMATION for

Gold-Loaded Polymeric Micelles for Computed Tomography–Guided Radiation Therapy Treatment and Radiosensitization

Ajlan Al Zaki[1], Daniel Joh[2], Zhiliang Cheng[1], André Luís Branco De Barros[1], Gary Kao[2], Jay Dorsey[2], Andrew Tsourkas[1,*]

[1]*Department of Bioengineering, School of Engineering and Applied Sciences, University of Pennsylvania, Philadelphia PA, 19104 USA*

[2]*Department of Radiation Oncology, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA 19104.*

SUPPLEMENTARY TABLES:

Table S1. Summary of GPM physical-chemical properties

Hydrodynamic Diameter (nm)	Core Size (nm)	Polydispersity Index	Zeta potential (mV)
30.9 ± 2.4	26.8 ± 10.4	0.088	-1.34 ± 0.17
57 ± 5.7	39.5 ± 10.3	0.063	-1.01 ± .05
78.6 ± 3.8	54.8 ± 7.1	0.05	-0.95 ± 0.3
97.8 ± 3.4	70.4 ± 16.8	.049	-1.17 ± 0.04
130.2 ± 2.7	106.3 ± 11.5	0.042	-1.5± 0.23
153.8 ± 6.3	115.2 ± 20.3	.055	-1.62 ± 0.85

Table S2. Biodistribution of GPM in mice at 48 hrs and 1-week post-injection.

Organs	%ID (48 hr)	%ID/g (48 hr)	%ID (1 week)	%ID/g (1 week)
Heart	0.1 ± 0.02	1.1 ± 0.2	0.05 ± 0.004	0.4 ± 0.01
Kidney	0.7 ± 0.1	1.9 ± 0.2	0.4 ± 0.01	1.1 ± 0.1
Lungs	0.4 ± 0.1	2.6 ± 0.7	0.04 ± 0.005	0.3 ± 0.01
Spleen	11.6 ± 0.3	104.3 ± 14.6	6.3 ± 0.6	61.9 ± 5.2
Liver	17.6 ± 1.8	13.9 ± 0.4	12.6 ± 1.0	10.0 ± 0.5
Feces	2.0 ± 0.06	0.6 ± 0.02	0.64 ± 0.04	0.19 ± 0.01
Urine	Not determined	0.006 ± 0.001	Not determined	0.002 ± 0.000

Table S3. Serum clinical chemistry of mice (n=3) injected with 650 mg Au/kg GPMs and sampled at 24 hours and 1 week compared with mice sham injected with phosphate buffered saline.

	BUN	Albumin	ALT	AST	Alk. Phos.	GGT
GPMs-Day 1	24.3 ± 3.9	2.4 ± 0.1	157.7 ± 111.7	377 ± 146.5	114 ± 7.1	5.3 ± 0.3
Control-Day 1	25 ± 2.1	2.4 ± 0.1	180 ± 89.3	337 ± 122.1	129.7 ± 11.8	9 ± 1.5
GPMs-Day 7	30.3 ± 3.5	2.4 ± 0.3	93 ± 29.5	245.3 ± 102.9	62.3 ± 2.9	12.7 ± 3.9
Control-Day 7	20 ± 2.6	2.3 ± 0.2	139 ± 4.4	267.3 ± 78.1	68.7 ± 10.7	23.1 ± 13.3

	Total Bil.	Cholesterol	Calcium	Creatinine	Glucose	Phosphorus
GPMs-Day 1	0.5 ± 0.2	99.3 ± 9.8	8.9 ± 0.4	0.2 ± 0.0	168.7 ± 24.5	8.5 ± 0.3
Control-Day 1	1.1 ± 0.0	91.3 ± 2.7	8.6 ± 0.4	0.2 ± 0.0	195.7 ± 34.1	10 ± 0.4
GPMs-Day 7	0.9 ± 0.6	77.3 ± 5	8.8 ± 0.1	0.2 ± 0.1	279.7 ± 10.3	7.7 ± 0.5
Control-Day 7	1.5 ± 0.9	180 ± 45	9.1 ± 0.6	0.1 ± 0.0	195.7 ± 34.1	8.6 ± 1.6

SUPPLEMENTARY FIGURES:

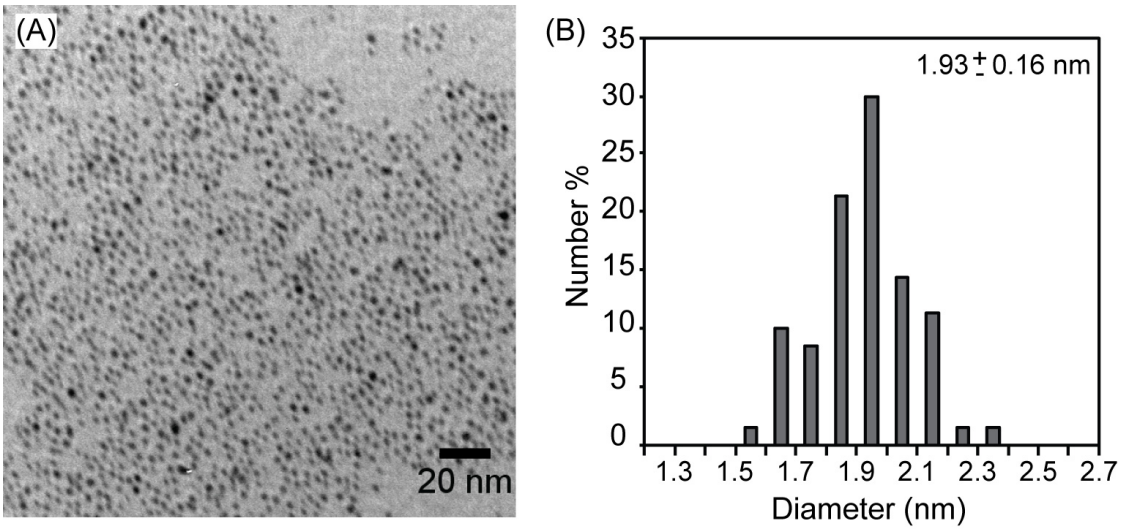

Figure S1. (A) Transmission electron micrograph of 1.9 nm AuNPs. Scale bar is 20nm. (B) Core size distribution of 1.9 nm AuNPs. The mean size and standard deviation is shown.

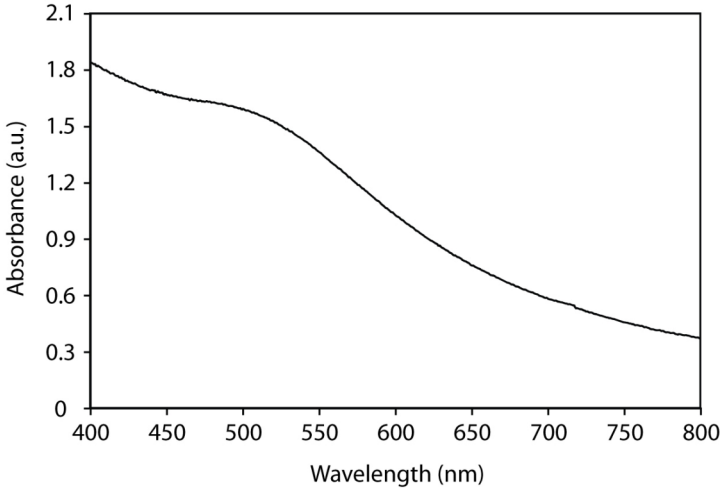

Figure S2. UV-vis absorption spectrum of 1.9 nm AuNPs with a broad surface plasmon resonance ranging from 490 nm – 510 nm

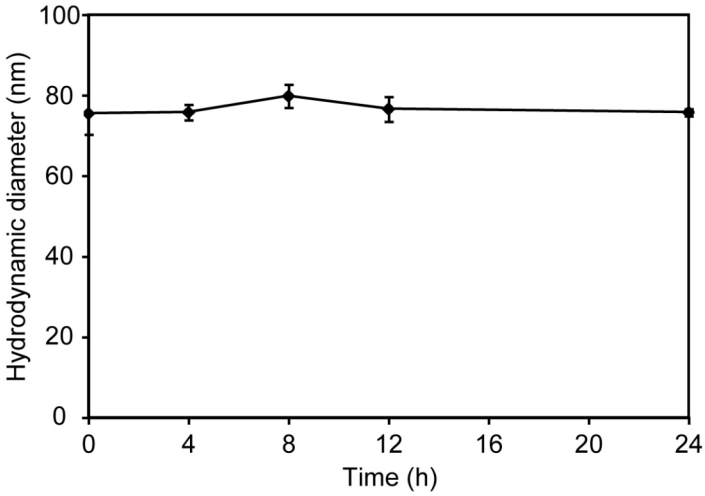

Figure S3. Mean hydrodynamic diameter of GPMs in fetal bovine serum as determined by dynamic light scattering. GPMs were incubated at 37°C and the hydrodynamic diameter was measured over the course of 24 hours.

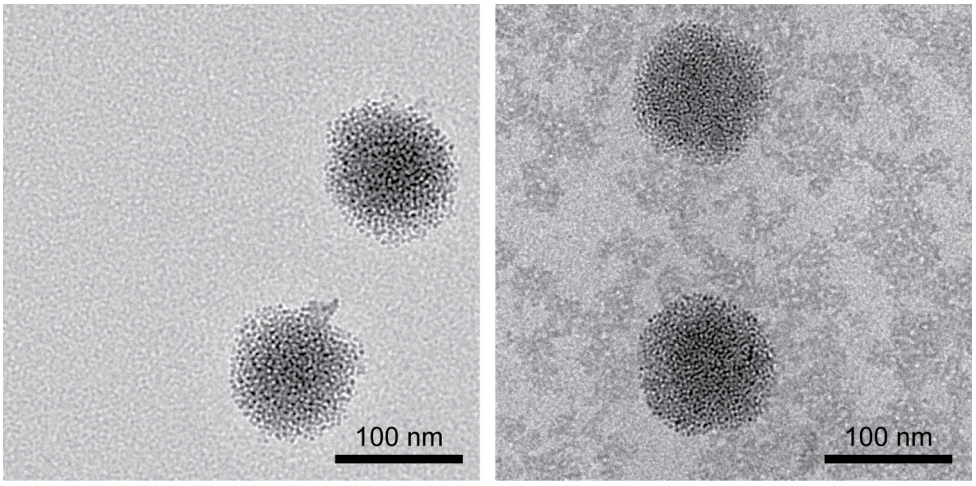

Figure S4. Transmission Electron Microscopy image of GPMs in PBS (left) and after a 24 hour incubation in serum at 37°C.

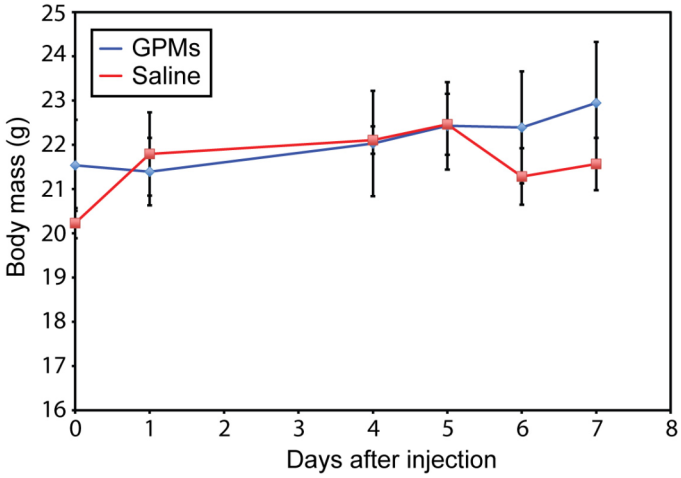

Figure S5. Whole animal weights of tumor-free mice treated with 650 mg Au/kg GPMs compared with mice sham injected with phosphate buffered saline. Data reflect average weights (n = 3) for each group.

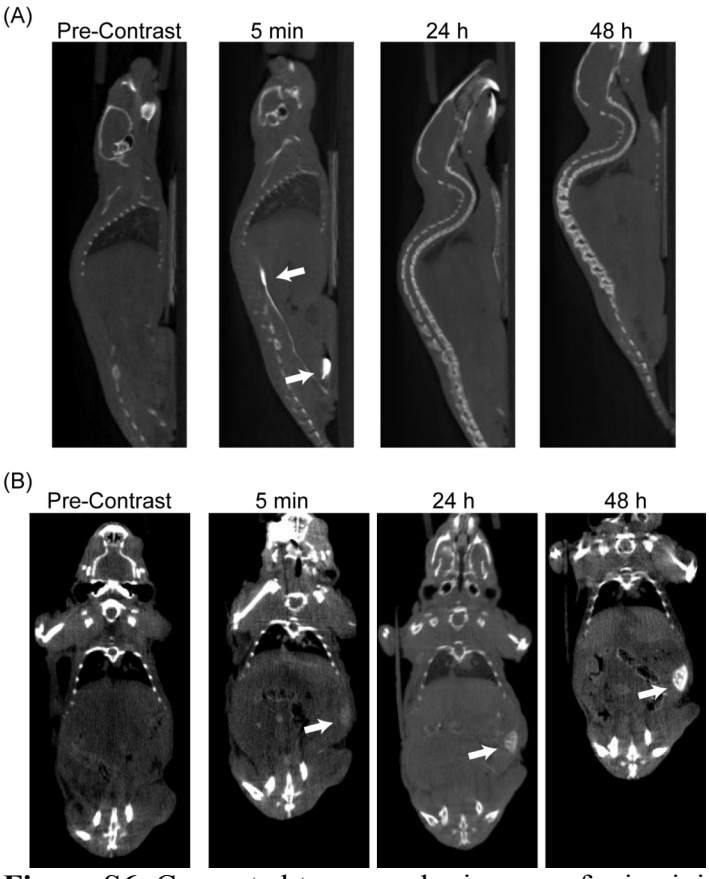

Figure S6. Computed tomography images of mice injected with AuroVist™ or GPMs. (A) The kidneys, ureter and bladder (arrows) are enhanced during early imaging time points following the injection of AuroVist™, but no contrast is evident at 24 h or 48 h, consistent with renal clearance. (B) The spleen (arrows) is observed as early as 5 min post-injection of GPMs and contrast continues to increase over the next 48 h, indicative of RES uptake.

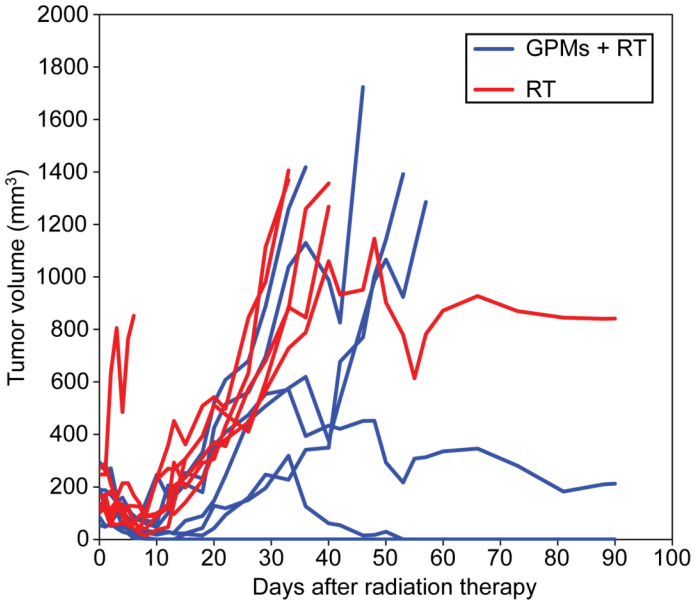

Figure S7. Tumor growth curves of mice receiving GPMs and radiation therapy (blue) or radiation therapy alone (red).