Supporting information

Bioinspired synthesis of gadolinium-based hybrid nanoparticles as MRI blood pool contrast agents with high relaxivity

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Supplementary Movie. MRA data set showing the aortic arch and the carotid arteries of a mouse. The movie consists of 36 individual images representing MIP views from different (equally spaced) angles. Reconstruction was performed using the General Electric Advantage Workstation 4.3. TR = 11.3 ms, TE = 2.1 ms, flip angle = 15°, FOV =8× 5.6cm2, matrix = 160 × 128.

Supplementary Figures and tables

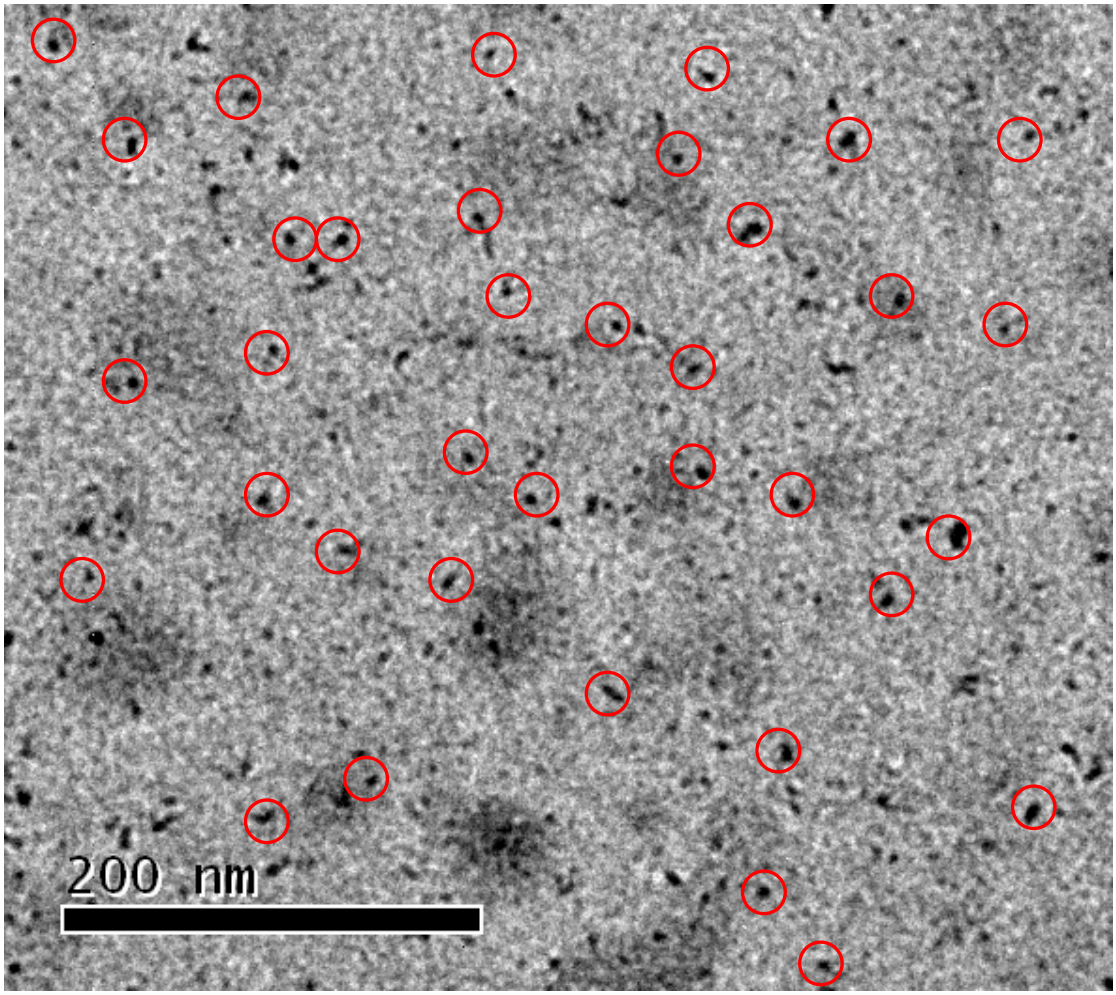


Fig. S1. TEM image of as-prepared GH nanoparticles indicated by the red circles. [1]

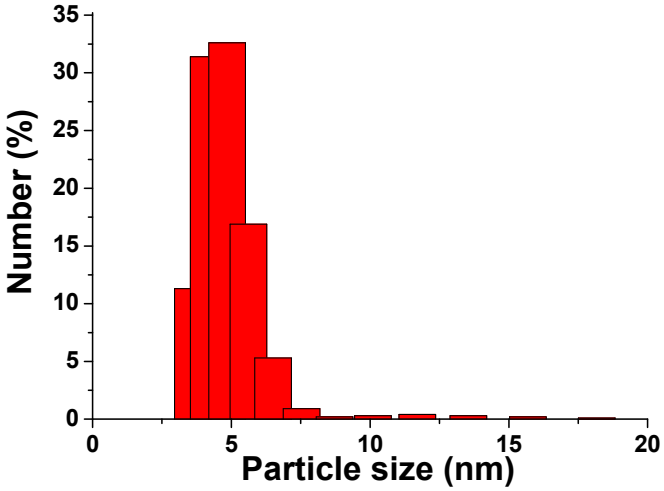
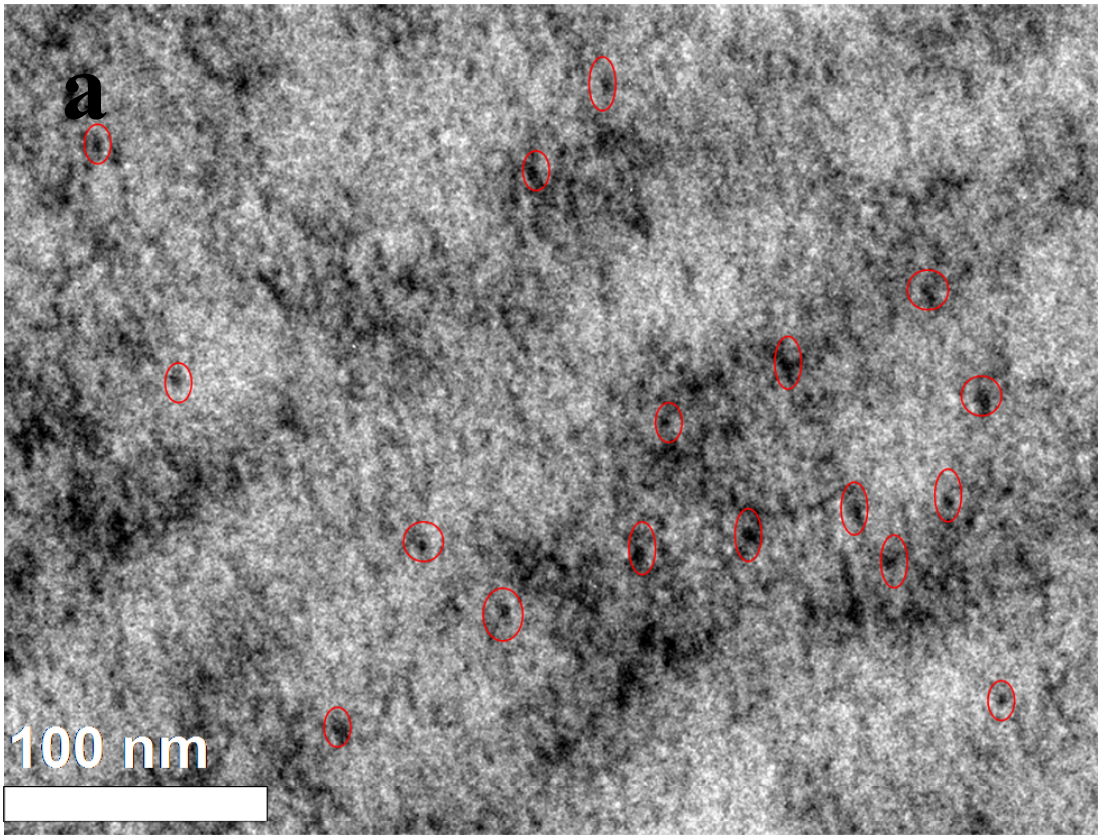


Fig. S2. Hydrodynamic diameter distribution of the GH nanoparticles.



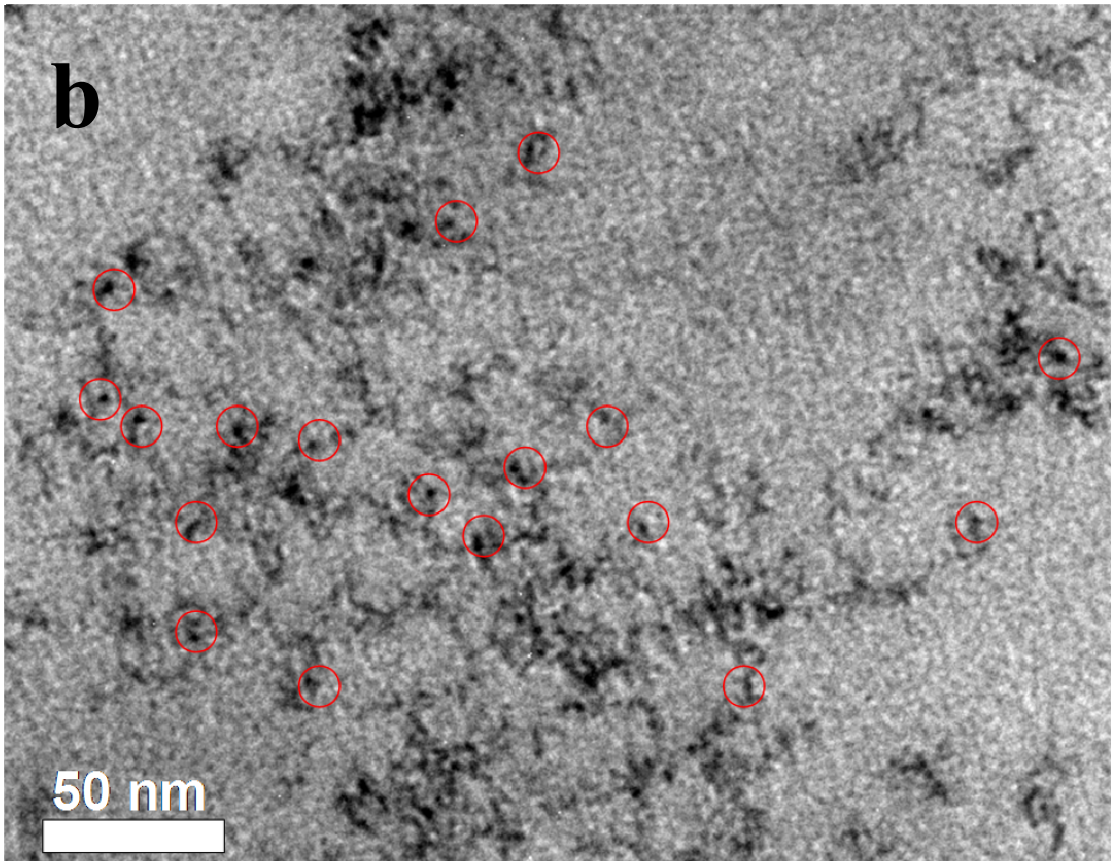


Fig. S3. TEM images showing the good colloidal and chemical stability of the GH nanoparticles (indicated by red circles) with serum. (a) incubated with serum for 24 hours at 37 ℃, and (b) incubated with serum for 25 days at 4 ℃.[1]

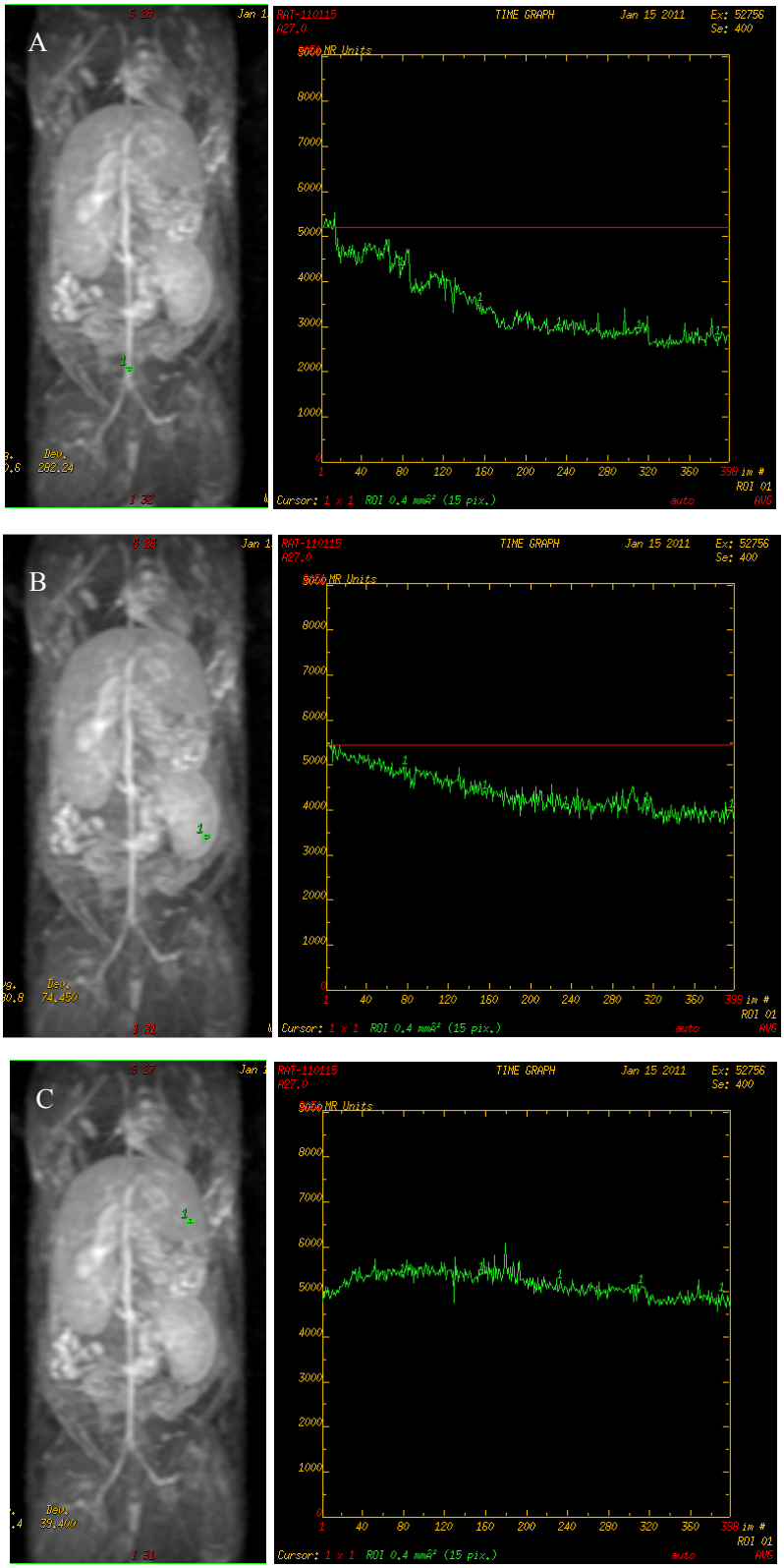


Fig. S4. A-C shows the dynamic process of the MR signal transformation in the abdominal aorta (A), kidney (B) and liver (C) after post-injection from 0-240 minutes.

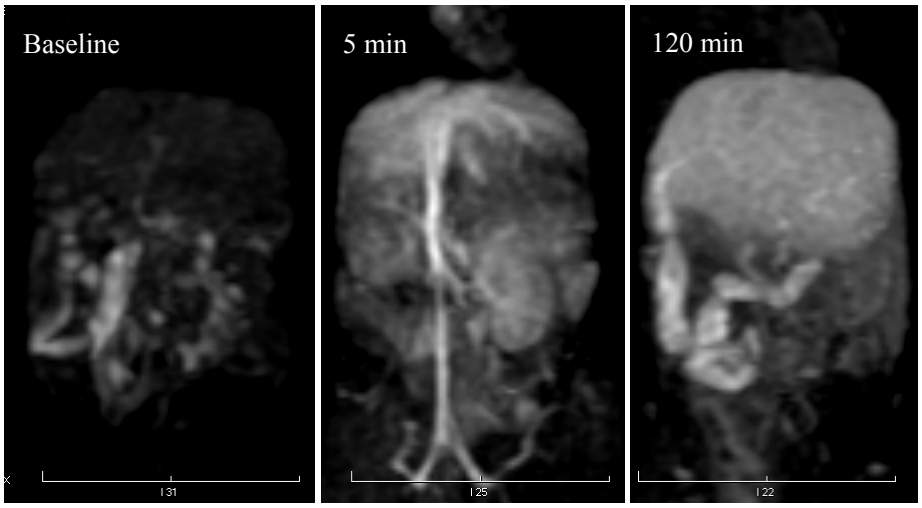


Fig. S5. MIPs from the 3D images acquired from the mouse intravenous- injected with GH nanoparticles; image is taken at baseline followed by the images at 5 and 120 minutes after intravenous injection.

Table S1. Chemical and Physical Properties of Various CAs

CA	composition	r_1 ($mM^{-1}s^{-1}$)	r_2 ($mM^{-1}s^{-1}$)	Application
Magnevist	Gd	3.8[b]	4.6[b]	Extracellular CAs
Resovist [2]	$Fe_2O_3 + Fe_3O_4$	25.4[b]	151.0[b]	Liver-Specific
Vasovist	Gd	20.0[c]	N/A	Blood Pool CAs
$Gd(BDC)_{1.5}(H2O)_2$ [3]	Gd	35.8[d]	55.6[d]	N/A
USPIO[a] [4]	Fe_2O_3	21.6[b]	44.1[b]	Blood Pool CAs
SPGO [5]	Gd_2O_3	4.8[e]	16.9[e]	N/A
PGP/dextran-K01[6]	$GdPO_4$	13.9[b]	15.0[b]	N/A
Hybrid Gadolinium Oxide Nanoparticles[7]	Gd_2O_3	8.8[f]	11.4[f]	Blood Pool CAs
Au@GdL[8]	Gd	20.1[c]	29.4[c]	Blood Pool and lymph node CAs
HA–(EDA–DTPA–Gd) [9]	Gd	5.0[g]	N/A	Blood Pool CAs
$Gd(OH)_3 \bullet Gd_2O_3$/BSA	**$Gd(OH)_3$+Gd_2O_3**	**15.0[c]**	**19.7[c]**	**Blood Pool and Liver-Specific CAs**

[a] USPIO was prepared from ferumoxides. [b] The relaxivity data were measured at 0.47 T. [c] The relaxivity data were measured at 1.5 T. [d] The relaxivity data were

measured at 3.0 T. [e] The relaxivity data were measured at 7.05 T. [f] The relaxivity data were measured at 7.0 T. [g] The relaxivity data were measured at 9.4 T.

References and Notes

1. The TEM photos were taken at high concentration of protein, which makes the background signals are high.

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