SUPPORTING INFORMATION to

Activatable Magnetic Resonance Nanosensor as a Potential Imaging Agent for Detecting and Discriminating Thrombosis

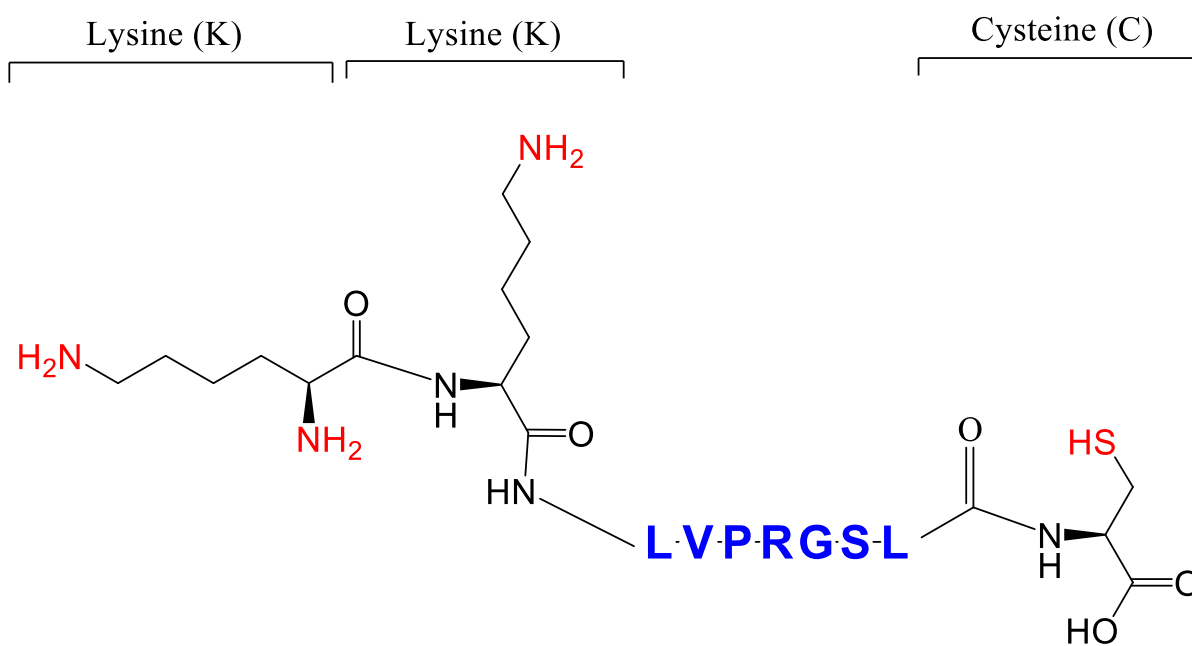**Supplementary Figures**

Figure S1: Thrombin-cleavable peptide (ThrPep) – KKLVPRGSLC
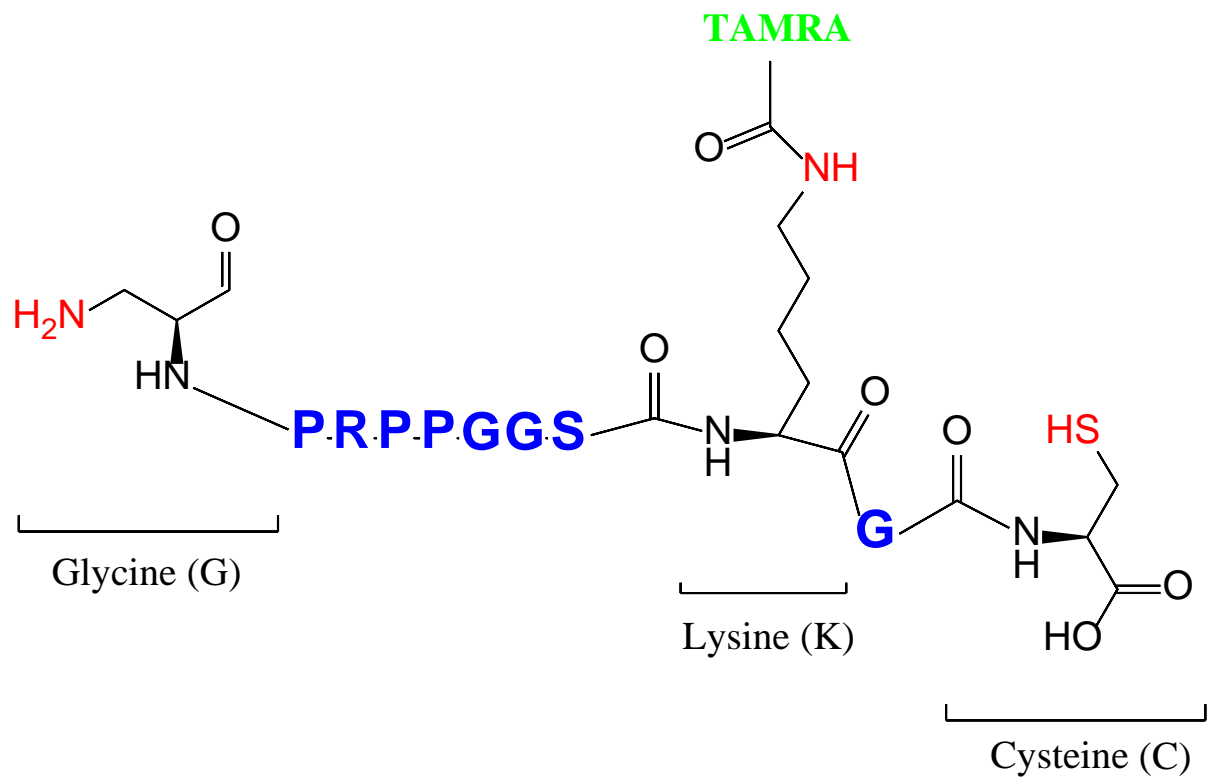
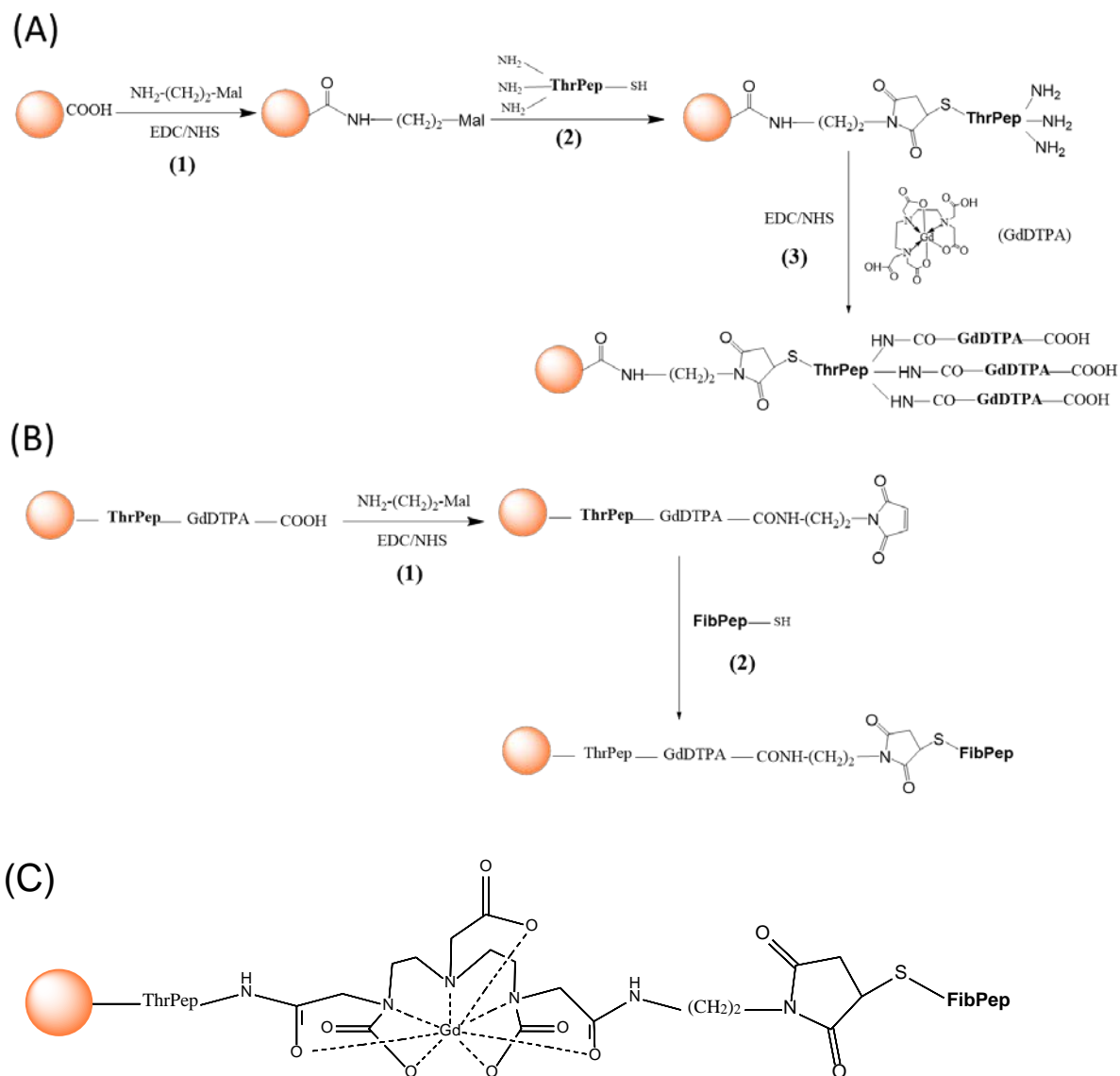**Figure S2:** Fibrin binding peptide (FibPep): GPRPPGGS{Lys(TMR)}GC.

Figure S3: Image illustrating the synthesis of the nanosensor. **(A)** Conjugation steps to prepare the nanosensor. The protocol including (1) the introduction of maleimide functional group to IONC surface via carbodiimide reaction, carboxyl activation using EDC and NHS; (2) the attachment of ThrPep to IONC surface via maleimide-thiol reaction; and (3) the introduction of Gd-DTPA layer via carbodiimide reaction. Each ThrPep was loaded with a mximum of three Gd-DTPA. **(B)** Conjugation steps to label the nanosensor with the binding peptide FibPep. The protocol including (1) the introduction of maleimide functional group to nanosensor surface via carbodiimide reaction, carboxyl activation using EDC and NHS; and (2) the attachment of

FibPep to the nanosensor via maleimide-thiol reaction. **(C)** Chemical structure of the nanosensor. ThrPep: thrombin-cleavable peptide. FibPep: fibrin-binding peptide.

(A)

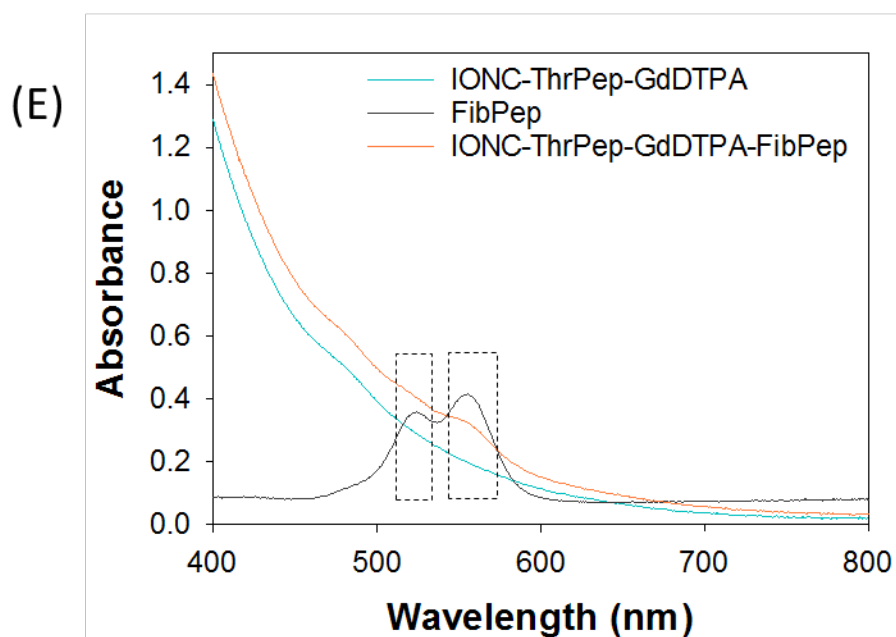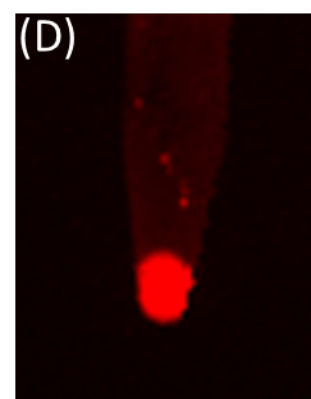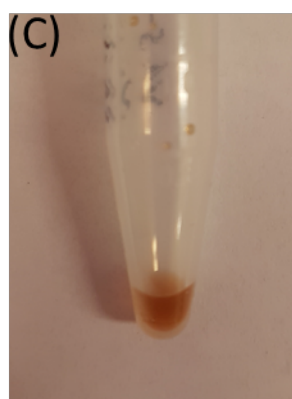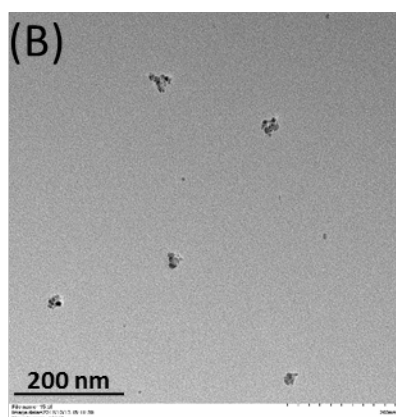| Hydrodynamic size and zeta potential of nanoparticles			
Sample	**Z-average**	**PDI**	**Zeta potential**
Bare iron oxide nanocluster (IONC)	103.2 ± 2.1	0.255 ± 0.016	-44.5 ± 1.4
IONC-ThrPep-GdDTPA	134.1 ± 1.5	0.314 ± 0.034	-36.7 ± 0.9
IONC-ThrPep-GdDTPA-FibPep	170.0 ± 1.9	0.269 ± 0.006	-29.1 ± 0.7

Figure S4: Characteristics of the nanosensors. **(A)** Hydrodynamic size and zeta potential of the nanoparticles. **(B)** TEM image of the FibPep-nanosensor. **(C)** Color image of the FibPep-nanosensor. **(D)** Fluorescence image of the FibPep-nanosensor. **(E)** UV-Vis Spectra.
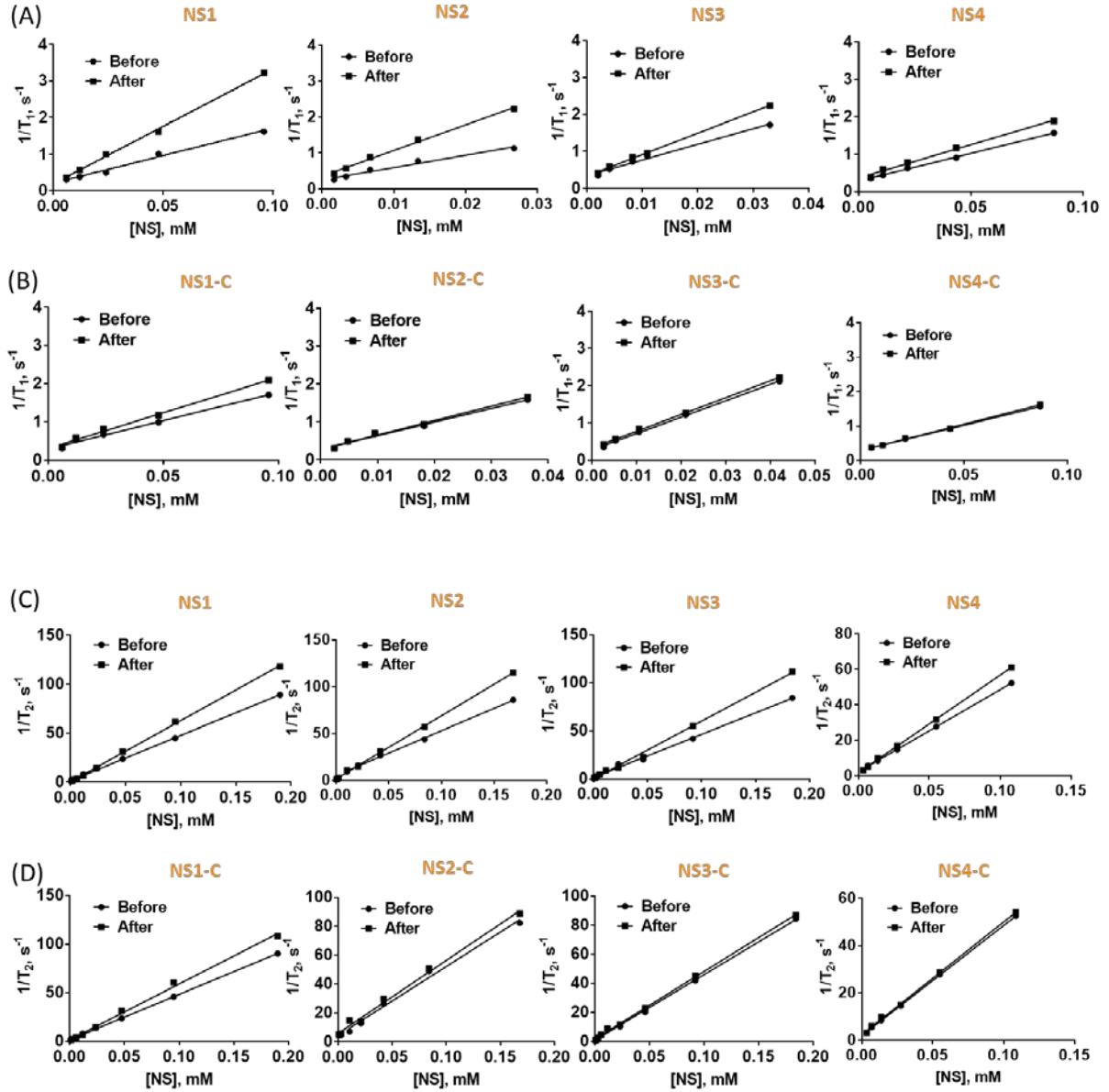
Figure S5: Relaxation of the nanosensors (NS) and control non-activatable nanosensor (NS-C) prepared with different grafting density of ThrPep. (A) T_1 relaxation of activatable nanoparticles (nanosensors). (B) T_1 relaxation of non-activatable nanoparticles (control nanosensors). (C) T_2 relaxation of activatable nanoparticles (nanosensors). (D) T_2 relaxation of non-activatable nanoparticles (control nanosensors). [NS] represents the sum concentration of Gd and Fe in the nanosensor solutions.