Supporting Information

Bifunctional supramolecular nanofiber inhibits atherosclerosis by enhancing plaque stability and anti-inflammation in apoE$^{-/-}$ mice

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Characteristic of compounds:

Npx-^{D}F^{D}FGSSSR: ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.29 (t, *J* = 5.5 Hz, 1H), 8.22 (d, *J* = 8.0 Hz, 1H), 8.12 (m, 5H), 8.01 (d, *J* = 7.8 Hz, 1H), 7.74 (d, *J* = 8.9 Hz, 1H), 7.66 (d, *J* = 8.5 Hz, 1H), 7.59 (s, 2H), 7.29 (s, 5H), 7.24 – 7.20 (m, 3H), 7.16 (dd, *J* = 8.9, 2.3 Hz, 2H), 6.97 – 6.92 (m, 5H), 4.59 (m, 1H), 4.46 (d, *J* = 16.9 Hz, 3H), 4.37 (m, 3H), 4.23 – 4.18 (m, 2H), 3.88 (d, *J* = 5.7 Hz, 4H), 3.83 (d, *J* = 5.2 Hz, 2H), 3.79 (d, *J* = 6.9 Hz, 1H), 3.67 – 3.61 (m, 5H), 3.11 (t, *J* = 8.7 Hz, 3H), 2.88 (m 2H), 2.70 (dd, *J* = 13.5, 9.8 Hz, 1H), 1.82 – 1.72 (m, 1H), 1.65 – 1.58 (m, 1H), 1.53 (m, 2H), 1.35 (d, *J* = 6.9 Hz, 3H). HR-MS: calc. M = 998.4498, obsvd. $(M+H)^{+}$ = 999.4559.

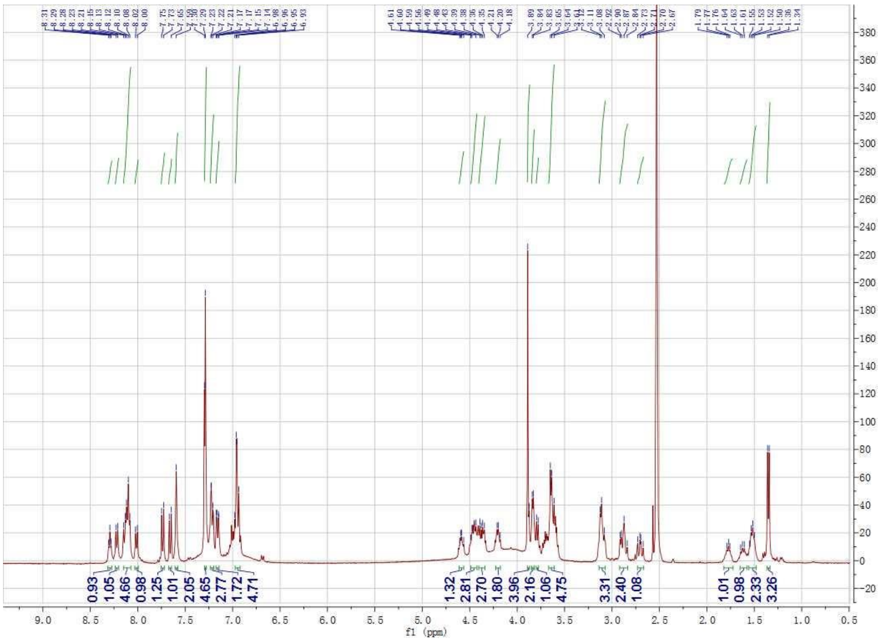

Figure S1. ^{1}H-NMR spectrum of Npx-^{D}F^{D}FGSSSR (compound ***1***).

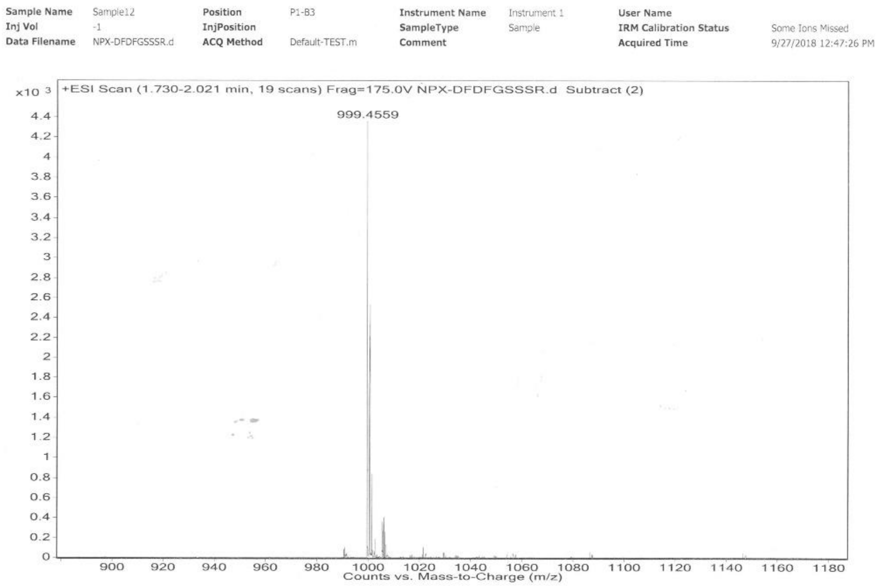

Figure S2. HR-MS spectrum of Npx-^{D}F^{D}FGSSSR (compound ***1***).

Npx-FFGSSSR: ^{1}H NMR (400 MHz, DMSO-d$_6$) δ 8.28 – 8.18 (m, 2H), 8.15 (d, *J* = 7.8 Hz, 2H), 8.09 (s, 2H), 8.04 (d, *J* = 7.5 Hz, 1H), 7.74 (dd, *J* = 15.0, 8.8 Hz, 2H), 7.66 (d, *J* = 6.9 Hz, 2H), 7.36 (d, *J* = 8.2 Hz, 1H), 7.29 (s, 1H), 7.24 (s, 5H), 7.16 (d, *J* = 4.4 Hz, 3H), 7.10 (d, *J* = 6.9 Hz, 2H), 7.04 (d, *J* = 6.8 Hz, 1H), 4.57 (d, *J* = 0.5 Hz, 1H), 4.50 (d, *J* = 3.1 Hz, 1H), 4.41 (s, 2H), 4.37 (s, 2H), 4.23 – 4.17 (m, 1H), 3.87 (s, 4H), 3.80 (s, 3H), 3.75 (d, *J* = 7.2 Hz, 2H), 3.66 – 3.59 (m, 6H), 3.12 (d, *J* = 4.9 Hz, 2H), 3.01 (m, 2H), 2.77 (m, 2H), 1.78 (d, *J* = 6.7 Hz, 1H), 1.64 (m, 1H), 1.52 (d, *J* = 4.7 Hz, 2H), 1.35 (d, *J* = 6.6 Hz, 1H), 1.21 (d, *J* = 6.5 Hz, 3H). HR-MS: calc. M = 998.4498, obsvd. $(M+H)^+$ = 999.4559.

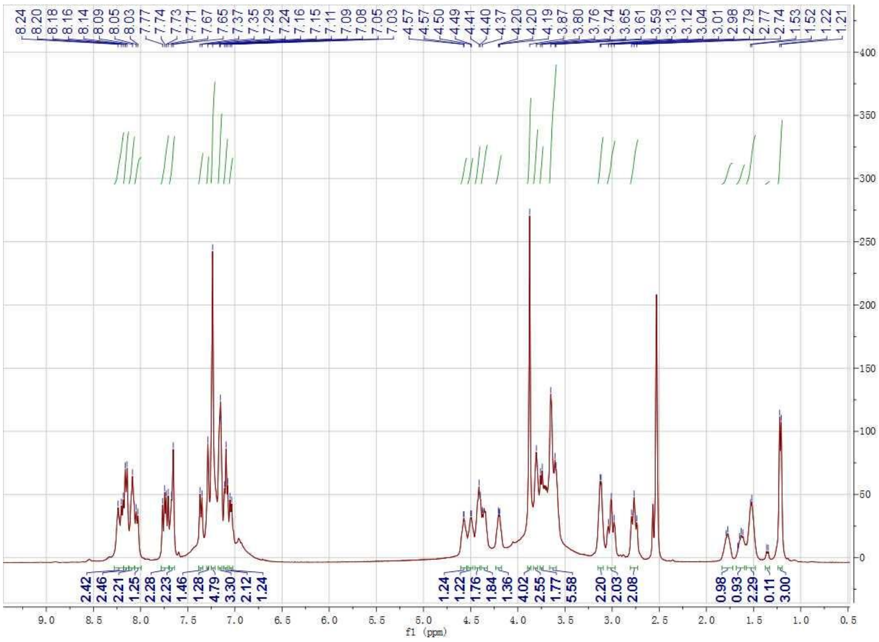

Figure S3. ^{1}H-NMR spectrum of Npx-FFGSSSR (compound ***2***).

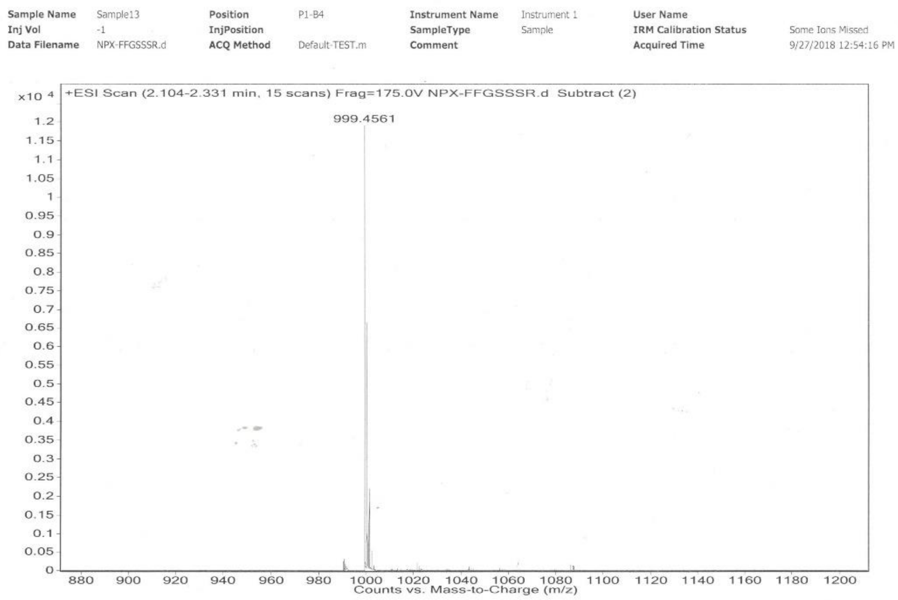

Figure S4. HR-MS spectrum of Npx-FFGSSSR (compound ***2***).

Nap-FFGSSSR: [1]H NMR (400 MHz, DMSO-d_6) δ 8.26 (s, 1H), 8.13 (m, 4H), 7.96 (d, *J* = 6.3 Hz, 1H), 7.71 (d, *J* = 7.8 Hz, 1H), 7.63 (d, *J* = 7.1 Hz, 1H), 7.54 (d, *J* = 20.1 Hz, 2H), 7.18 (m, 10H), 6.93 (s, 5H), 4.39 (m, 6H), 3.93 – 3.73 (m, 7H), 3.61 (s, 18H), 3.08 (s, 3H), 2.85 (s, 2H), 2.68 (s, 1H), 1.84 – 1.41 (m, 3H), 1.33 (s, 2H). HR-MS: calc. M = 954.4236, obsvd. $(M+H)^+$ = 955.4293.

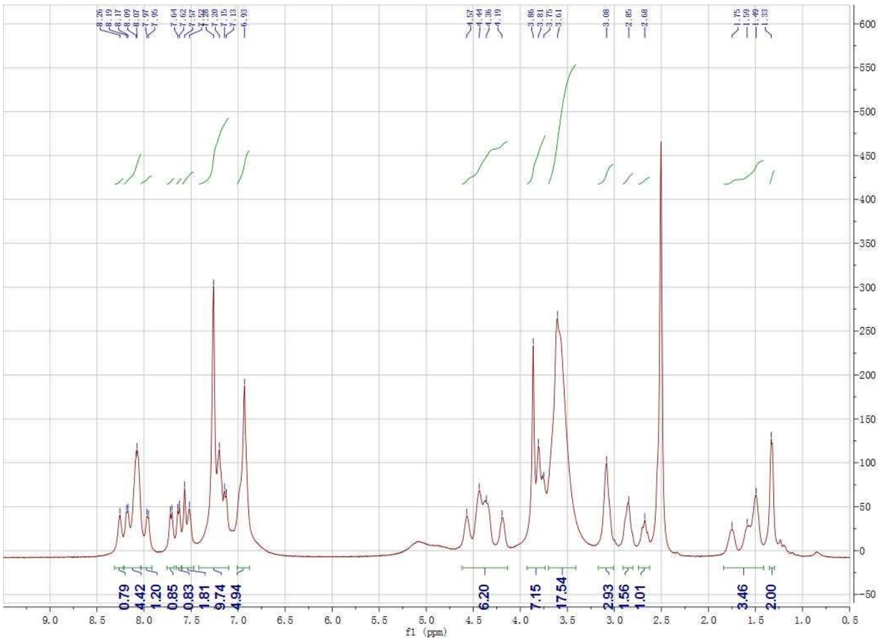

Figure S5. [1]H-NMR spectrum of Nap-FFGSSSR (compound ***3***).

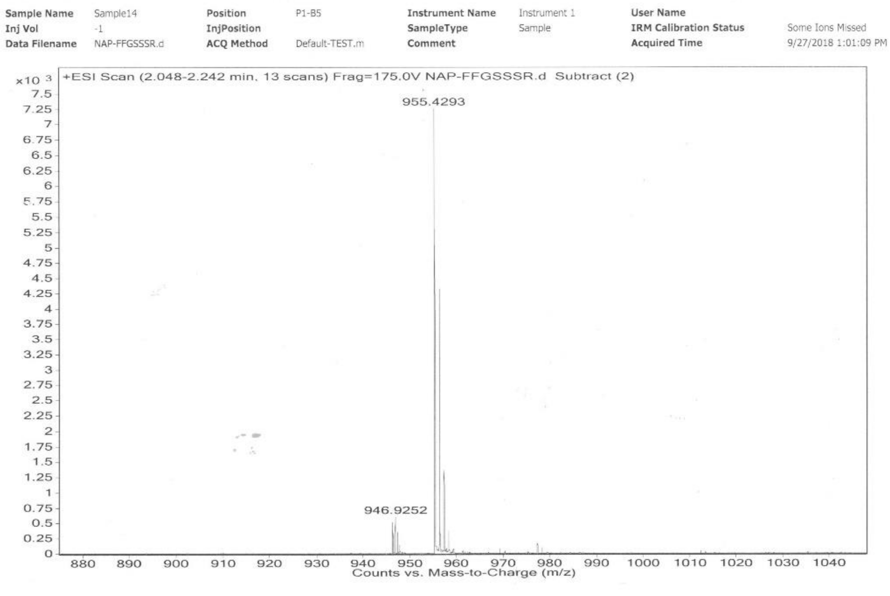

Figure S6. HR-MS spectrum of Nap-FFGSSSR (compound ***3***).

Nap-FFGSRSS: ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.35 (d, *J* = 8.3 Hz, 1H), 8.29 (d, *J* = 6.4 Hz, 2H), 8.22 (d, *J* = 7.9 Hz, 1H), 8.10 (d, *J* = 7.2 Hz, 1H), 8.03 (d, *J* = 7.5 Hz, 2H), 7.88 (d, *J* = 7.6 Hz, 1H), 7.81 (s, 1H), 7.79 (s, 1H), 7.78 (s, 1H), 7.76 (s, 1H), 7.59 (m, 2H), 7.53 – 7.45 (m, 2H), 7.26 (t, *J* = 7.8 Hz, 4H), 7.22 (s, 1H), 7.18 (d, *J* = 7.4 Hz, 7H), 4.63 – 4.51 (m, 3H), 4.40 (m, 4H), 4.31 – 4.26 (m, 2H), 3.83 (s, 2H), 3.75 (m, 1H), 3.66 (d, *J* = 3.6 Hz, 2H), 3.61 (m, 4H), 3.53 (s, 1H), 3.50 (s, 1H), 3.11 (d, *J* = 6.1 Hz, 2H), 3.07 (d, *J* = 4.1 Hz, 1H), 3.01 (d, *J* = 4.0 Hz, 1H), 2.98 (d, *J* = 3.8 Hz, 1H), 2.86 (m, 1H), 2.75 (m, 1H), 1.81 (d, *J* = 7.8 Hz, 1H), 1.61 (d, *J* = 7.0 Hz, 1H), 1.55 (d, *J* = 7.2 Hz, 2H). HR-MS: calc. M = 954.4236, obsvd. $(M+H)^+$ = 955.43.

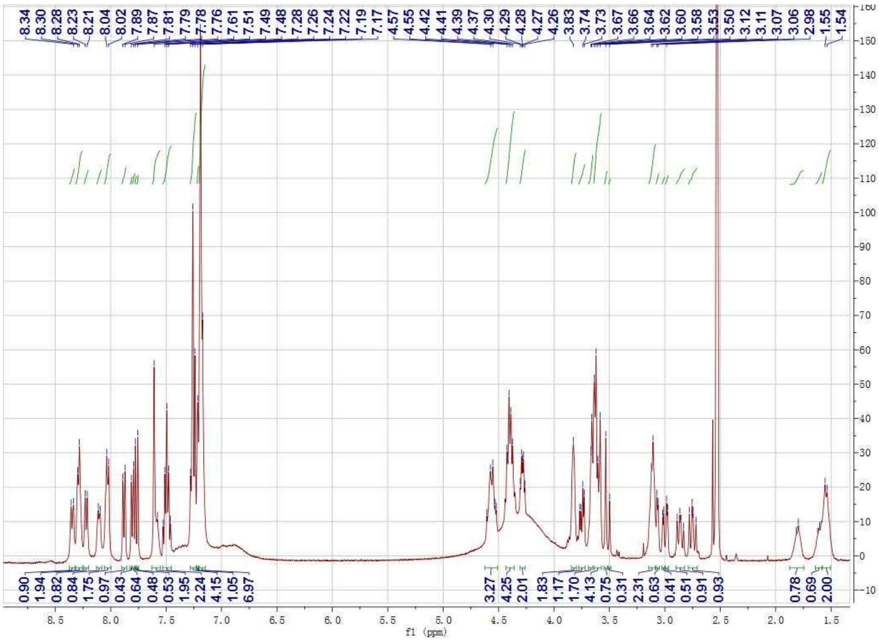

Figure S7. ^{1}H-NMR spectrum of Nap-FFGSRSS (compound ***4***).

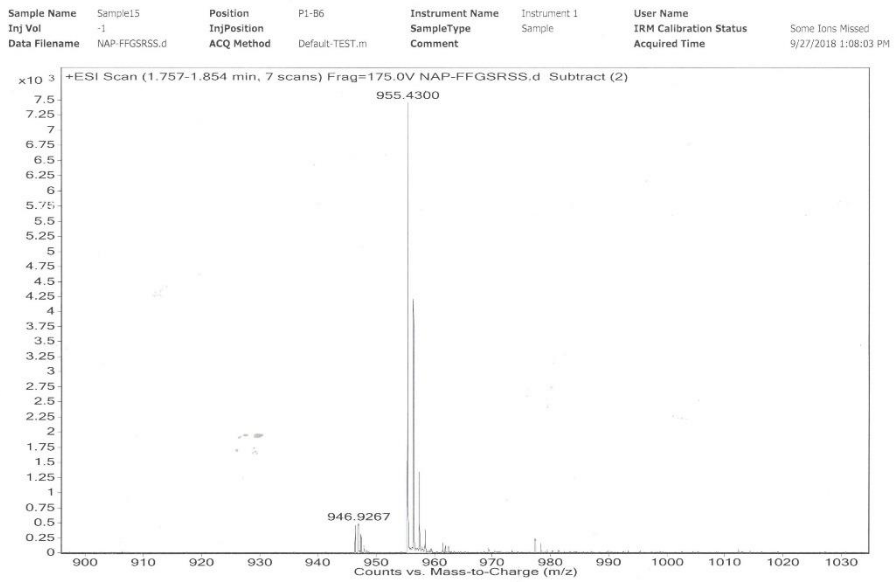

Figure S8. HR-MS spectrum of Nap-FFGSRSS (compound ***4***).

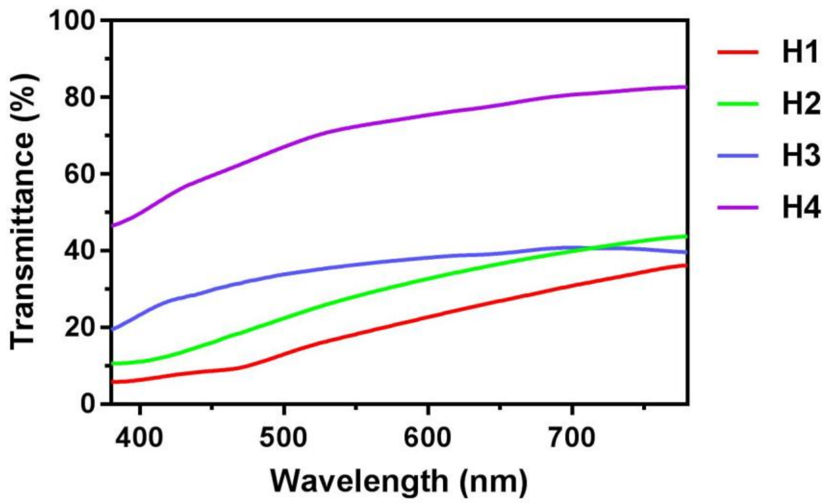

Figure S9. Transmittance of the four hydrogels as a function of the wavelength.

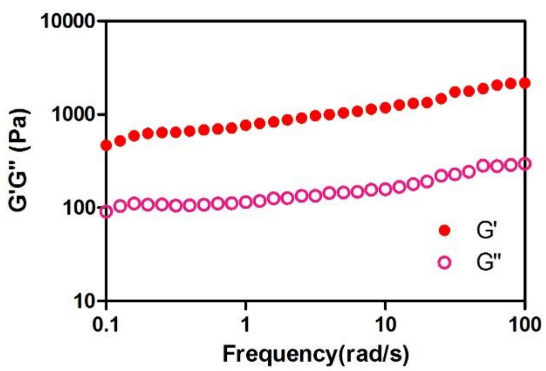

Figure S10. Dynamic frequency sweep of hydrogel 1 (H1) at strain of 1% at 37 ^{o}C

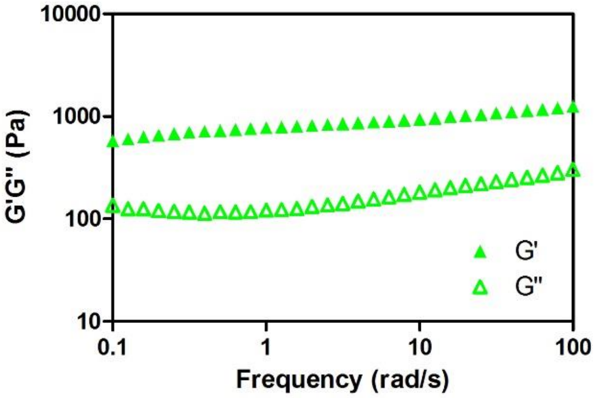

Figure S11. Dynamic frequency sweep of hydrogel 2 (H2) at strain of 1% at 37 ^{o}C

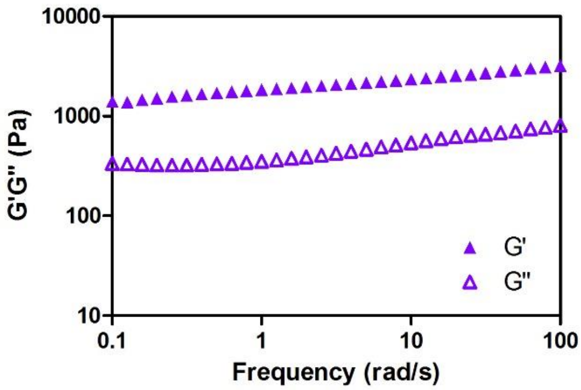

Figure S12. Dynamic frequency sweep of hydrogel 3 (H3) at strain of 1% at 37 ^{o}C

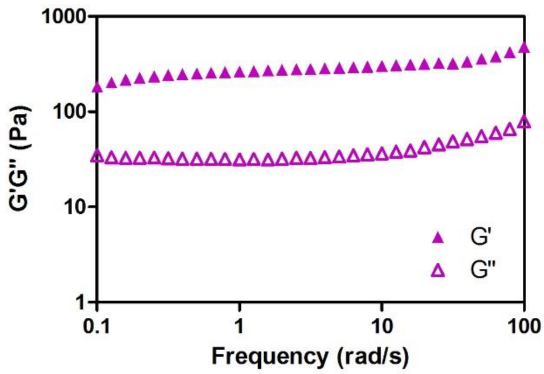

Figure S13. Dynamic frequency sweep of hydrogel 4 (H4) at strain of 1% at 37 ^{o}C

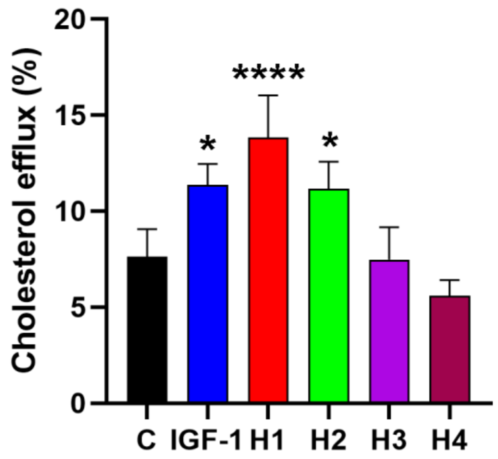

Figure S14. Cholesterol efflux of peritoneal macrophage were assessed after treatment as indicated, n=5. Data are presented as mean ± SEM, *P < 0.05, **P < 0.01, ***P < 0.001, significantly different as indicated.

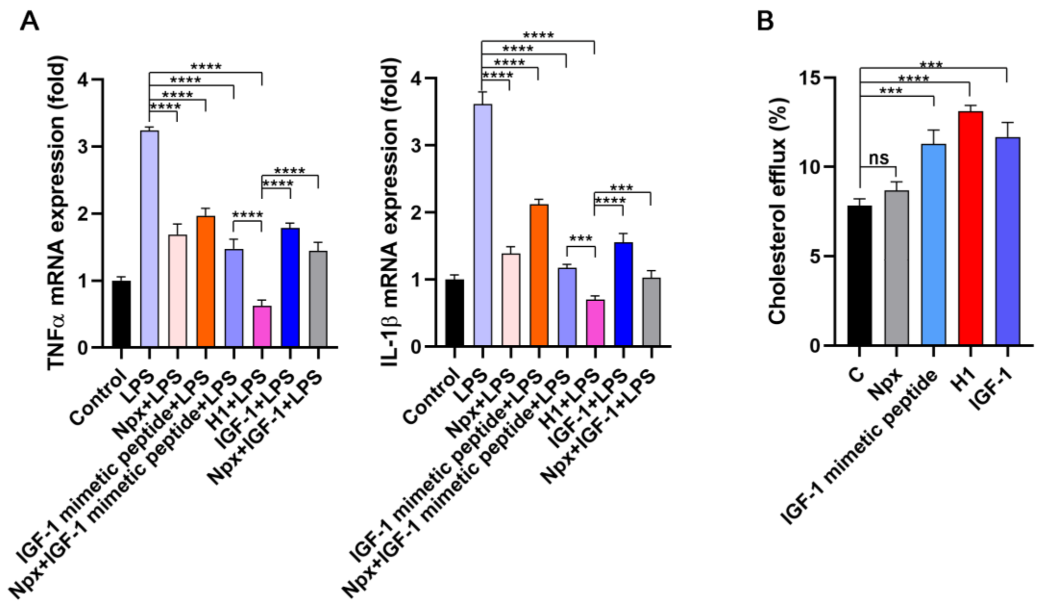

Figure S15. Effects of Npx and IGF-1 mimetic peptide on inflammation and cholesterol efflux. (A) qRT-PCR analysis of TNFα and IL-1β in macrophage after indicated treatment, n=5. (B) Cholesterol efflux of peritoneal macrophage were assessed after treatment as indicated, n=5. Data are presented as mean ± SEM, ***P < 0.001, ****P < 0.0001 significantly different as indicated. ns: not significantly different.