Electronic Supplementary Material (ESI) for Biomaterials Science.

Supporting information

Table S1 The particle size, particle size distribution and drug loading content of vesicle

Vesicle	Size (nm)[a]	PDI[a]	DLC (wt%)[b]
$Vesicle_{MEM}$	203 ± 3	0.18 ± 0.02	19.4 ± 0.2
$Vesicle_{DON}$	202 ± 2	0.18 ± 0.02	19.5 ± 0.2
$Vesicle_{INS}$	204 ± 2	0.16 ± 0.03	19.3 ± 0.3
$Vesicle_{REP}$	203 ± 3	0.17 ± 0.01	19.2 ± 0.3
$Vesicle_{MET}$	201 ± 3	0.16 ± 0.03	19.3 ± 0.1

a: Determined by DLS, b: Determined by UV

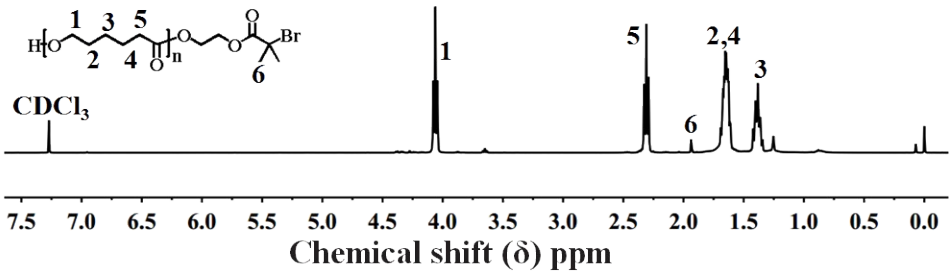

Fig. S1. ^{1}H-NMR spectrum of PCL_{60}-HEBIB.

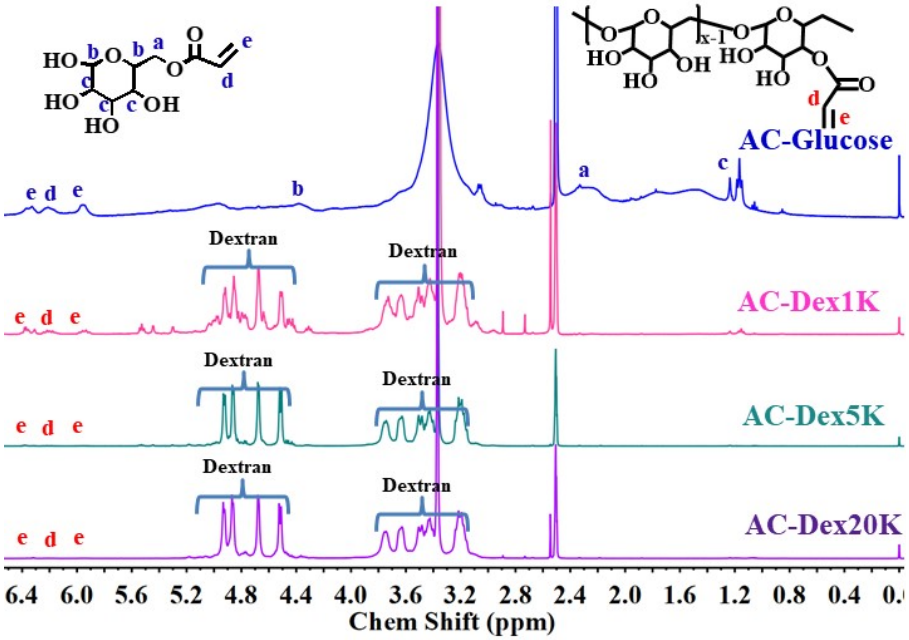

Fig. S2 ^{1}H-NMR spectrum of AC-Glucose, AC-Dex1K, AC-Dex5K, AC-Dex20K.

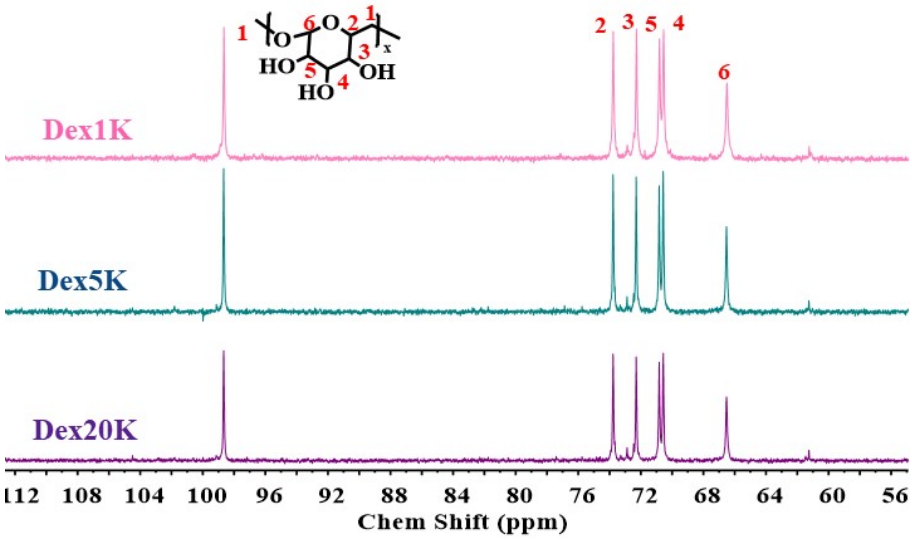

Fig. S3. ^{13}C-NMR spectrum of Dex1K, Dex5K and Dex20K.

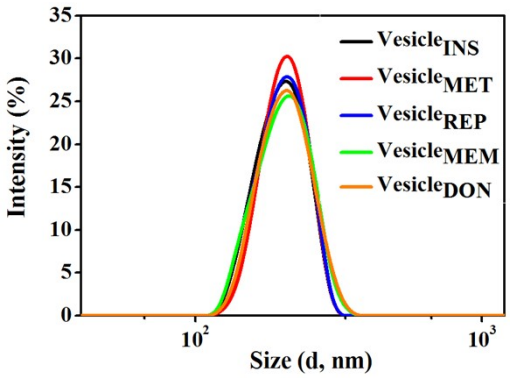

Fig. S4. The hydrodynamic diameter of drug-loaded vesicle.

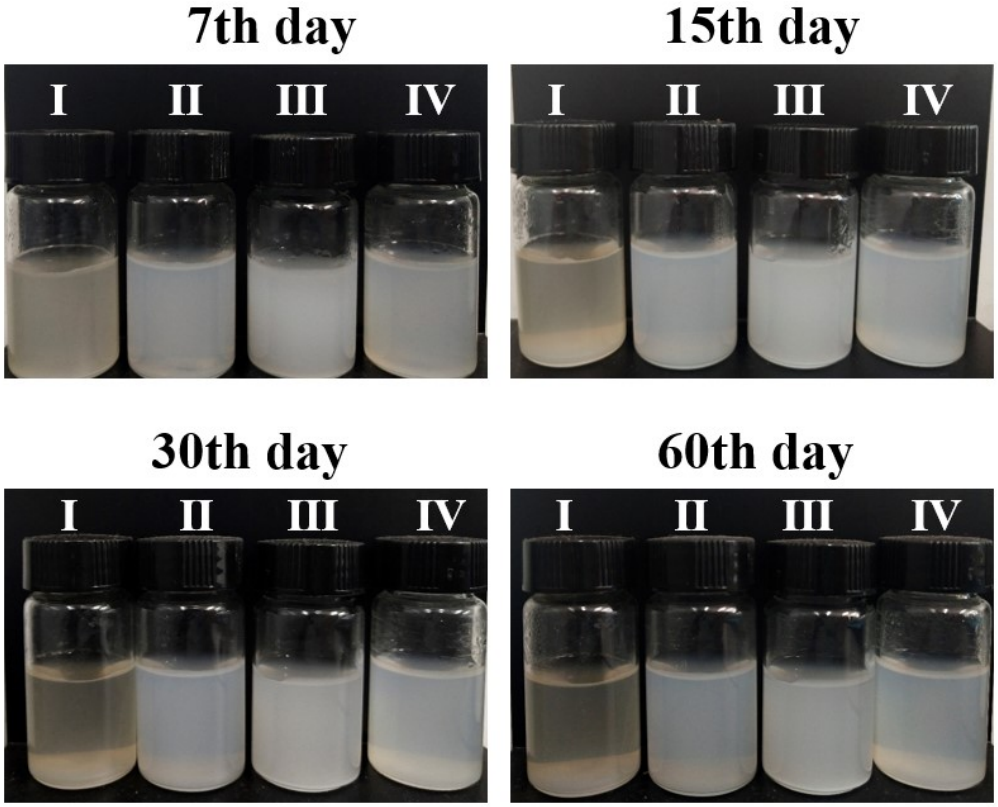

Fig. S5 Nanoparticles stability test. (I: PCL-g-PGlu$_{120}$, II: PCL-g-Dex1K$_{20}$, III: PCL-g-Dex5K$_4$, IV: PCL-g-Dex20K).

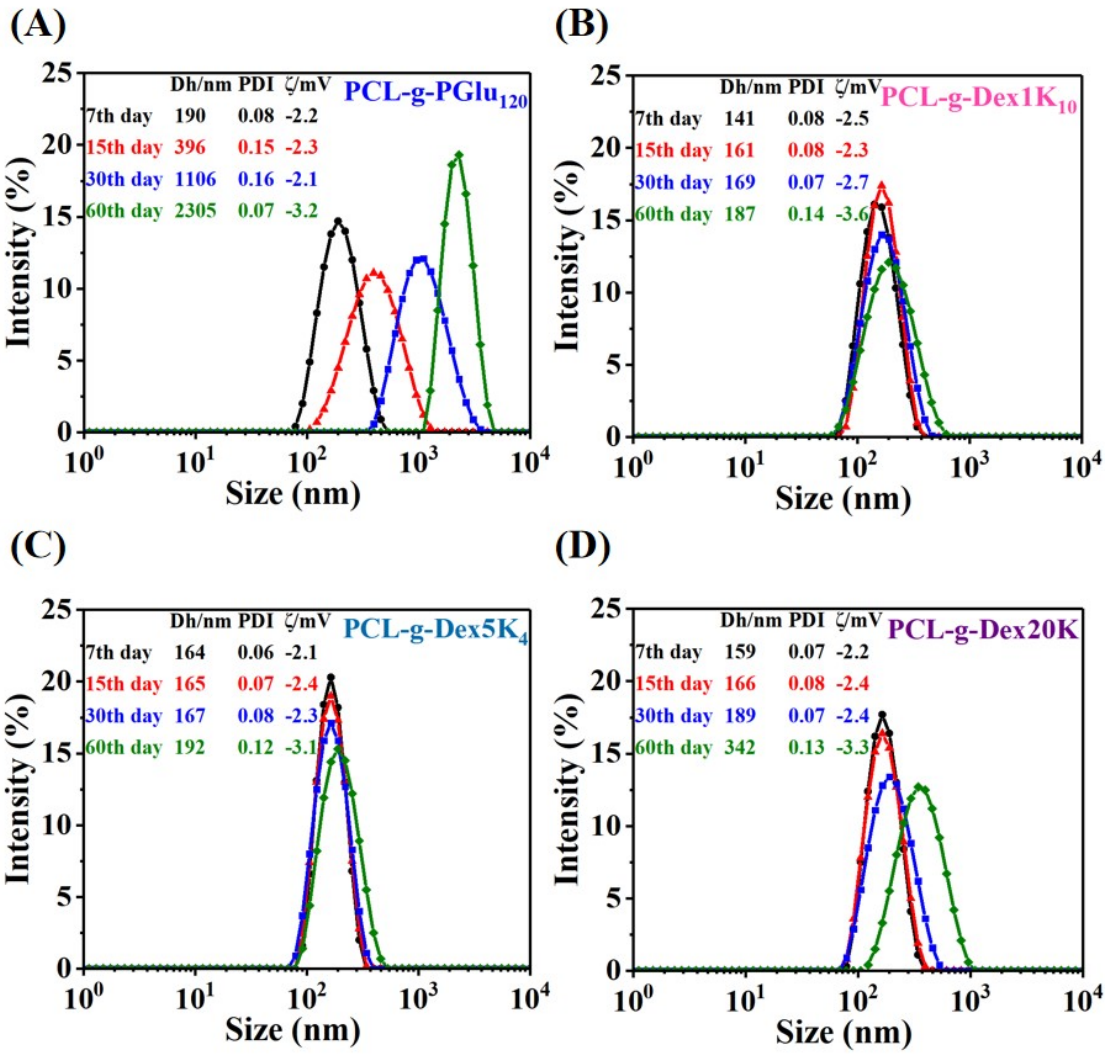

Fig. S6 Nanoparticles stability test. Changes in hydrodynamic diameter and zeta potential (by DLS) of (A: PCL-g-PGlu$_{120}$, B: PCL-g-Dex1K$_{20}$, C: PCL-g-Dex5K$_4$, D: PCL-g-Dex20K) over time.

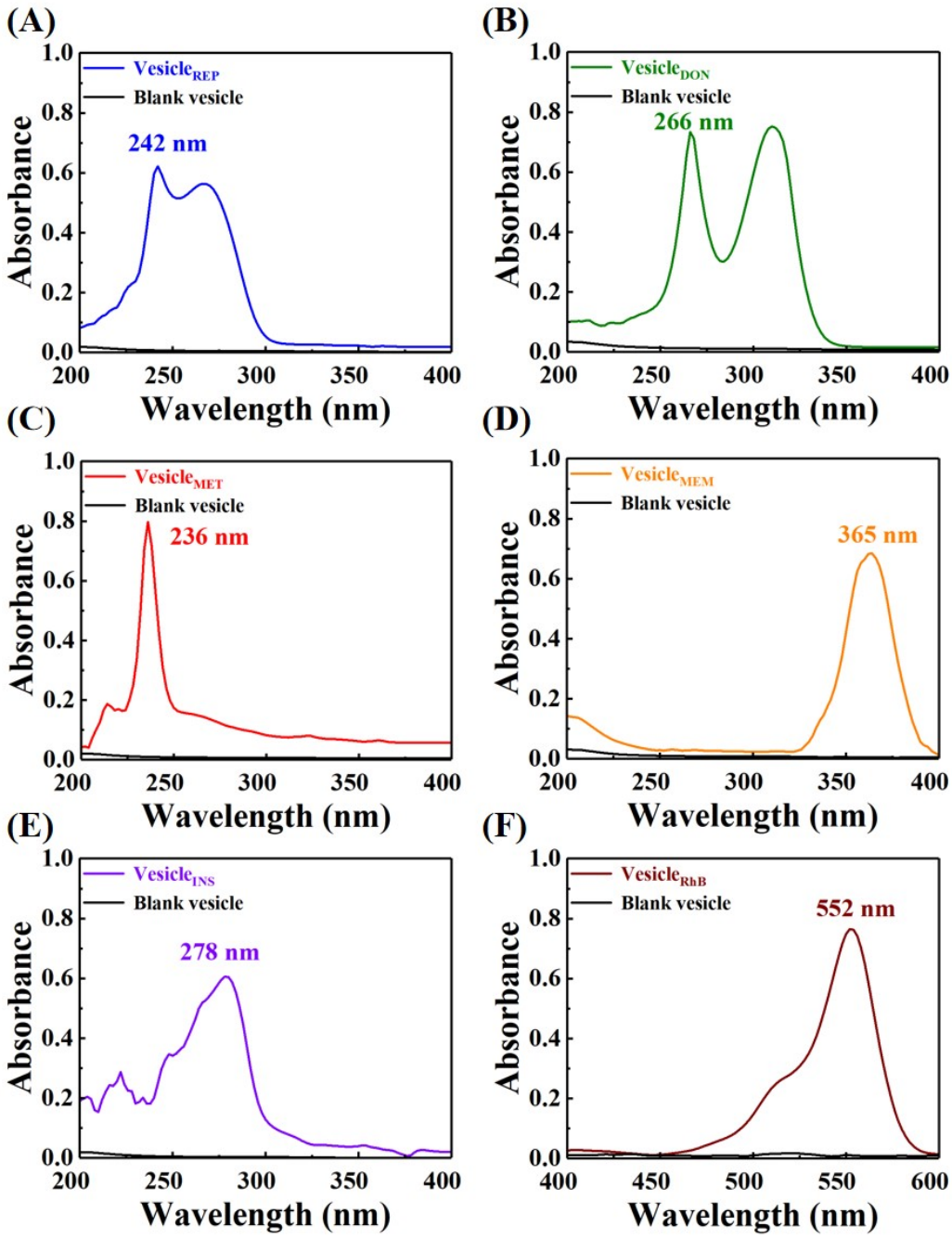

Fig. S7 The UV absorption curve of vesicles before and after loading drug. A) Vesicle$_{REP}$, B) Vesicle$_{DON}$, C) Vesicle$_{MET}$, D) Vesicle$_{MEM}$, E) Vesicle$_{INS}$, F) Vesicle$_{RhB}$.

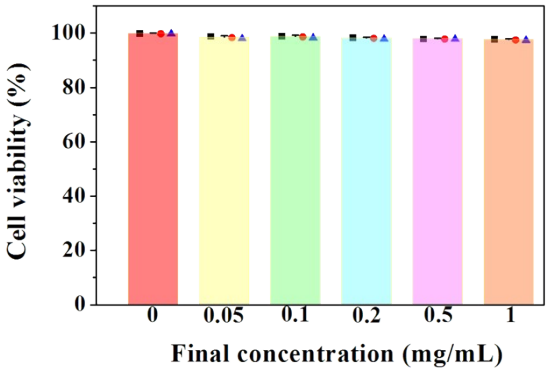

Fig. S8 Biocompatibility of vesicle. The mean ± SD is shown versus control.

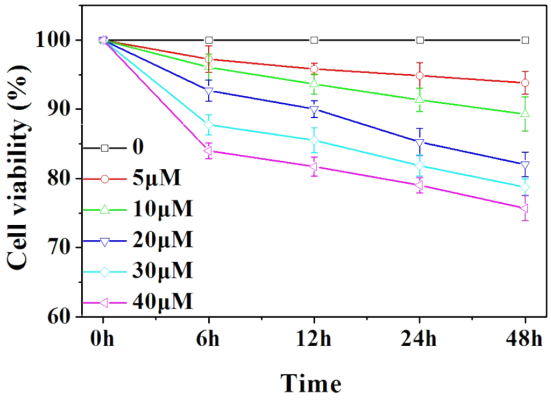

Fig. S9 The viability of SH-SY5Y cells under different glucosamine concentration and treatment time. The mean ± SD is shown.

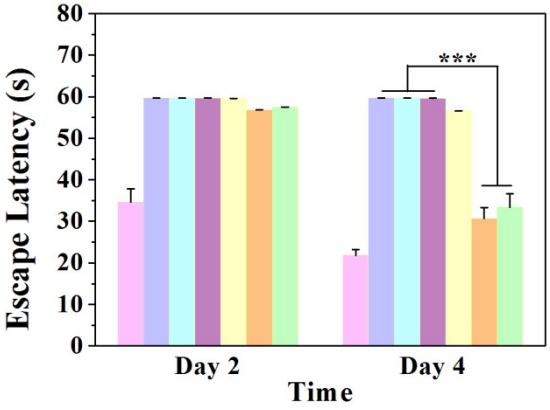

Fig. S10 The escape latencies of mice. The mean ± SD is shown. **p < 0.01 versus control.

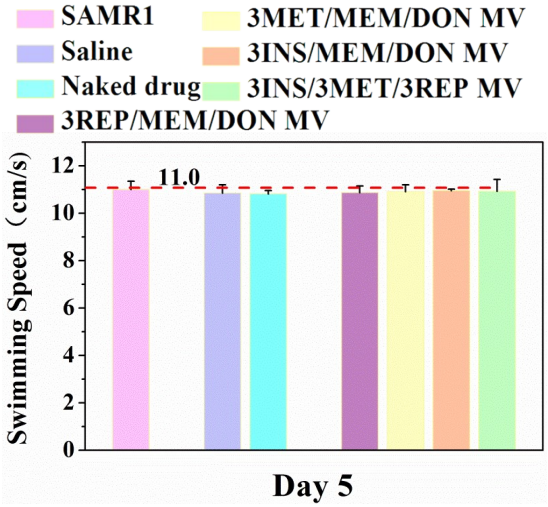

Fig. S11 Swimming speed of mice. The mean ± SD is shown.

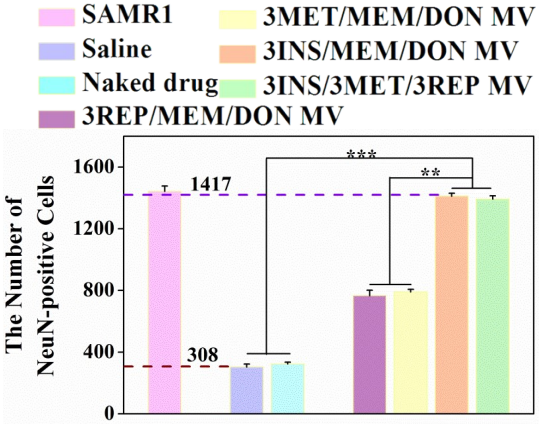

Fig. S12 The number of Neun positive cells of mice. The mean ± SD is shown. **p < 0.01 and ***p < 0.005 versus control.

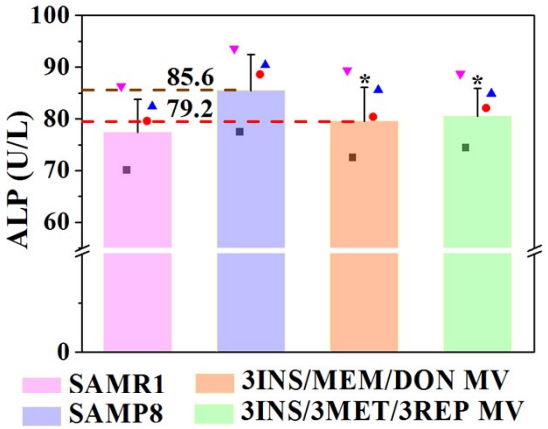

Fig. S13 Serum alcaline phosphatase (ALP)level. The mean ± SD is shown. *p < 0.05 versus control.

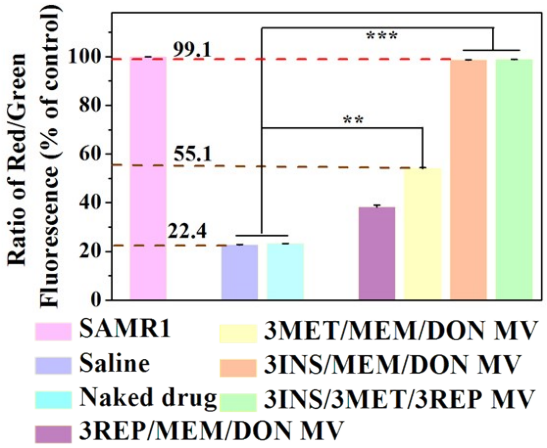

Fig. S14 The mitochondrial membrane potential (ΔΨm) of hippocampal neuron of mice. The mean ± SD is shown. *p < 0.05, **p < 0.01, and ***p < 0.005 versus control.

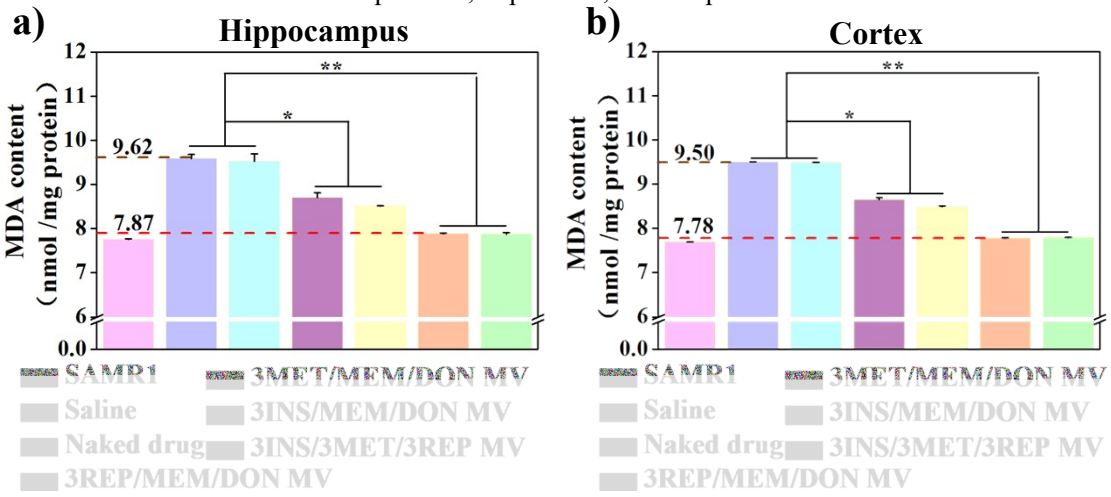

Fig. S15 MDA content test of (a) hippocampus and (b) cortex. The mean ± SD is shown. *p < 0.05, **p < 0.01, and ***p < 0.005 versus control.