Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary materials

As shown in Figure S1, when the normal synovial cells cultured with PBS or 10 mmol/L zinc gluconate, there was no fluorescence under the laser confocal fluorescence imaging system (Figure 2 (a) and (b)). Similarly, no fluorescence were found in fibroblast synoviocytes cultured with PBS (Figure (c)). However, very strong fluoresce were observed in fibroblast synoviocytes cultured with zinc gluconate for 24 hours (Figure 2 (d)-(f)), and the fluorescence intensity increased along with the upgrade of the concentration of zinc gluconate (from 2 mmol/L to 10 mmol/L).

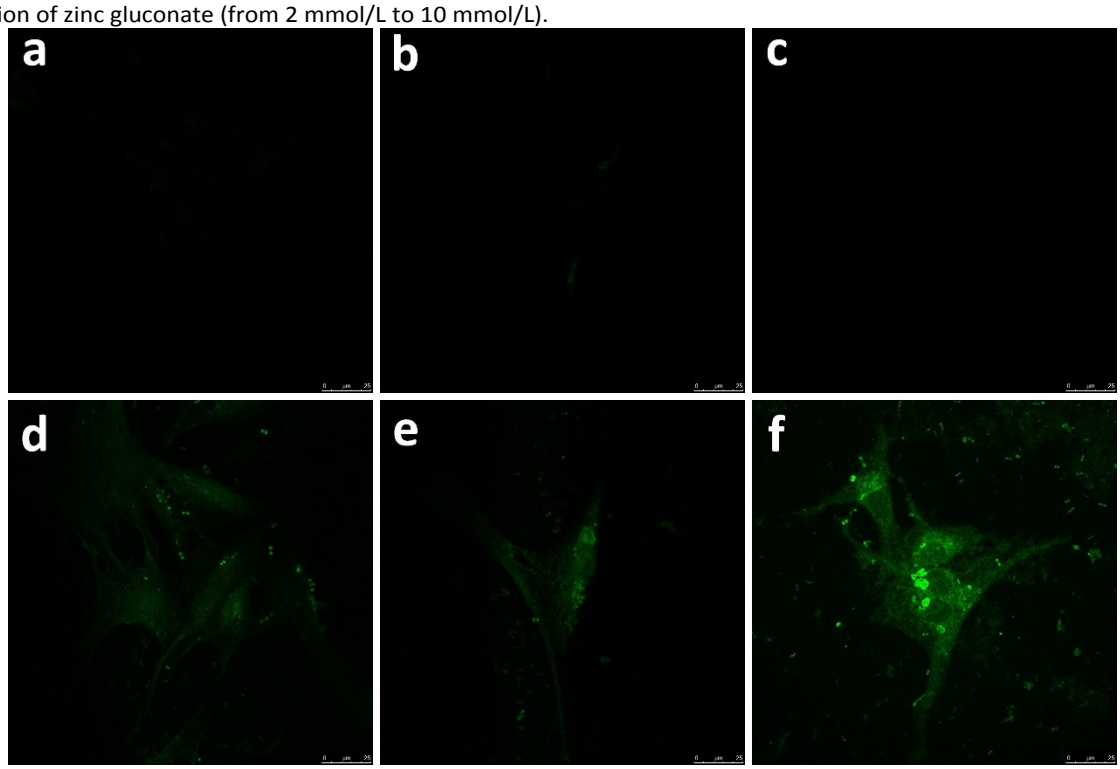

Figure S1. *In vitro* laser confocal fluorescence imaging.
In vitro laser confocal fluorescence imaging of normal synovial cell lines cultured with (a): PBS (control) or (b): 10 mmol/L zinc gluconate, and fibroblast synoviocytes cultured with (c): PBS (control) or (d): 2 mmol/L, (e): 5 mmol/L, (f): 10 mmol/L zinc gluconate for 24 hours.

On the basis of above observations, we further explored the bio-imaging of dissected brains from the mice with injection of zinc gluconate. Figure S2 (a)-(f) shows the fluorescence imaging of brains from all three groups (NOR, CON and CIS) at both dorsal view and ventral view, under excitation wavelength of 420 nm and emission wavelength of 670 nm. Figure S2 (g) and (h) shows the fluorescence imaging of cut brains from NOR and CIS groups at both cranial view and caudal view, under excitation wavelength of 420 nm and emission wavelength of 670 nm. The relative fluorescence intensity of the embolism region in right brain of CIS group is obviously stronger than left brain or brains of other groups, which was exactly consistent with the brain pathological results (Figure S3) and brain MRI image (Figure S4) of CIS model mice.

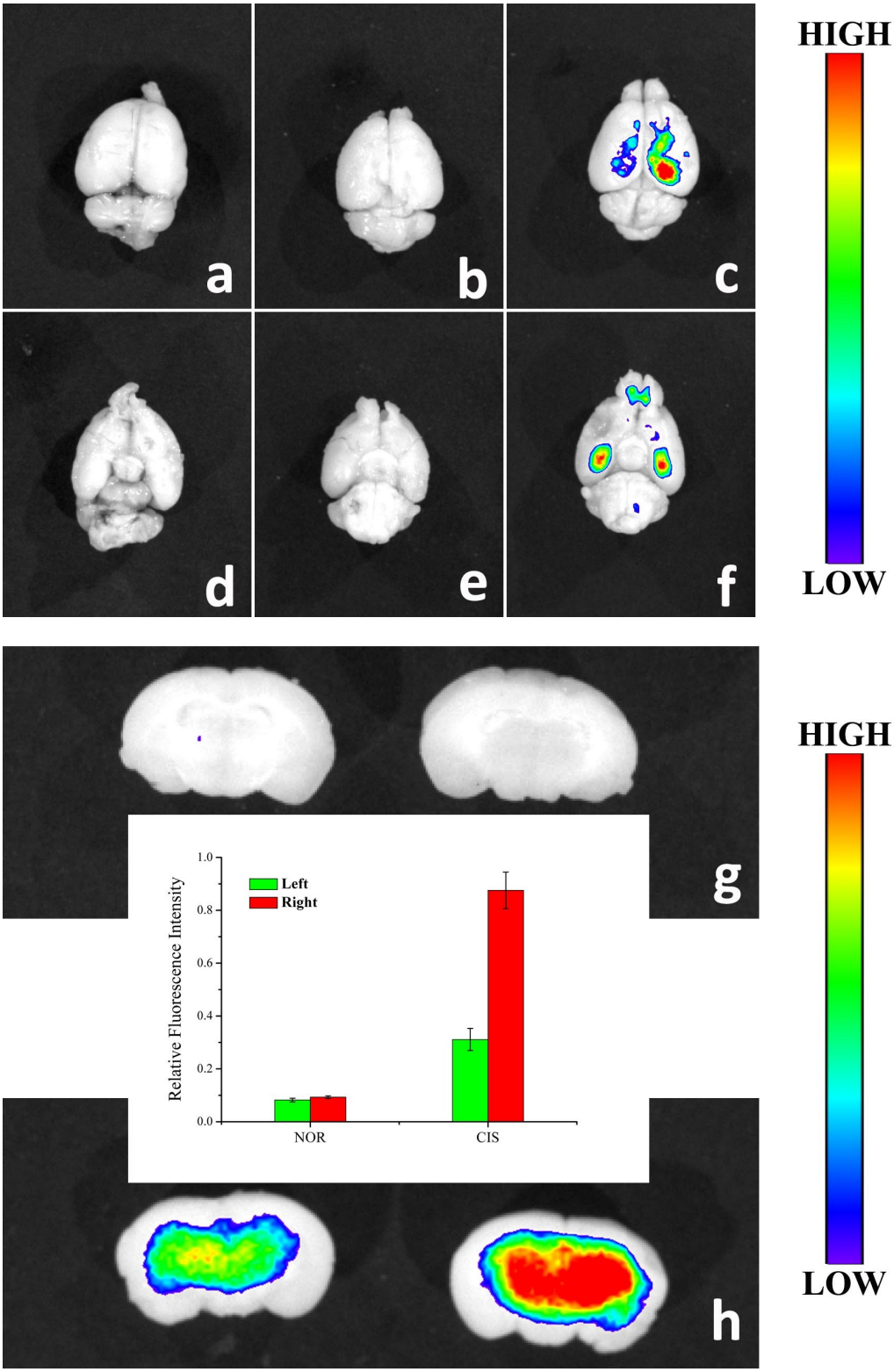

Figure S2 Fluorescence of CIS brain.

(a)-(f): Fluorescence imaging of the pathoanatomical brain from three groups (a,d: normal group, b,e: control group, c,f: CIS group) at 48H post injection of 0.1 ml 10mmol/L zinc gluconate solution via tail-vein (ex: 420 nm, em: 670 nm). All brains' images were taken from two angles (a,b,c: dorsal view, d,e,f: ventral view). (g)- (h): Fluorescence imaging of the pathoanatomical brains' cross section, (g) represents for con group and (h) for CIS group. (i): Relative fluorescence intensity of both side brain from NOR/CIS groups

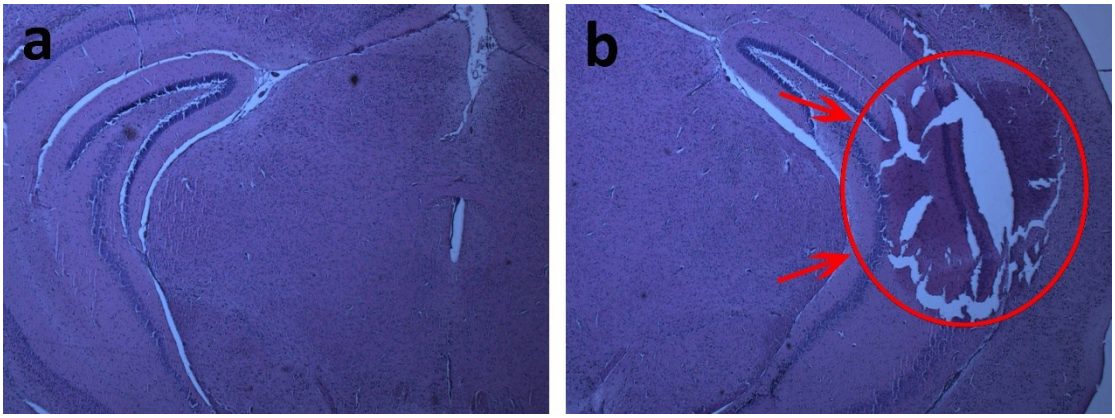

Figure S3 Histopathologic analyses.
Histopathologic analyses of H&E-stained tissue sections from pathoanatomical brain of CIS model mice, (a) represent left side and (b) is for right side. We can obviously recognize the damage region at right side (b) which is also the part under MACO surgery.

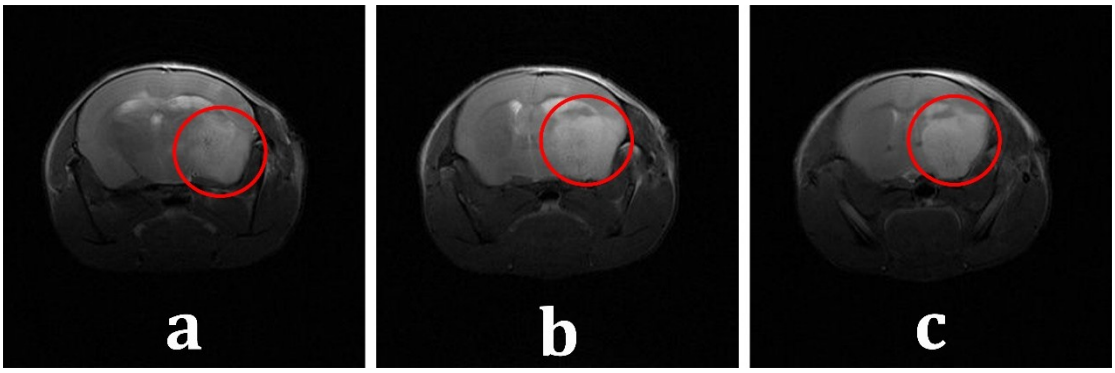

Figure S4 MRI images of CIS model mice.
It is obviously that the MACO surgery has effect on the right side of brain. (a)(b)(c) represent different sections of damage region.

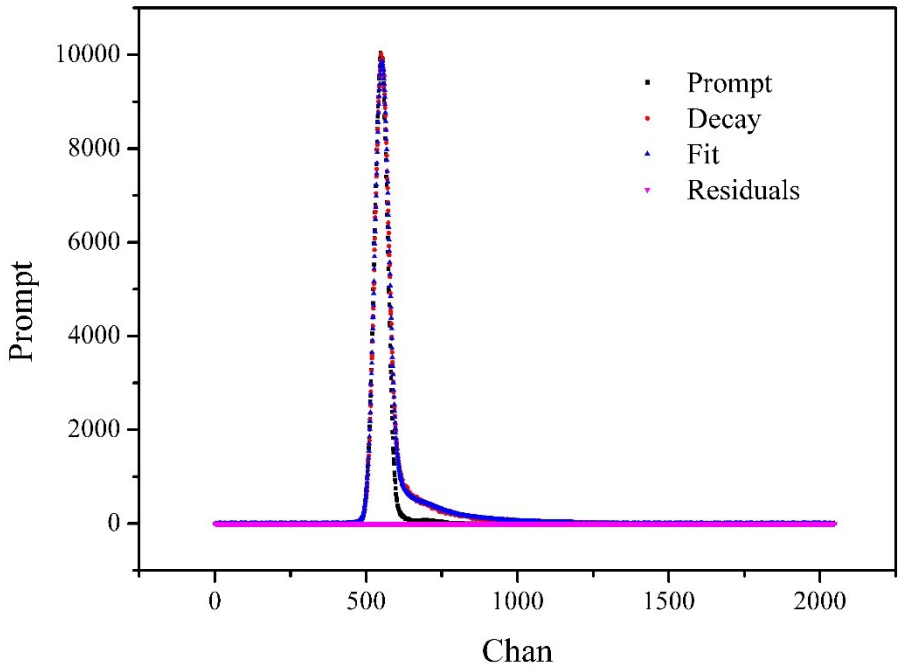

Figure S5 Fluorescence lifetime of biosynthesized zinc nanoclusters extract from the brain of CIS group.

The fluorescence lifetime is 1.1102 ns.

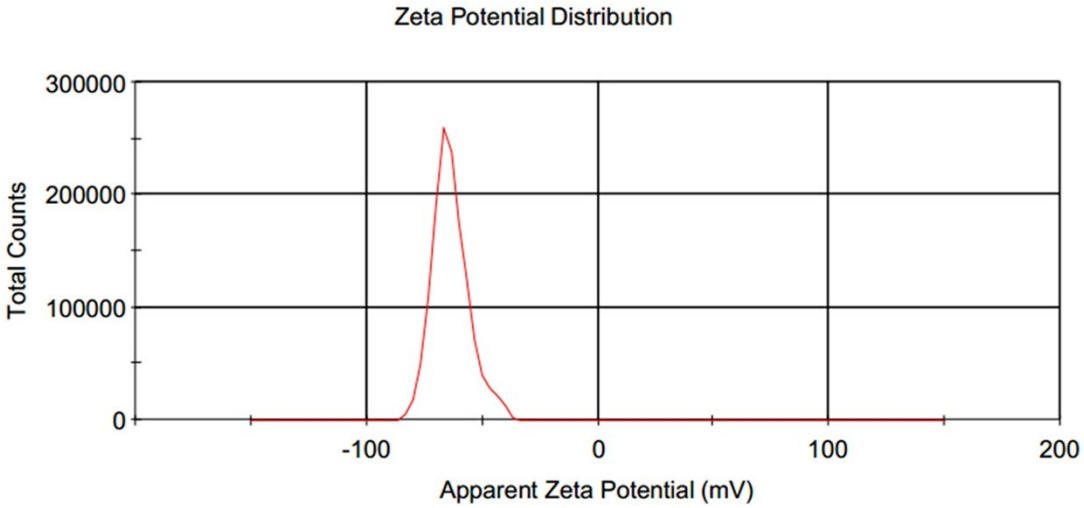

Figure S6 Zeta potential distribution of biosynthesized zinc nanoclusters extract from the brain of CIS group.
The zeta potential is -63.6±7.96 mV.

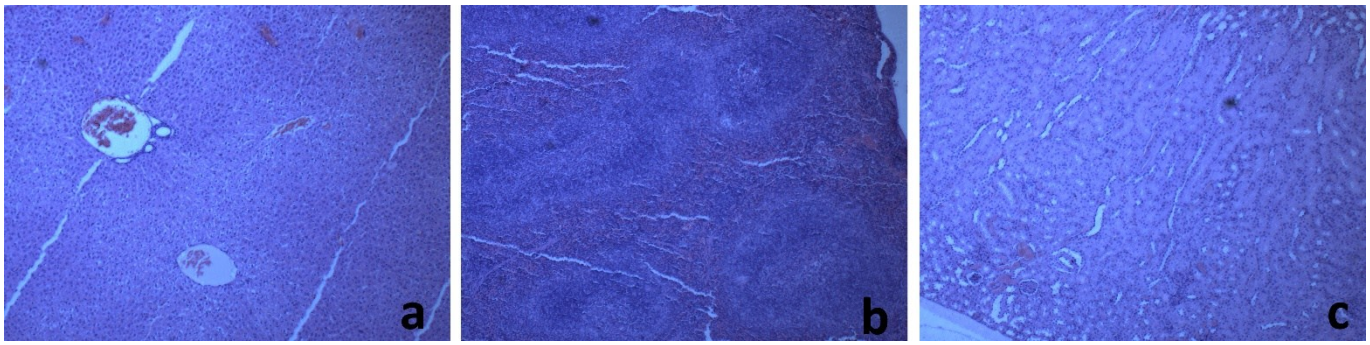

Figure S7. Histopathologic analysis of H&E-stained tissue sections.
Histopathologic analysis of H&E-stained tissue sections from organs of control group (a for liver, b for spleen and c for kidney).

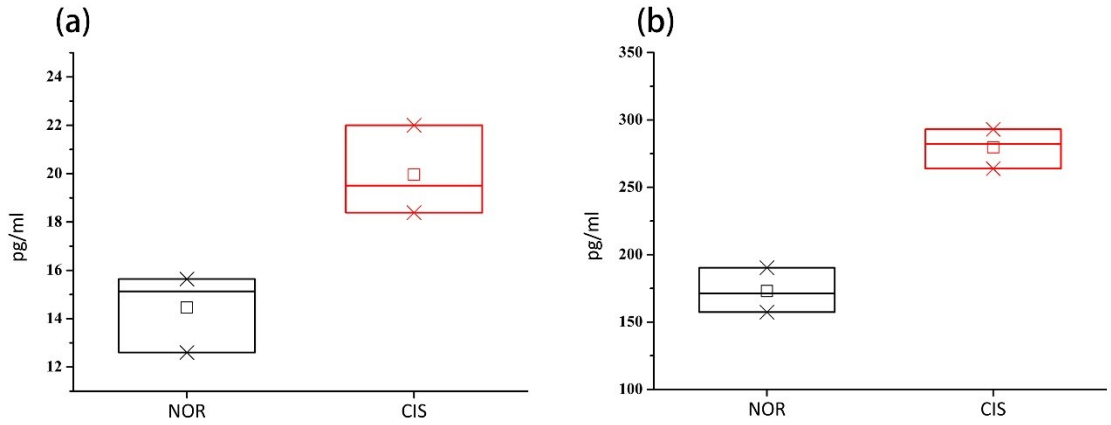

Figure S8. Blood serum level for Interleukin (IL) 17 and Tumor Necrosis factor (TNF-α).
In this figure (a) shows the concentration level of IL-17 and (b) represents TNF-α in serum. The black box shows the control group and red one for CIS group.