Electronic supplementary information (ESI)

Siramesine-loaded Metal Organic Framework Nanoplatform for Overcoming Multidrug Resistance with Efficient Cancer Cell Targeting

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Figure S1. DLS analysis of ZIF-8, ZIF-8@Sira and ZIF-8@Sira/FA.
Figure S2. Photographic images of ZIF-8, ZIF-8@Sira and ZIF-8@Sira/FA aqueous solution before (top) and after (bottom) centrifugation.
Figure S3. Nitrogen adsorption-desorption isotherms of ZIF-8 (A) and ZIF-8@Sira (C) and the pore size distribution of ZIF-8 (B) and ZIF-8@Sira (D).
Figure S4. Zeta potentials of ZIF-8, ZIF-8@Sira and ZIF-8@Sira/FA, bars represent mean ± standard deviation (n = 3).
Figure S5. Drug release assay in vitro. (A) Linear calibration plots for siramesine detection; (B) The release curves of siramesine from ZIF-8@Sira in different PBS of pH 7.4 and pH 5.0 at 37 °C.
**Figure S6.** Single molecule fluorescence imaging of PFG-F (A) and ZIF-8/F (B).
Figure S7. Cell viability of MCF-7 cells (A) and MCF-7/ADR cells (B) after incubating with ZIF-8/FA at different concentrations for 24 h and 48 h, the data are represent as the mean ± SD (n = 6).
Figure S8. Confocal fluorescence images of drug delivery system incubated MCF-7 cells for 2 h. Live/dead stain shows dead cells as red and viable cells as green.
Figure S9. Cytotoxicity of ZIF-8@Sira/FA (2 μg·mL⁻¹) against MCF-7/ADR cells with free FA (5 μg·mL⁻¹) in 24 h. **p < 0.01 when compared with ZIF-8@Sira/FA group. Data are represented as mean ± SD (n = 3).
Table S1. The data obtained from TEM and DLS of NPs.

|                | Diameter (nm)       | DLS size (nm)       | PDI   |
|----------------|---------------------|---------------------|-------|
| ZIF-8          | 157 ± 6.8 (n = 100) | 188 ± 6.1 (n = 3)   | 0.37  |
| ZIF-8@Sira     | 168 ± 7.4 (n = 100) | 209 ± 5.8 (n = 3)   | 0.42  |
| ZIF-8@Sira/FA  | 193 ± 6.3 (n = 100) | 281 ± 5.5 (n = 3)   | 0.26  |
Table S2. Analysis data of single molecule fluorescence imaging by Image-J.

|                  | Fluorescence intensity | Particle number | MFI  |
|------------------|------------------------|-----------------|------|
| PEG-F            | 207.16                 | 2360            | 0.09 |
| ZIF-8@Sira/F     | 215.84                 | 862             | 0.25 |
Table S3. IC$_{50}$ values for MCF-7 cells, MCF-7/ADR cells, and MCF-7/10A cells treated with ZIF-8 nanoparticles for 24 h and 48 h (n=3).

|                  | IC$_{50}$ (μg·mL$^{-1}$) — 24 h | MCF-7 | MCF-7/ADR | MCF-10A |
|------------------|---------------------------------|-------|-----------|---------|
| Sira             | 2.72                            | 8.64  | 7.46      |
| ZIF-8@Sira       | 2.10                            | 2.95  | 1.92      |
| ZIF-8@Sira/FA    | 1.56                            | 2.27  | 2.60      |

|                  | IC$_{50}$ (μg·mL$^{-1}$) — 48 h | MCF-7 | MCF-7/ADR | MCF-10A |
|------------------|---------------------------------|-------|-----------|---------|
| Sira             | 3.32                            | 8.57  | 5.97      |
| ZIF-8@Sira       | 1.09                            | 2.70  | 1.24      |
| ZIF-8@Sira/FA    | 0.54                            | 1.46  | 2.28      |