**Supporting information**

# Mesoporous silica SBA-15 composite for delivery of amoxicillin against *S. aureus* skin infection

Qingshuang Wang[a], Yurui Cui[a], Wei Ai[a], Siqi Li[a], Zhe Zhang[b], Xiangru Feng*[a]

### Materials

Poly (ethylene glycol)-block-poly (propylene glycol)-block-poly (ethylene glycol) [Pluronic P123] was purchased from Aldrich. Tetraethyl orthosilicate (TEOS) and 3-(triethoxysilyl) propan-1-amine (APTES), toluene, hydrochloric acid and ethanol were purchased from Beijing Chemical Industry Department. Amoxicillin was purchased from Shanghai Macleans. Distilled water was used during the experiment.

### Synthesis of SBA-15 and $NH_2$-SBA-15

SBA-15 was synthesized according to the methods reported in Refs[20, 24]. 2.0 g of pluronic 123 as a structure-directing agent was dissolved in a mixture of 15.0 mL distilled water and 60.0 mL 2M HCl and stirred at 40 °C for 4 h. Then 4.25 g TEOS was added into the solution and reacted overnight at 40 °C. The product was transferred into Teflon autoclave and crystallized in an oven at 100 °C for 2 days. The final solution was filtered, washed, and dried at room temperature. The organic surfactant was removed by calcination at 550 °C for 6 h.

The synthesized SBA-15 was then modified [25]. 1.0 g of calcined SBA-15 was dried at 100 °C for 3 h before being introduced into 40.0 mL dry toluene containing 10.0 mL (3-Aminopropyl) triethoxysilane (APTES). The mixture was heated to reflux under $N_2$ for 10 h. The product was washed with toluene followed by drying at 60 ºC for 12 h. The final sample was collected and named as $NH_2$-SBA-15.

### Loading of amoxicillin

AM was loaded via post-impregnation. Specifically, 200.0 mg AM was fully dissolved in 200.0 mL distilled water. AM solution was further added with 200 mg SBA-15 or $NH_2$-SBA-15 and stirred at 25°C for 24 h. Finally, the nanocomposite materials, *i.e.*, SBA-15@AM and $NH_2$-SBA-15@AM were washed with distilled water, freeze-dried, and stored at 4 °C in the darkness. The AM content was detected at 272 nm by ultraviolet spectroscopy [26]. The drug loading contents (DLC) were then calculated by using the following equation.

$$DLC = \frac{\text{The weight of loaded drug}}{\text{The weight of nanocomposite material}} \times 100\%$$

Table S1 Structural parameters of samples

| sample | d100 (nm) | a0[a] (nm) | BET surface area ($m^2/g$) | pore volume ($cm^3/g$) | pore diameter (nm) | Zeta potential (mV) |
|---|---|---|---|---|---|---|
| SBA-15 | 106.86 | 123.39 | 517.3611 | 0.759016 | 5.8684 | -28.2 |
| SBA-15@AM | 110.06 | 127.08 | 318.2137 | 0.582798 | 7.3259 | -31.3 |
| $NH_2$-SBA-15 | 110.61 | 127.72 | 507.7084 | 0.720520 | 5.6766 | 25.4 |
| $NH_2$-SBA-15@AM | 108.04 | 124.75 | 188.1651 | 0.348844 | 7.4157 | 23.2 |

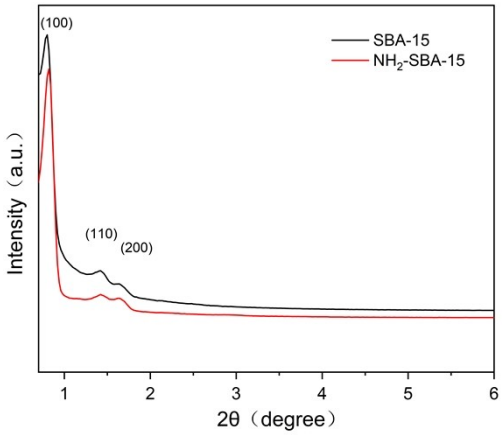


Figure S1. Small-angle XRD of SBA-15 and $NH_2$-SBA-15.

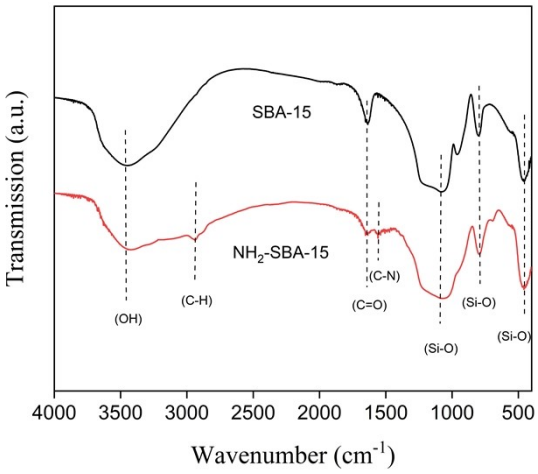


Figure S2. FT-IR spectra of SBA-15 and $NH_2$-SBA-15.

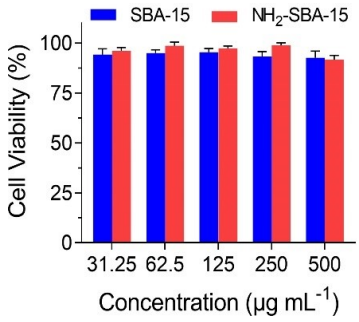


Figure S3. The cytotoxicity of SBA-15 and $NH_2$-SBA-15 nanocomposites on L929 cells. Error bars represented standard deviations (n = 3).

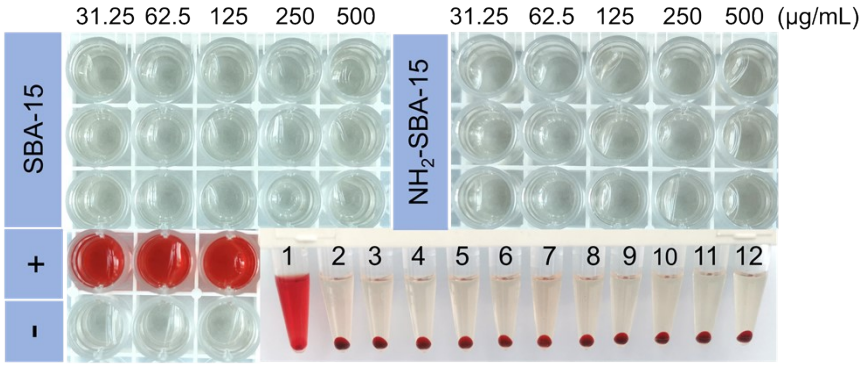


Figure S4. Hemolytic assays of SBA-15 and $NH_2$-SBA-15 at different concentrations (31.25-500 μg/mL). 1 represents positive control ($ddH_2O$), 2 represents negative control (PBS), 3-7 represent SBA-15 group in various concentrations (31.25-500 μg/mL), and 8-12 represent NH2-SBA-15 group in various concentrations (31.25-500 μg/mL).

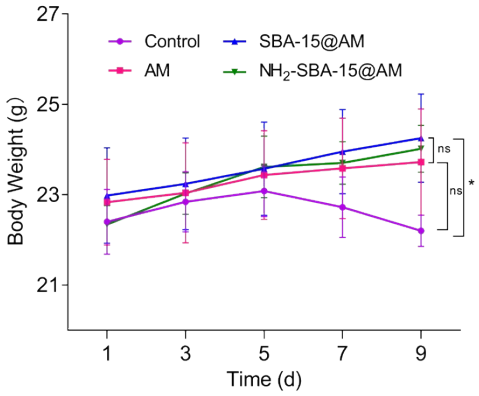


Figure S5. Body weight of mice during treatment.