

Supporting information

Thermo-responsive hydrogel loaded with ionic liquid microemulsion for transdermal delivery of methotrexate

Yang Shu, Rong Xue, Yiru Gao, Wenxin Zhang, Jianhua Wang*

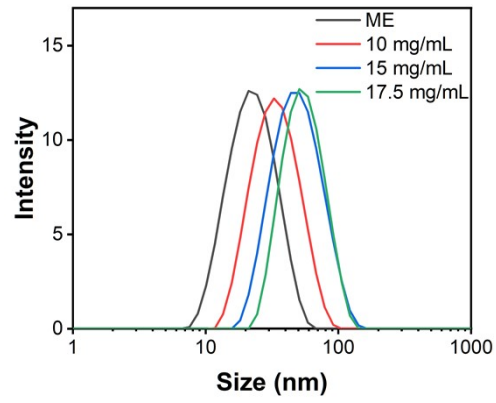


Fig S1. Size distribution of MTX/ME at different concentrations (0, 10, 15, 17.5 mg/mL).

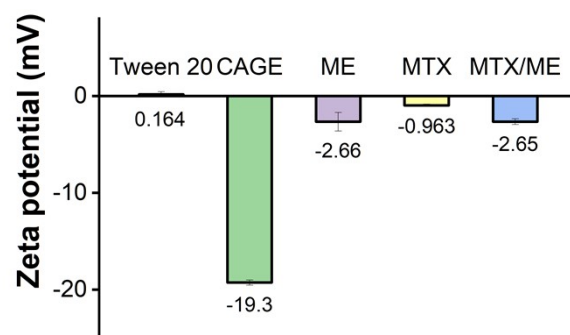


Fig S2. Zeta potential of Tween 20, CAGE, ME, MTX, and MTX/ME at 25 °C.

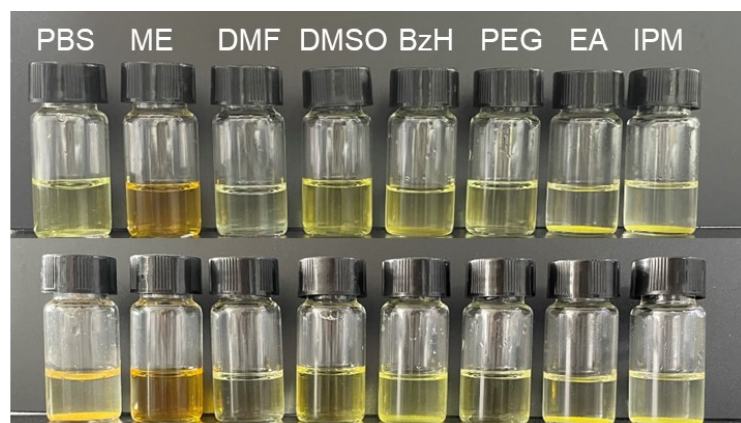


Fig S3. Photographs of MTX in PBS, ME, and common pharmaceutical solvents on the day 1 (top) and day 35 (bottom).

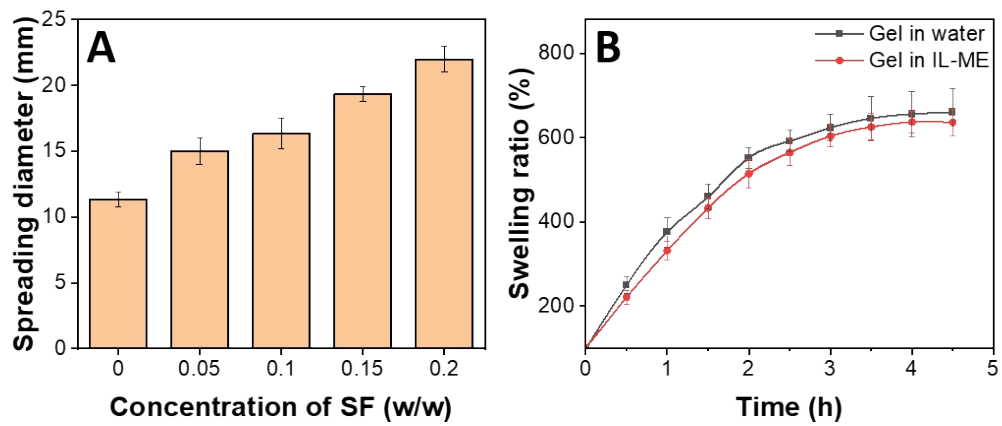


Fig S4. (A) The spreading diameter of Gel with different concentrations of SF (0, 0.05, 0.1, 0.15, 0.2 w/w). (B) The swelling ratio of Gel in different solutions (PBS, IL-ME).

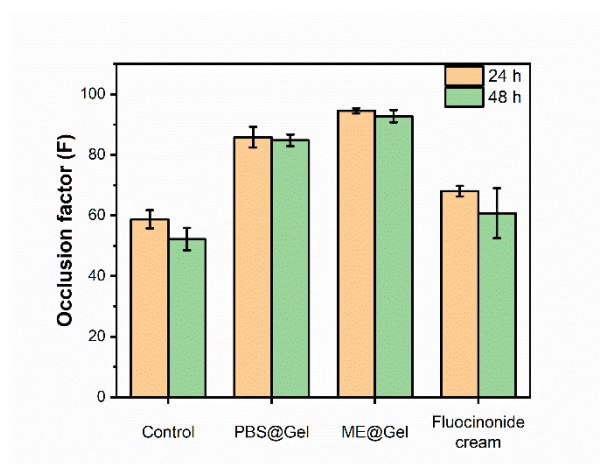


Fig S5. The occlusivity of PBS@Gel, ME@Gel and Fluocinonide cream.

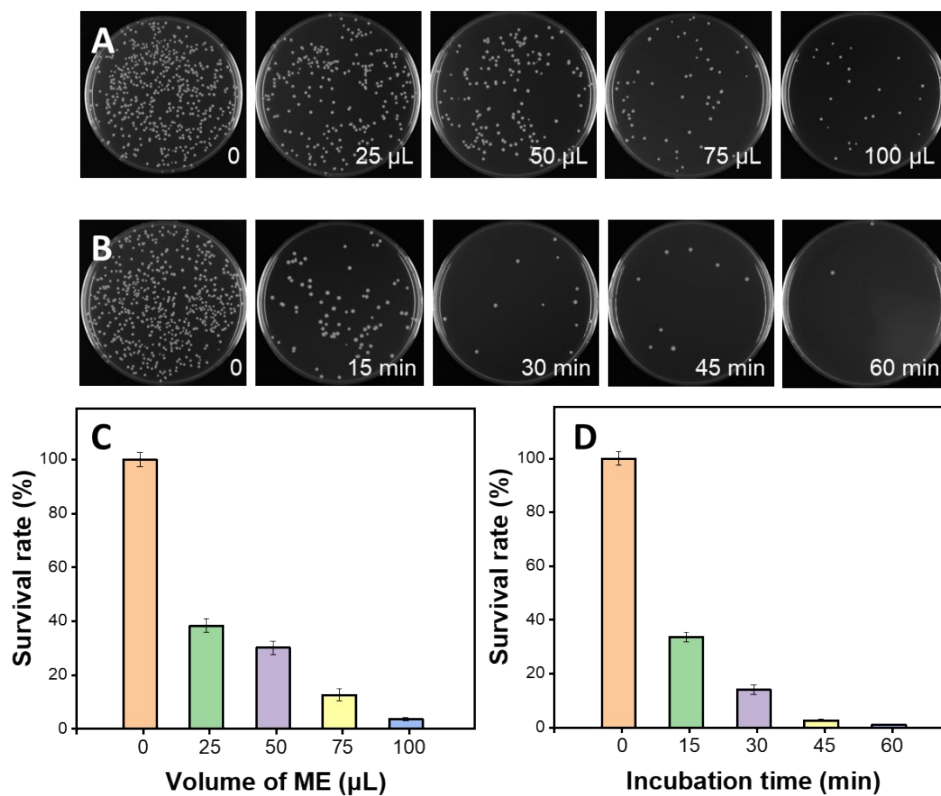


Fig S6. (A) Photographs of the number of *S. aureus* colonies after co-incubation with different doses of ME (0, 25, 50, 75, 100 µL) for 45 min, (B) Photographs of the number of *S. aureus* colonies after co-incubation with of ME (100 µL) for different time (0, 15, 30, 45, 60 min). (C) The quantitative analysis of bactericidal activity intensity of ME at different doses (0, 25, 50, 75, 100 µL) and incubation time (0, 15, 30, 45, 60 min).

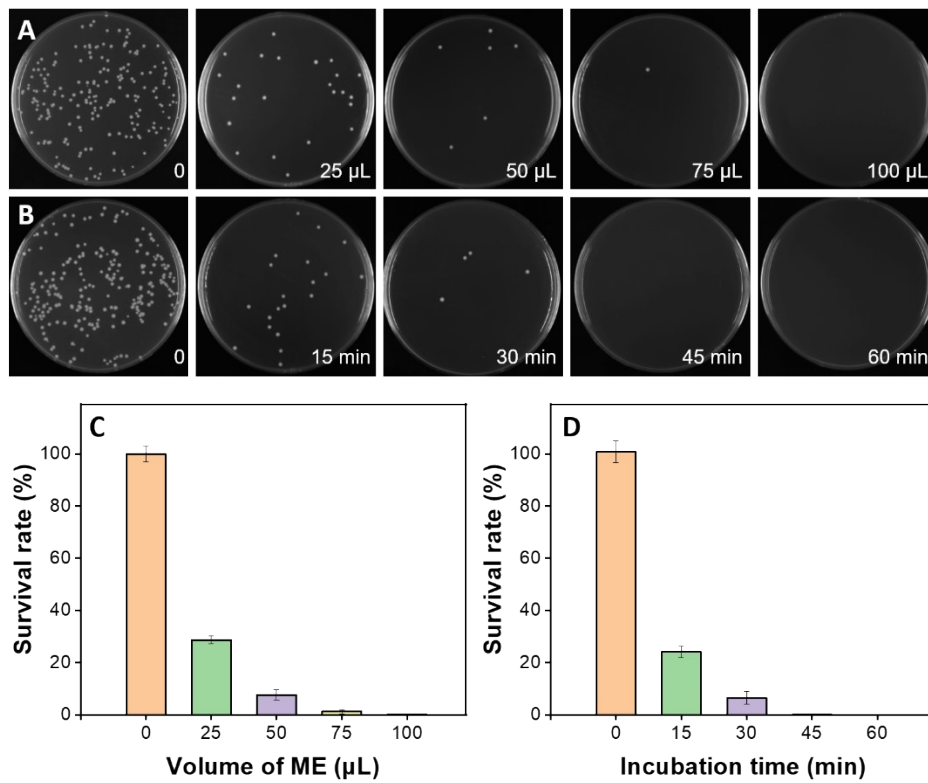


Fig S7. (A) Photographs of the number of *Coli.* colonies after co-incubation with different doses of ME (0, 25, 50, 75, 100 μL) for 45 min, (B) Photographs of the number of *Coli.* colonies after co-incubation with of ME (100 μL) for different time (0, 15, 30, 45, 60 min). (C) The quantitative analysis of bactericidal activity intensity of ME at different doses (0, 25, 50, 75, 100 μL) and incubation time (0, 15, 30 ,45, 60 min).

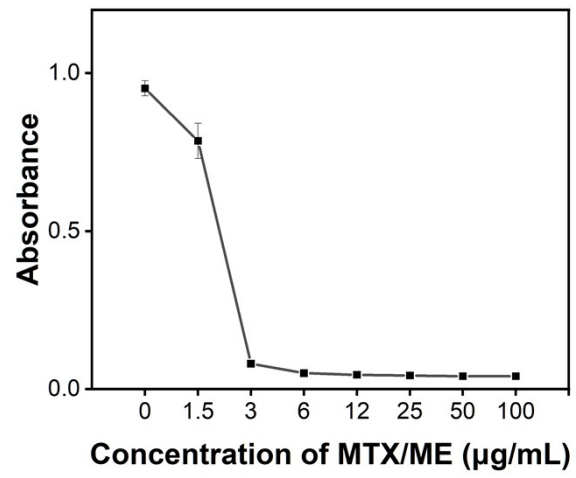


Fig S8. Minimum inhibitory concentration of MTX/ME (1.5, 3, 6, 12, 25, 50, 100 µg/mL).

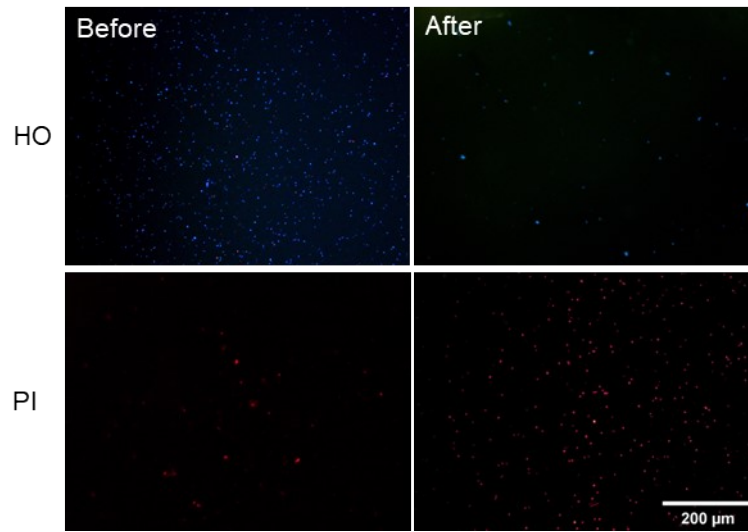


Fig S9. HO/ PI-stained images of *S. aureus* incubated with MTX/ME at 37°C for 30 min.

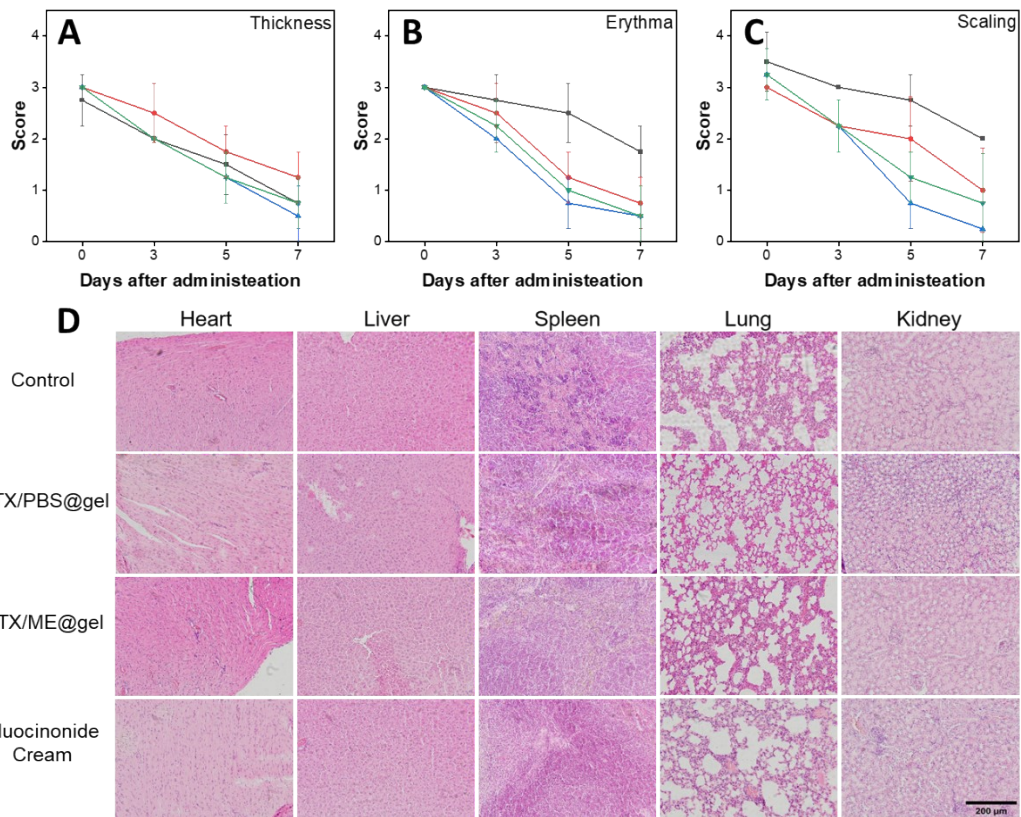


Fig S10. The symptom score PASI (thickness (A), scaling (B) and erythema (C)) of the skin of the four groups of mice on the 1st, 3rd, 5th, 7th day of treatment. (D) H&E staining of heart, liver, spleen, lung, and kidney slices after 7 days treatment for the different groups. Scale bar=200 μm.

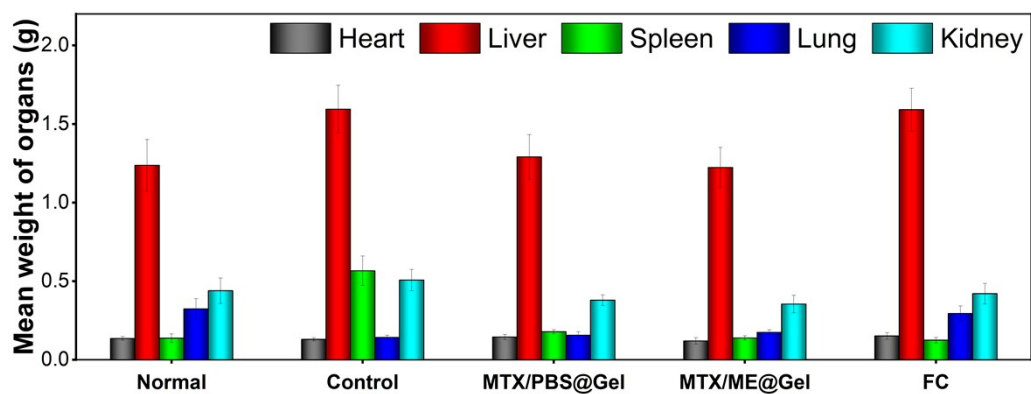


Fig S11. Visceral weight of mice after 7 days of treatment (PBS, MTX/PBS@Gel, MTX/ME@Gel, Fluocinonide cream).

Table S1. The tensile strength of the pure PNIPAM and Gel.

Sample	Thickness (mm)	Elastic Modulus (MPa)	Elongation at break (%)	Tensile Stress at break (MPa)	Tensile Strength (MPa)	Tensile yield stress (MPa)	Maximum Force (N)
PNIPAM	2	210.53	128.51	0.02	0.05	0.03	0.38
SF/PNIPAM	2	7.2	533.59	0.14	0.28	0.11	2.21