Supplementary Material

Fabrication of yeast β-glucan/sodium alginate/γ-polyglutamic acid composite particles for hemostasis and wound healing

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Experimental

Antibacterial experiments

Antibacterial activities of APGG particles against *S. aureus* (25923, ATCC) and *E. coli* (25922, ATCC) were investigated in solid LB agar plates. The tested samples were sterilized for 2 h under a UV lamp and dissolved in LB medium to afford different concentrations of solutions (1, 0.1, and 0.01 mg/mL). The solutions were mixed with bacterial suspensions and diluted. The bacterial suspensions (100 μL, 1×10^5 CFUs) were uniformly coated on the LB agar plates, and incubated at 37 ℃ overnight. The photos of the agar plates were taken with a camera. The bacterial colonies were counted and the bacterial survival ratio was calculated using the following equation:

$$Bacterial\ survival\ ratio = \frac{N_e}{N_c} \times 100\%$$

Where N_e and N_c indicate the bacterial colonies of experimental group and control group,

respectively.

Results

Antibacterial activity

The antibacterial activity of APGG particles against *S. aureus* and *E. coli* was investigated by the flat-coating method. As depicted in Fig. S1A, APGG particles showed no obvious antibacterial activities against *S. aureus* and *E. coli*. The Bacterial survival ratio showed no obvious decrease (Fig. S1B). These results might be caused by the fact that all the starting materials including CMG, SA, and γ-PGA showed no or moderate antibacterial effects *in vitro*.

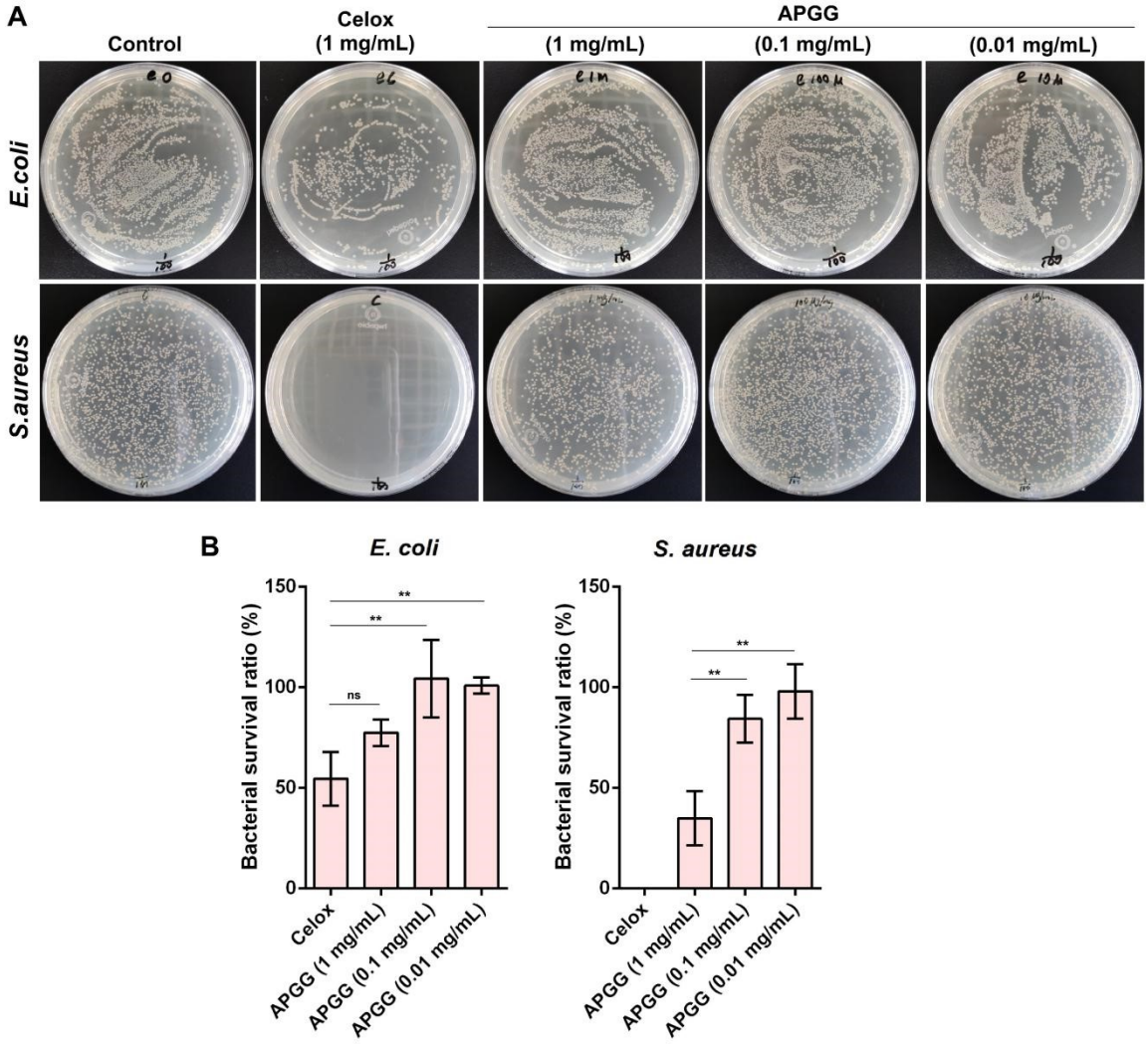

Fig. S1. (A) Antibacterial activity of APGG particles (APGG0.5) and Celox against *S. aureus* and *E. coli* analyzed on agar plates. (B) Bacterial survival ratio after treatment with APGG particles and Celox for 4 h. Data are presented as mean ± SD. $^{**}p < 0.01$.

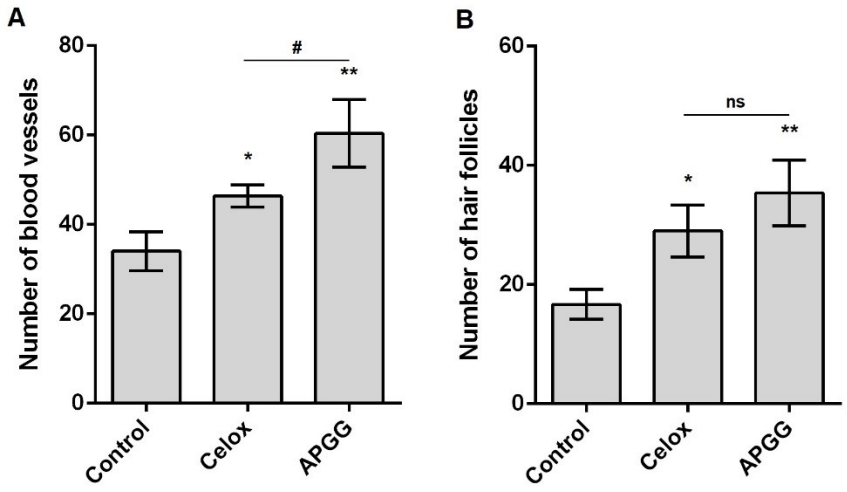

Fig. S2. (A) Number of blood vessels on the wound sites at day 7. (B) Number of hair follicles on the wound sites at day 14. Data are presented as mean ± SD. $^{**}p < 0.05$ and $^{**}p < 0.01$ vs Control, $^{\#}p < 0.05$ vs Celox.

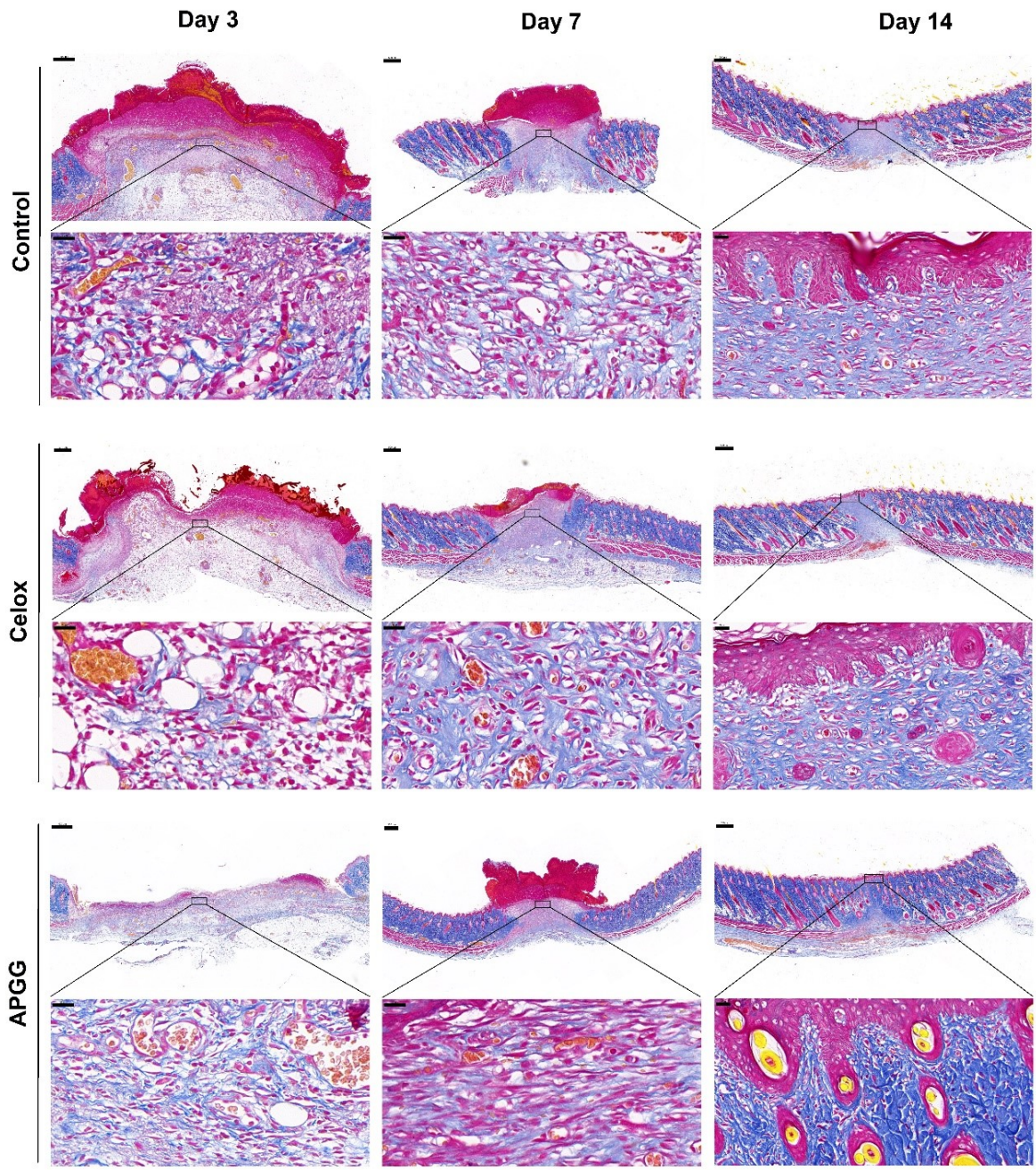

Fig. S3. Masson's trichrome staining of wound tissues at day 3, 7 and 14, n = 3 per group. Scale bar is 500 μm for the original pictures, scale bar is 20 μm for the enlarged pictures.

Table S1. Hemostasis time of APGG and Celox in a liver rupture bleeding model.

Samples	APGG	Celox
Approximately hemostatic time	< 20 seconds	> 30 seconds