

Metal-organic framework-based nanoplatform accelerates soft tissue healing for treating periodontitis

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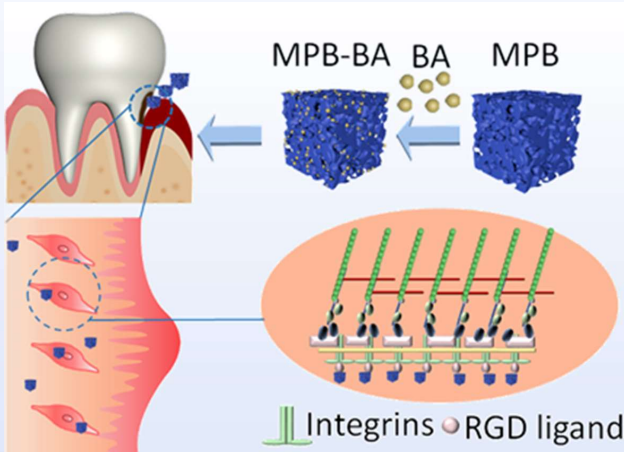
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Introduction



Scheme 1 Diagram of periodontitis treatment.

Baicalein-loaded mesoporous Prussian blue (MPB-BA) nanoplatform is fabricated to promote fibroblasts adhesion and migration for treating periodontitis.

Methods

We investigated

- (1) Cell proliferation assay
- (2) Transwell migration assay
- (3) Scratch wound healing assay
- (4) Immunofluorescence staining for cell adhesion and qRT-PCR analysis
- (5) *In vivo* animal experiment

Results

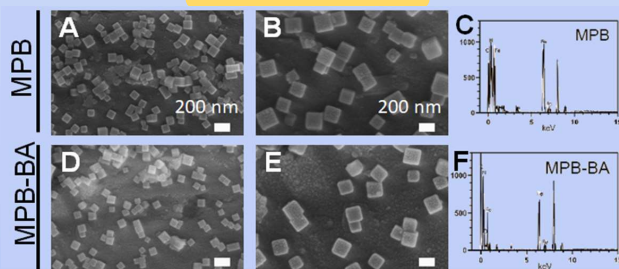


Fig. 1 SEM and EDS for MPB and MPB-BA.

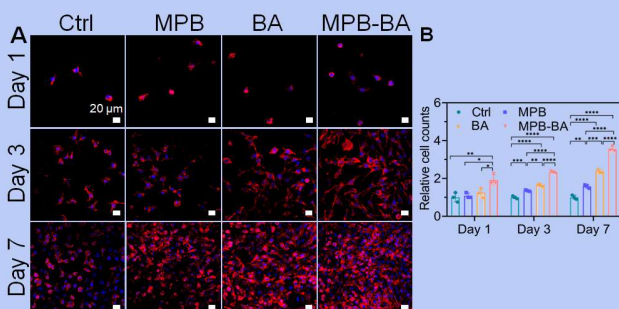


Fig. 2 Cell proliferation assay.

Fig. 2 Cell proliferation assay revealed improved proliferative effect of MPB-BA, compared with the MPB and BA groups.

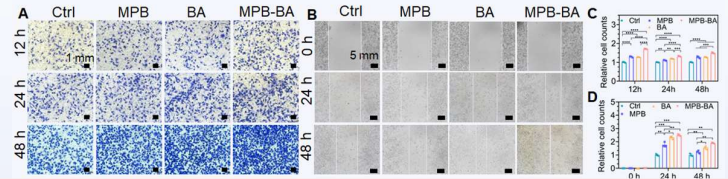


Fig. 3 Transwell assay and scratch wound healing assay. Fig.3 Transwell migration and scratch wound healing assays displayed that MPB, BA, MPB-BA significantly increased the cell migration capability ($p < 0.01$), with MPB-BA exhibiting the best migration capability.

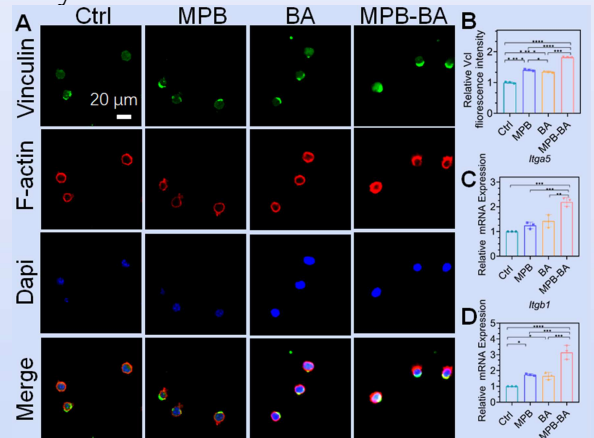


Fig. 4 IF staining and qRT-PCR analysis.

Fig. 4 Increased vinculin immunofluorescence staining and upregulated *Integrin alpha5 (Itga5)* and *beta1 (Itga1)* gene levels implied that MPB-BA facilitated FA formation ($p < 0.01$).

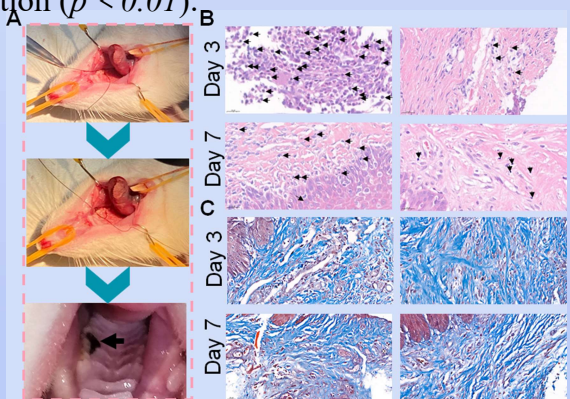


Figure 5 *In vivo* animal experiment.

Fig.5 *In vivo* animal experiments indicated that MPB-BA could impede inflammatory progression and induce collagen fiber restoration in experimental periodontitis.

Conclusion

In this study, MPB-BA nanoplatform demonstrated improved fibroblast cell adhesion and migration *in vitro* and promote soft tissue healing *in vivo*. Our findings provide a promising strategy for treatment of periodontitis.