

Supplementary Materials for

Dissolved oxygen from microalgae-gel patch promotes chronic wound healing in diabetes

Huanhuan Chen, Yuhao Cheng, Jingrun Tian, Peizheng Yang, Xuerao Zhang, Yunhao Chen, Yiqiao Hu*, Jinhui Wu*

*Corresponding author. Email: huyiqiao@nju.edu.cn (Y.H.); wuj@nju.edu.cn (J.W.)

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Figs. S1 to S8

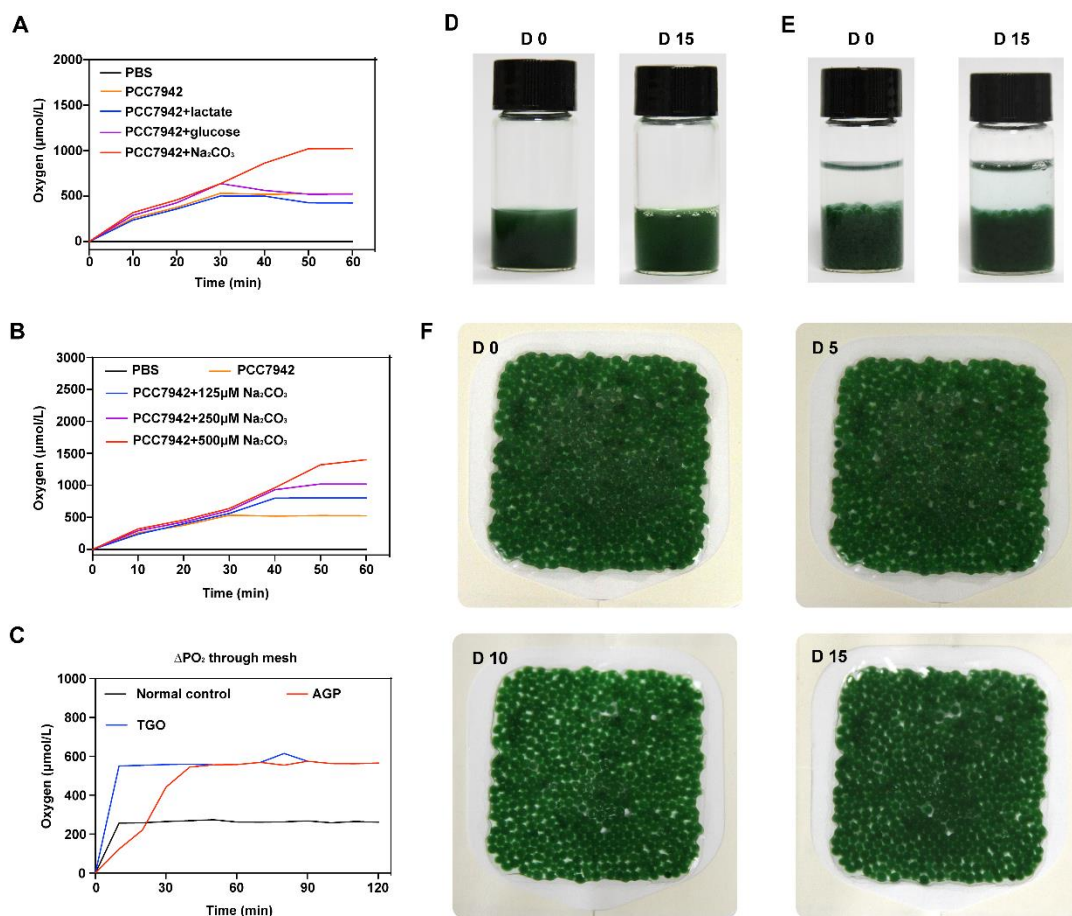


Fig. S1. Releasing dissolved oxygen of *S. elongatus* PCC7942. (A) Comparison releasing dissolved oxygen of *S. elongatus* PCC7942 with different carbon source. (B) Comparison releasing dissolved oxygen between the *S. elongatus* PCC7942 (1×10^9 cells/mL) supplement with different concentration of Na_2CO_3 . (C) Transfer of dissolved oxygen for control recording into saline at 37 °C. (D and E) Images of *S. elongatus* PCC7942 solution and alga-gel at day 0, 15 at 4 °C. (F) Images of AGP at day 0, 5, 10, 15 at 4 °C, respectively.

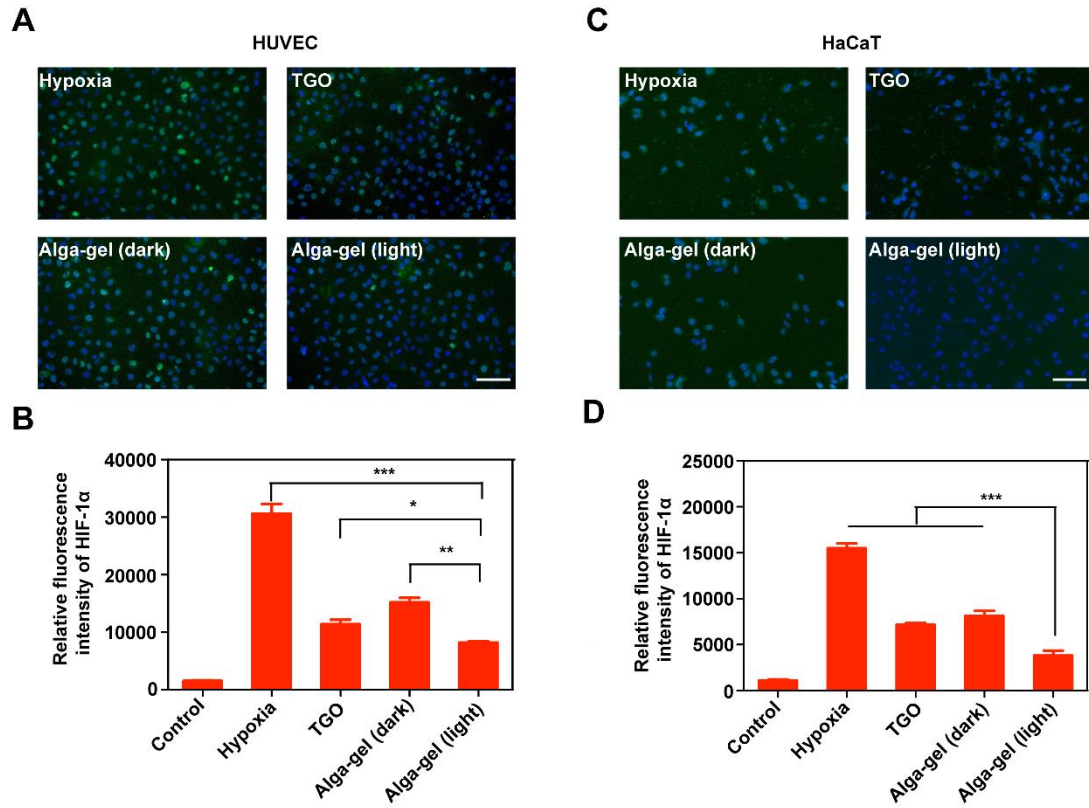


Fig. S2. The expression of HIF-1 α on high glucose induced-cells. (A and B) The expression of HIF-1 α on high glucose induced in HUVECs (n=3). Scale bars, 200 μ m. **(C and D)** The expression of HIF-1 α on high glucose induced in HaCaT (n=3). Scale bars, 200 μ m. Significantly different (one-way ANOVA): * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

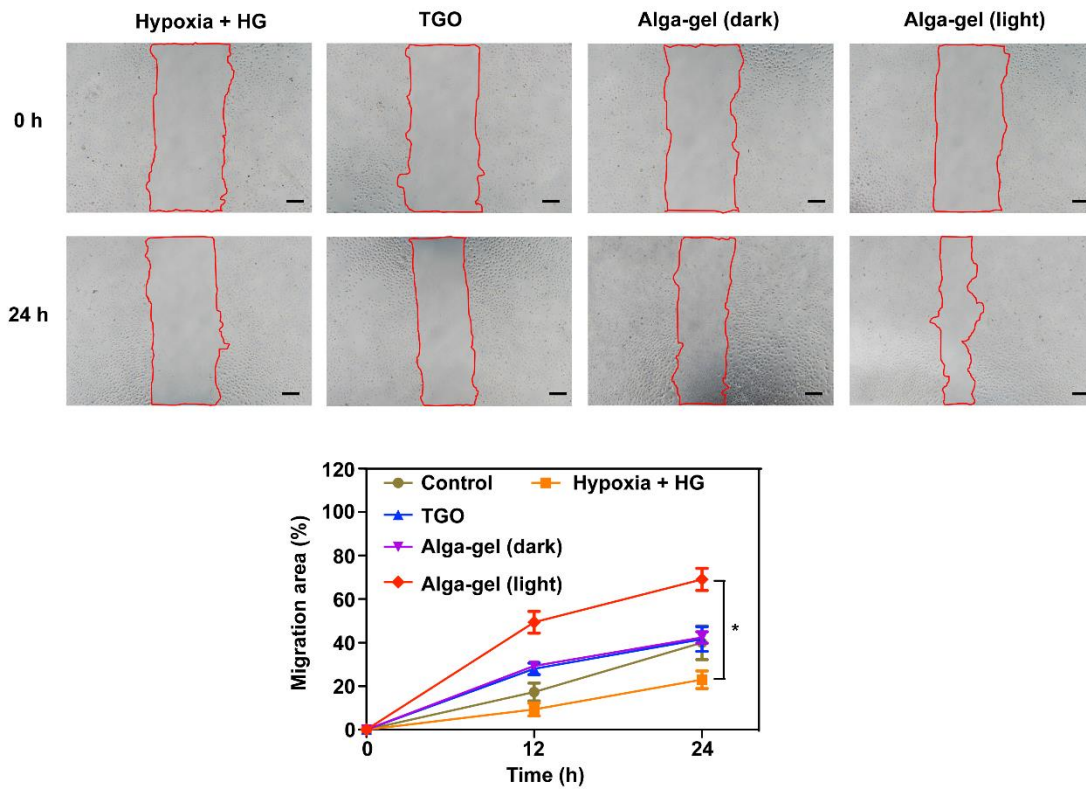


Fig. S3. Alga-gel promotes HUVEC cell-migration. (A and B) Representative images and quantification of HUVEC cell-migration (n=3). Scale bars: 200 μ m. Significantly different (one-way ANOVA): * $P < 0.05$.

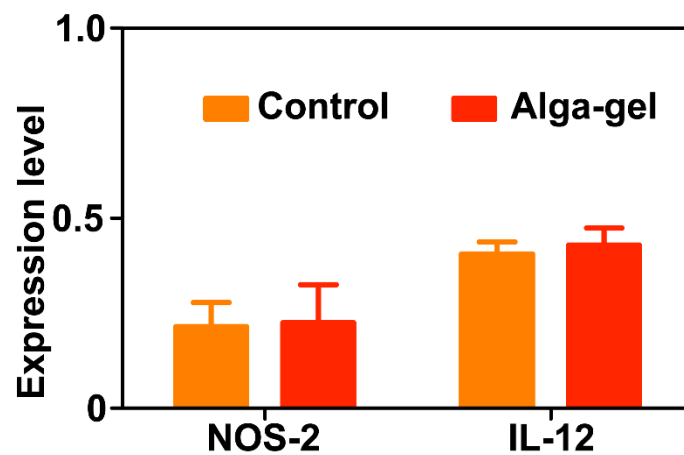


Fig. S4. Alga-gel does not evoke immune response.

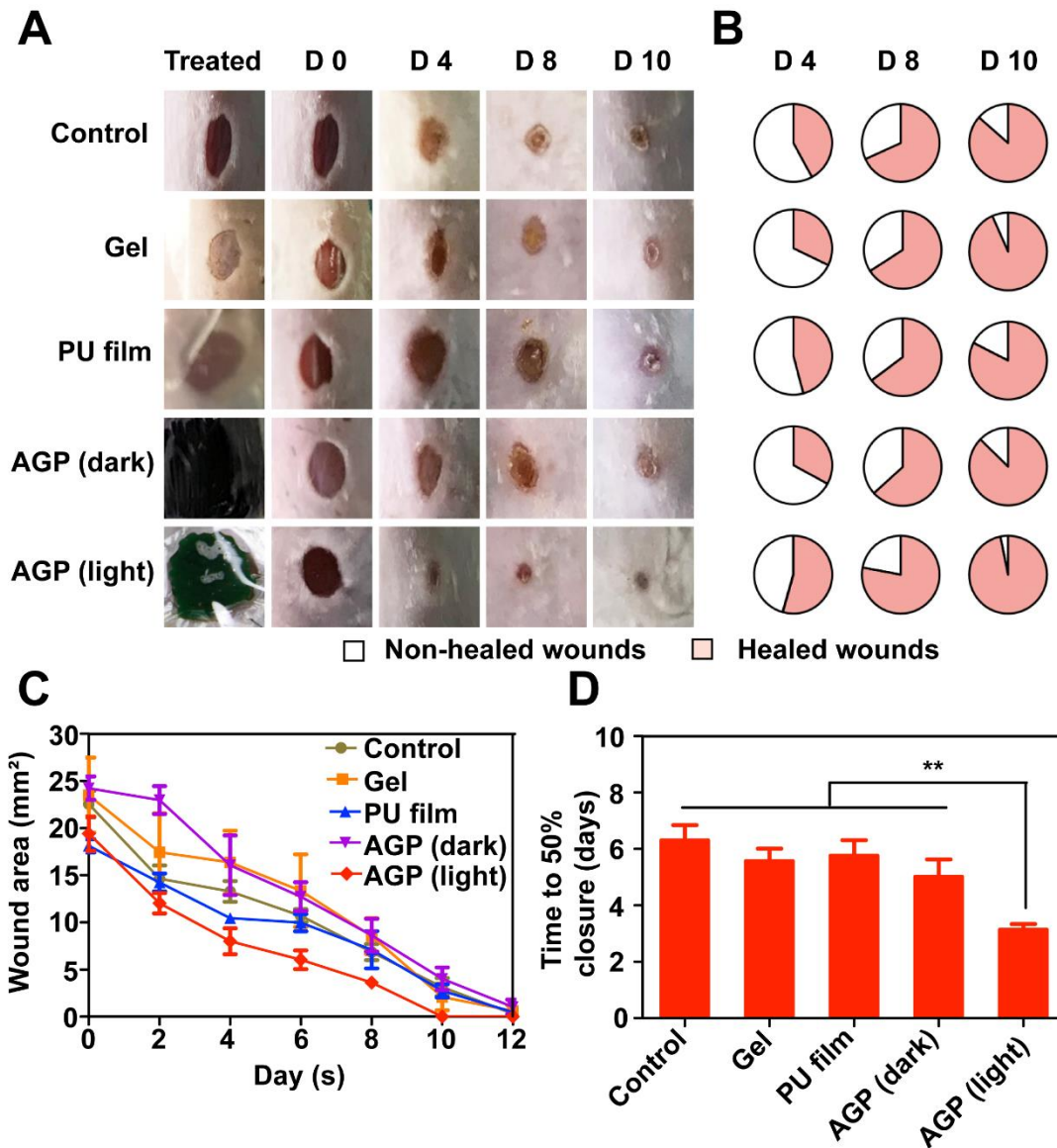


Fig. S5. AGP promoted acute wound healing. (A) Representative images of the wound area by different treatments on day 0, 4, 8 and 10 after operation. (B) Fractions of wounds healed by different treatments at days 0, 4, 8 and 10. (C) Wound area over time in mice by different treatment. (D) Summary of the 50% wound-closure times ($n \geq 6$). Significantly different (one-way ANOVA): $**P < 0.01$.

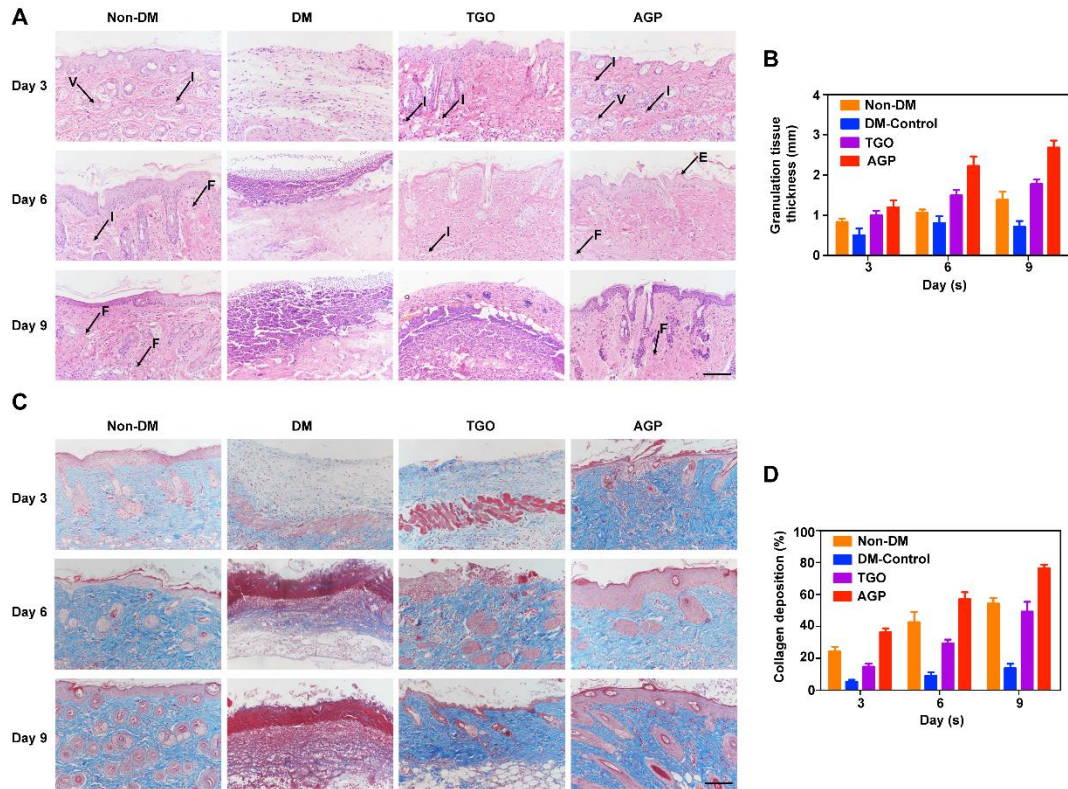


Fig. S6. Wound healing at the inflammatory and proliferative stages in different groups. (A and B) H&E staining of the wound area reflected the regenerated skin at day 3, 6, 9 (n=3). Scale bars, 100 μ m. (C and D) Masson staining of the wound area reflected the regenerated skin at day 3, 6, 9 (n=3). Scale bars, 100 μ m. (V vessels; Fibroblast cell; I inflammatory cell; F fibroblast cells; E epidermis)

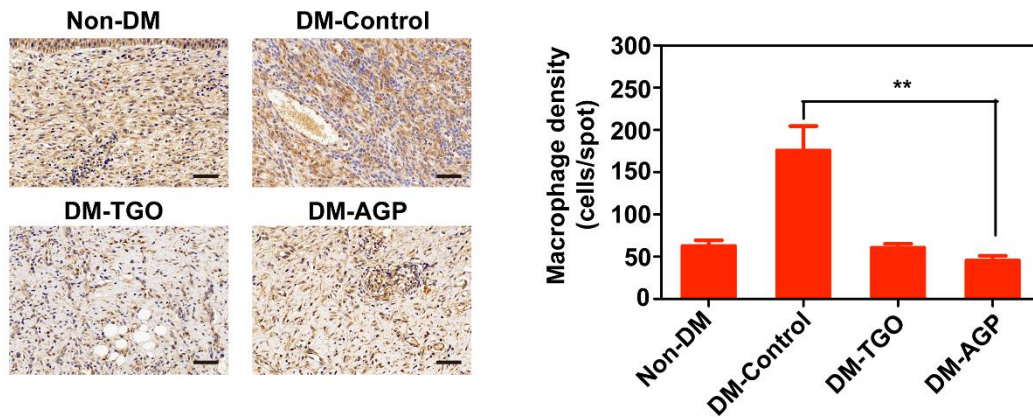


Fig. S7. The immunohistochemical images the average macrophage densities in different groups at day 9 (n=3). Scale bars, 50 μ m. Significantly different (one-way ANOVA): ** $P < 0.01$.

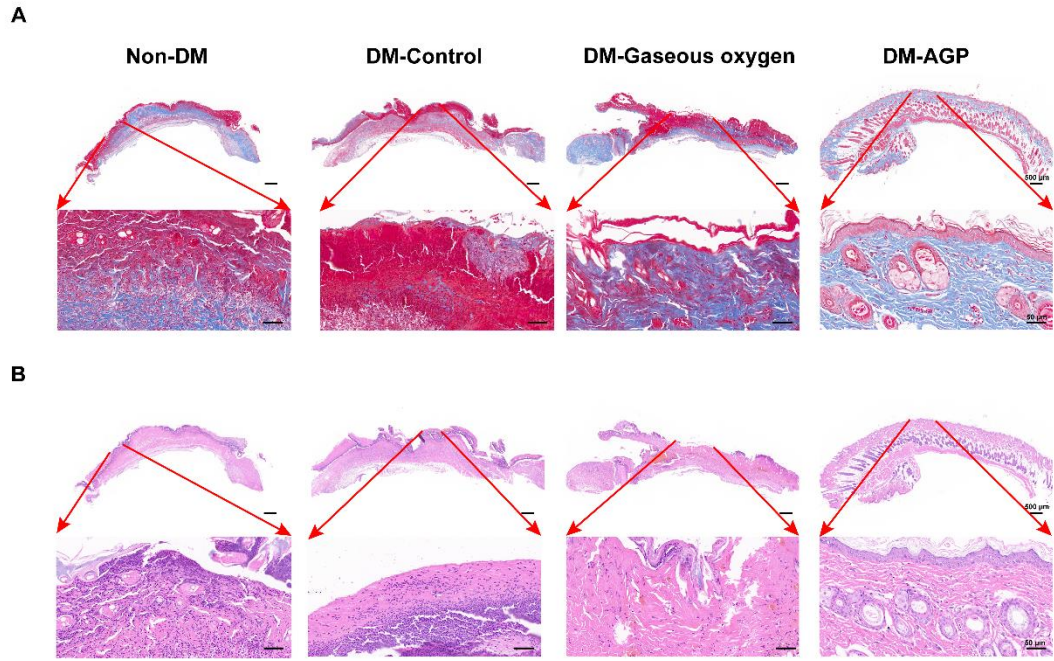


Fig. S8. Staining of the flap necrosis in different groups at day 6. (A and B)
Masson and H&E staining.