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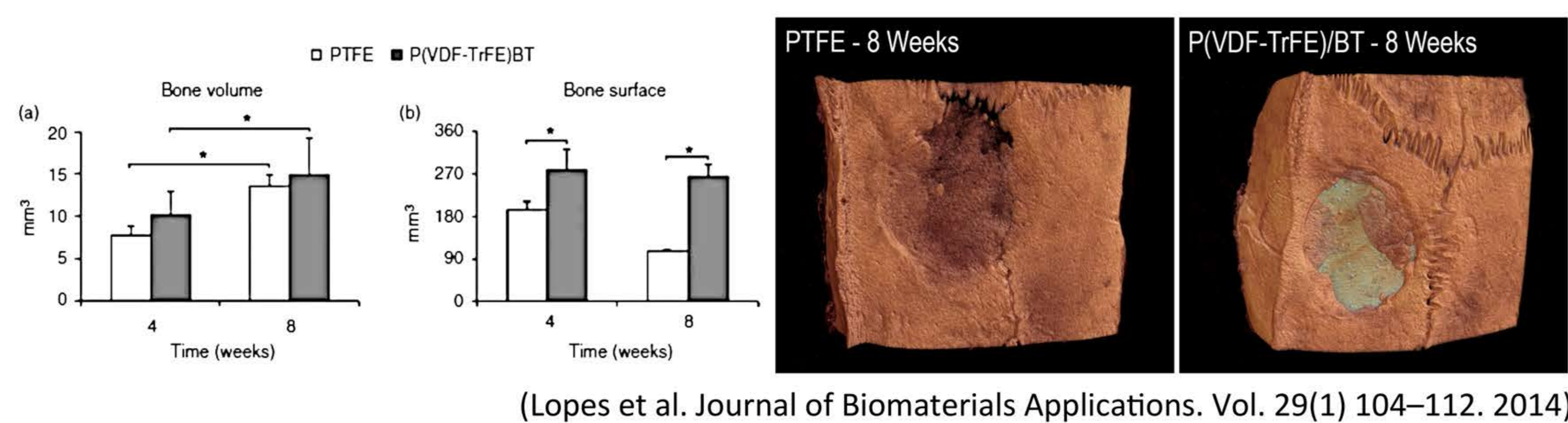
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Purpose of Study

The aim of this study was to investigate a possible mechanism involving miRs and RANKL in the osteogenic potential of the Poly(vinylidene-trifluoroethylene)/barium titanate composite membrane (PVDF).

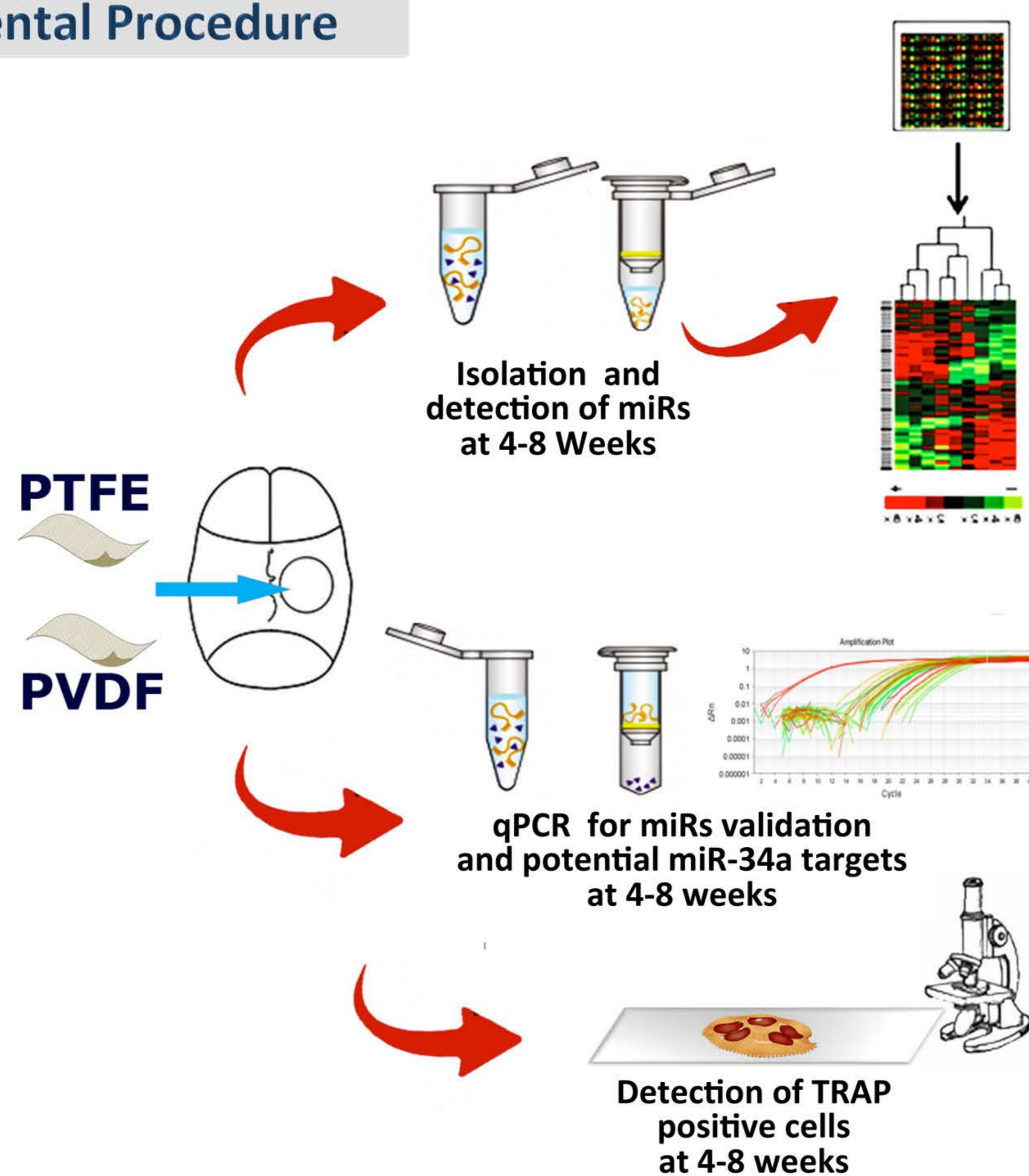
Background

Barrier membranes have been extensively used in dentistry to prevent soft tissue down-growth into the bone defects and to promote alveolar ridge augmentation. Previous studies of our group showed that the PVDF enhances both the in vitro osteoblastic differentiation and the in vivo bone repair compared with a commercially available polytetrafluoroethylene (PTFE) membrane.



(Lopes et al. Journal of Biomaterials Applications. Vol. 29(1) 104–112. 2014)

Experimental Procedure



Concluding Remark

PVDF membrane induces higher bone repair, at least in part, by triggering an intracellular mechanism of miR-34a upregulation/RANKL downregulation loop, which inhibits osteoclastic activity.

Results

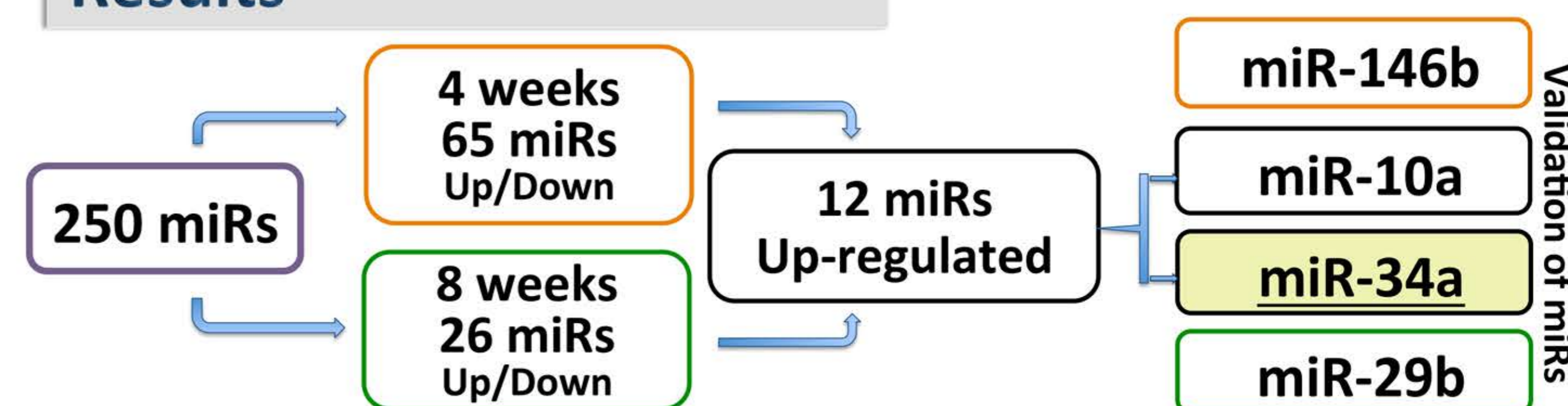


Figure 1. miR detected at fold change ≥ 2 (up or downregulated) $p < 0.05$ and $q\text{-value} < 0.05$

Validation of miR Expression

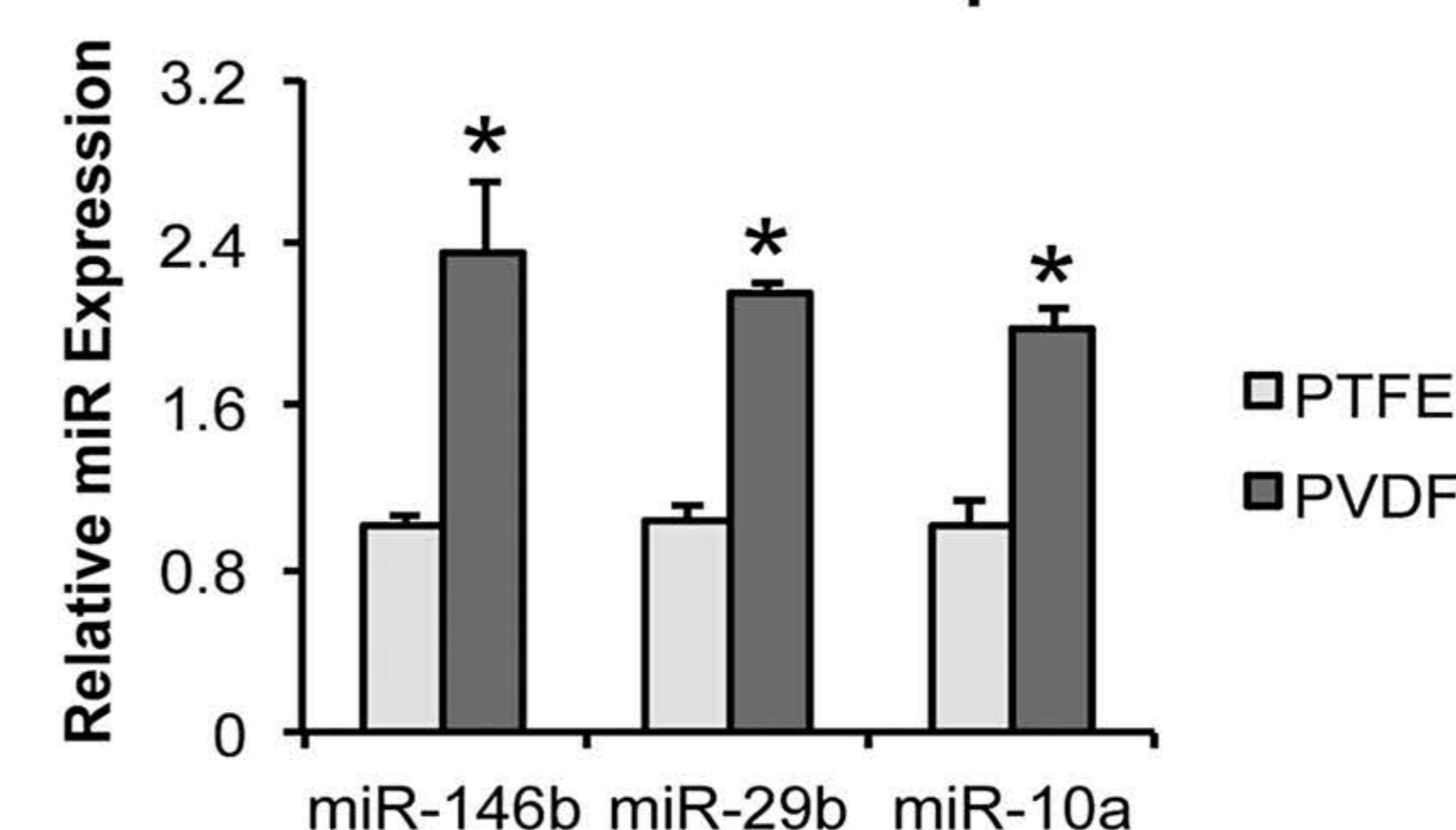


Figure 2. Expression of miR-146b at 4 weeks, and miR-29b and -10a at 8 weeks. * indicate statistical significant difference ($p \leq 0.05$).

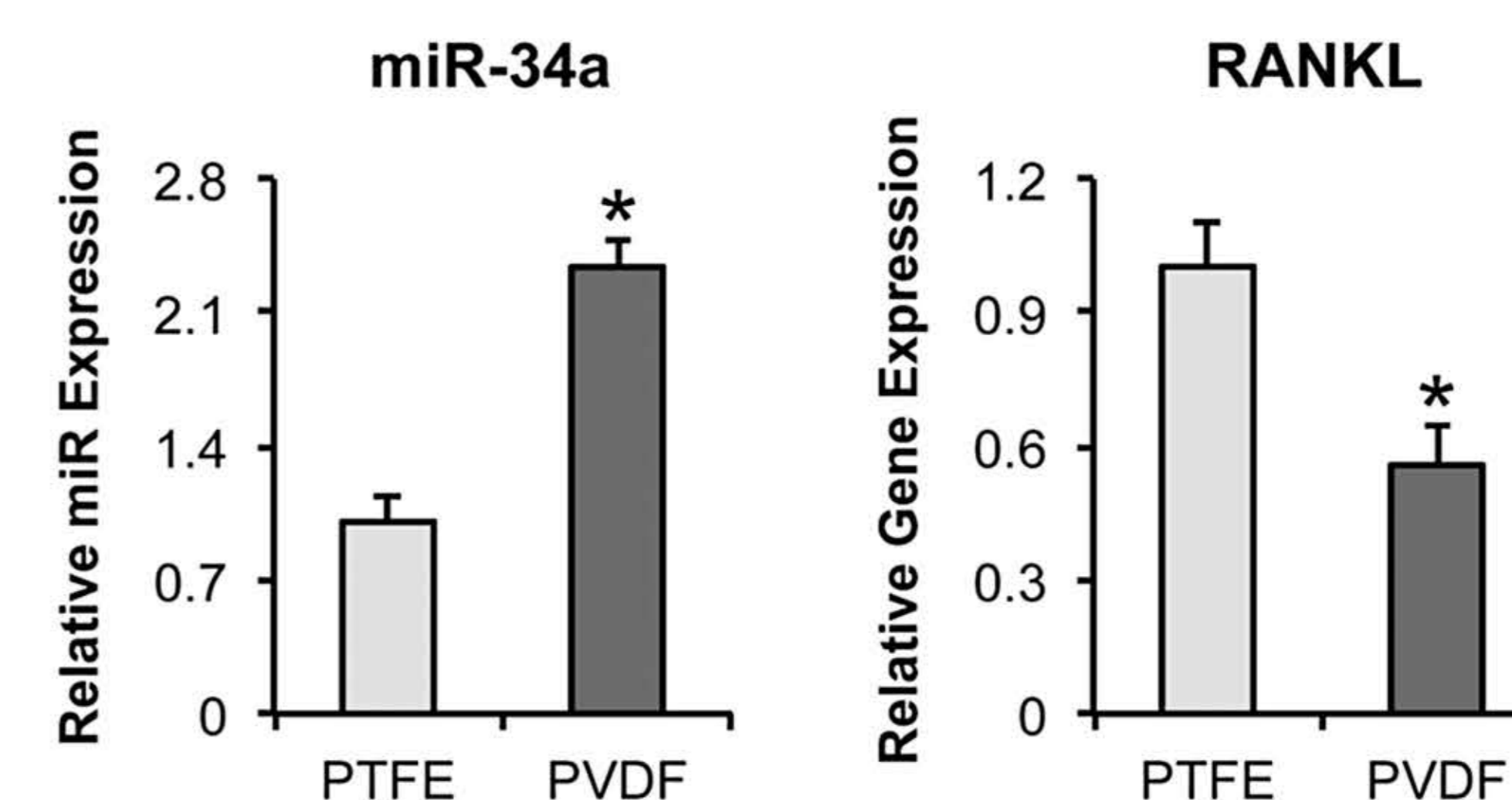


Figure 3. Expression of miR-34a and RANKL at 8 weeks. * indicate statistical significant difference ($p \leq 0.05$).

Potential miR-34a Targets

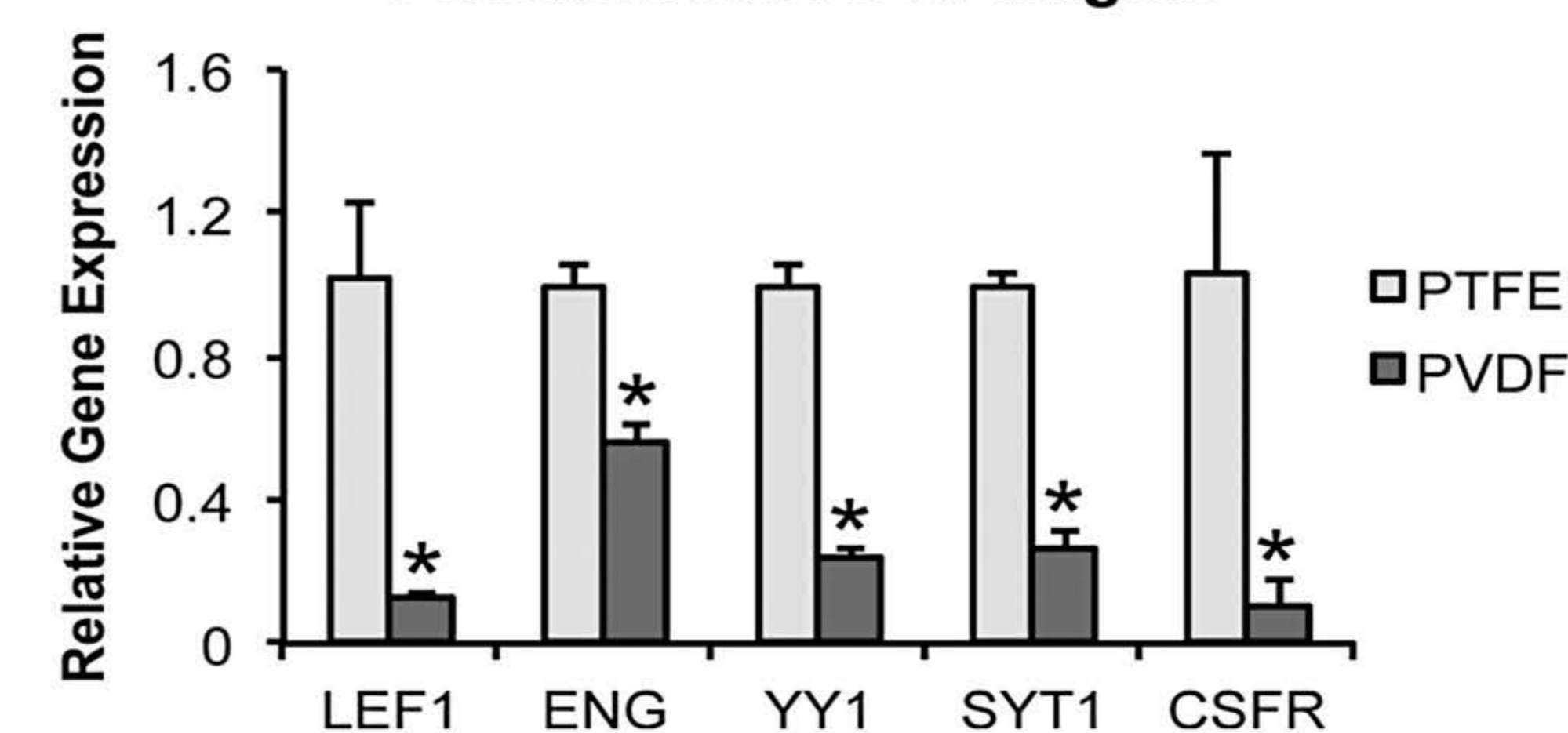


Figure 4. Expression of miR-34a targets at 8 weeks. * indicate statistical significant difference ($p \leq 0.05$).

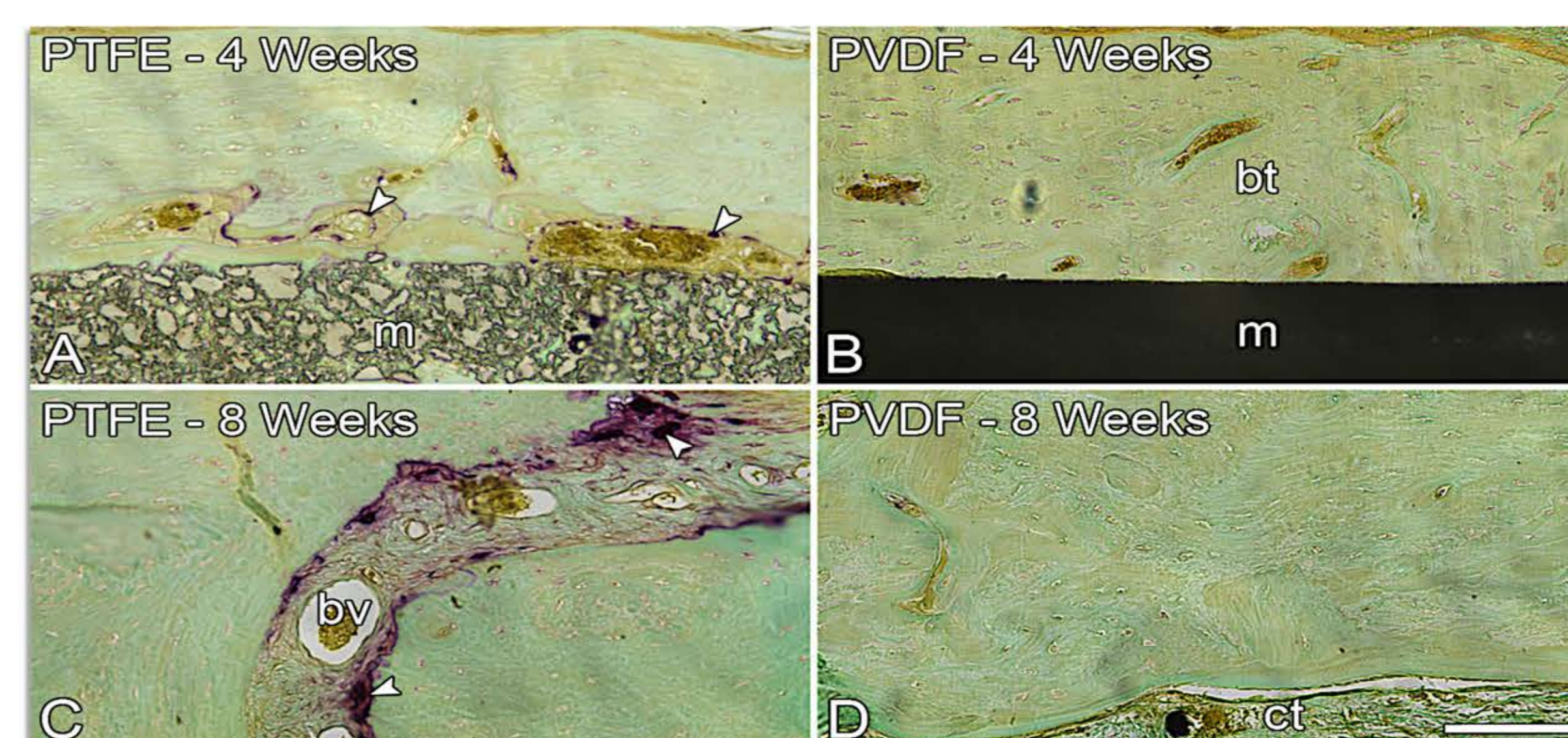


Figure 5. Light microscopy of rat calvarial bone defects implanted with (PTFE; A and C) or (PVDF; B and D) membrane at 4 (A and B) and 8 (C and D). bt: bone tissue; bv: blood vessel; ct: connective tissue; m: membrane. Scale bar: A–D = 100 μm .