

INTRODUCTION

Transdermal deferoxamine patch (DFO) is a novel experimental treatment with potential to reduce radiation-induced skin injury in breast cancer patients undergoing radiation. However, DFO safety in oncological settings has not been extensively explored.

Goal: Thus, the purpose of this study is to investigate the effects of DFO on mammary tumor cell biology using xenograft murine breast cancer model.

STUDY DESIGN

Animal model: Human breast cancer in a xenograft murine model

Cancer cell line: MCF7-luc

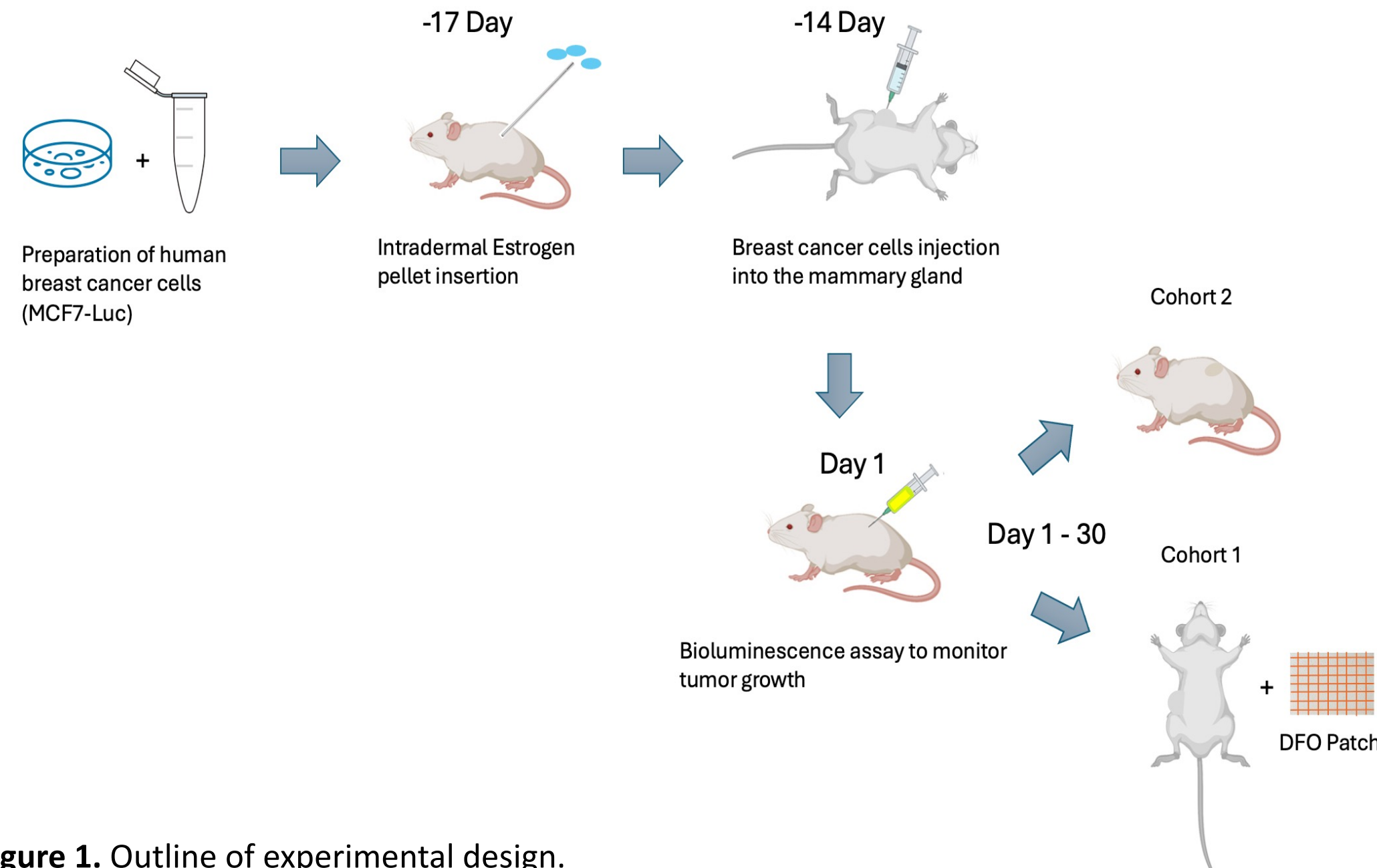


Figure 1. Outline of experimental design.

Study design: To support tumor growth estrogen pellet was inserted subcutaneously three days before MCF7-luc breast cancer cells implantation into mammary gland. The *in vivo* tumor growth was evaluated weekly immediately after luciferin injection using LAGO bioluminescence imaging system until study endpoint. Once tumor reached desired size (bioluminescence intensity $\sim 1 \times 10^8$) DFO patches were applied daily for 30 days. Non-treated mice served as control. Changes in mice weight and activity were monitored. On the day of tissue harvesting tumor and skin tissue were preserved to evaluate DFO effect on cell proliferation and vascularization. Tumor volume and weight were recorded.

RESULTS

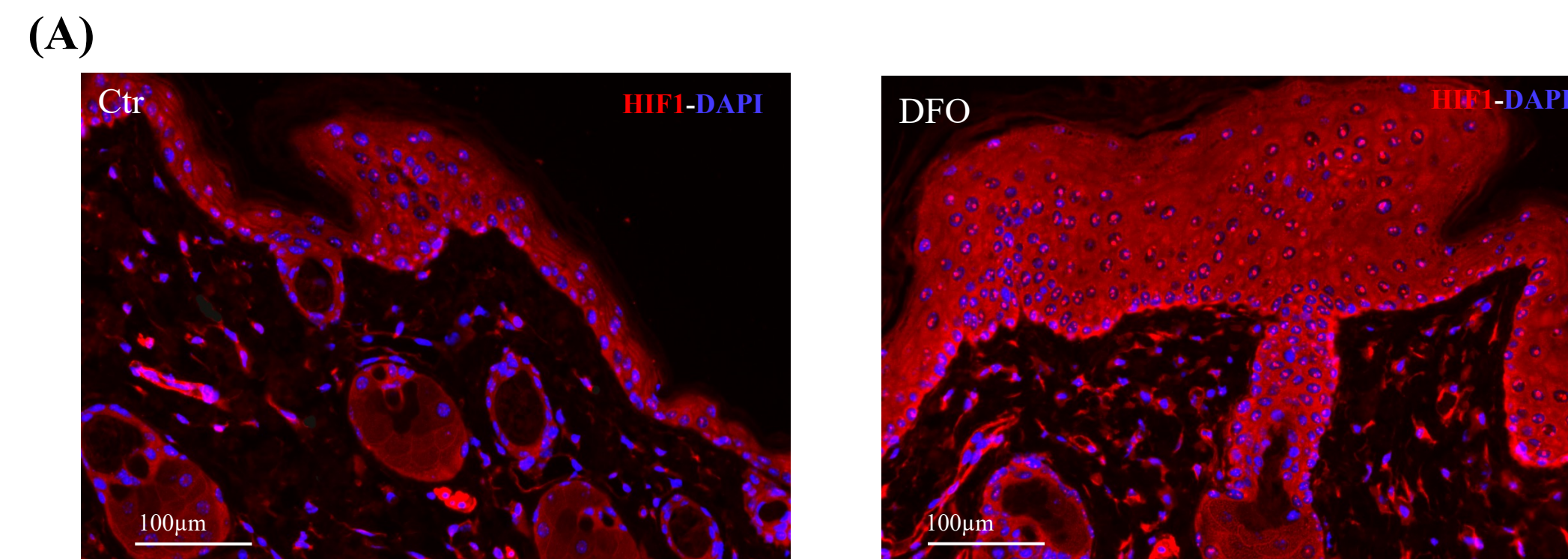


Figure 2. IF staining showed stabilization of HIF1a in the DFO-treated skin compared to non-treated control. Representative images of IF staining of HIF1a for control and DFO-treated skin.

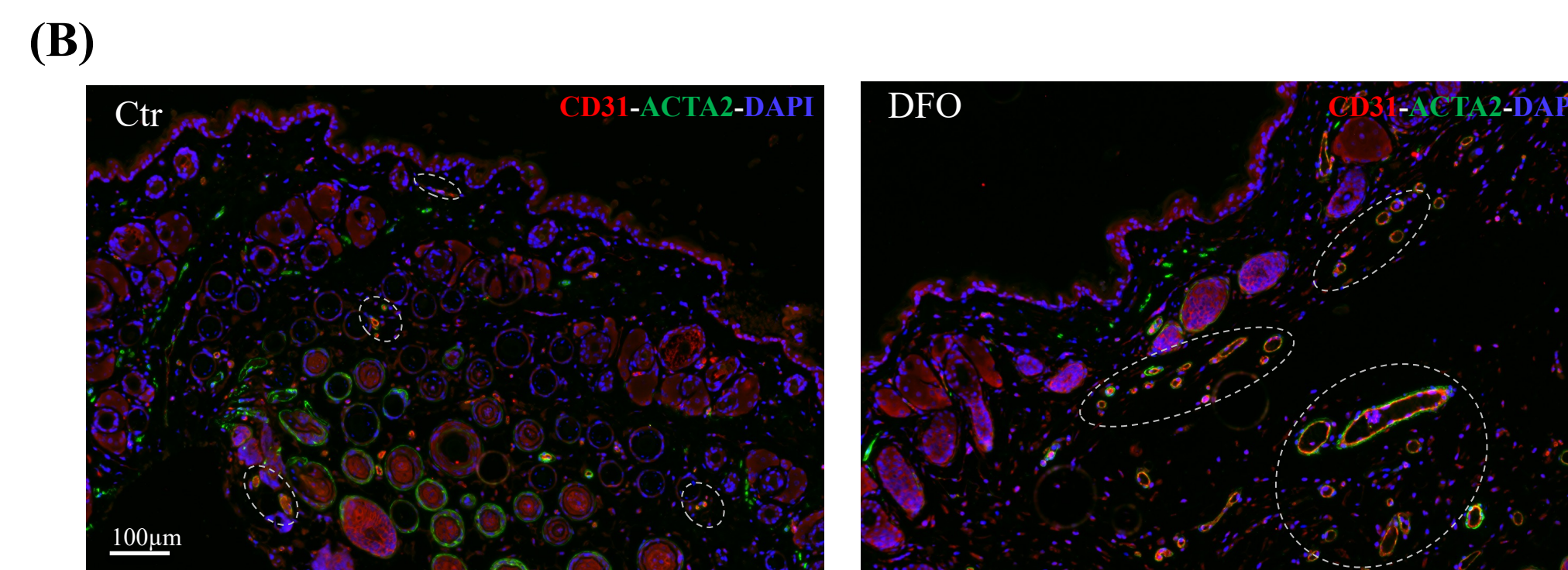
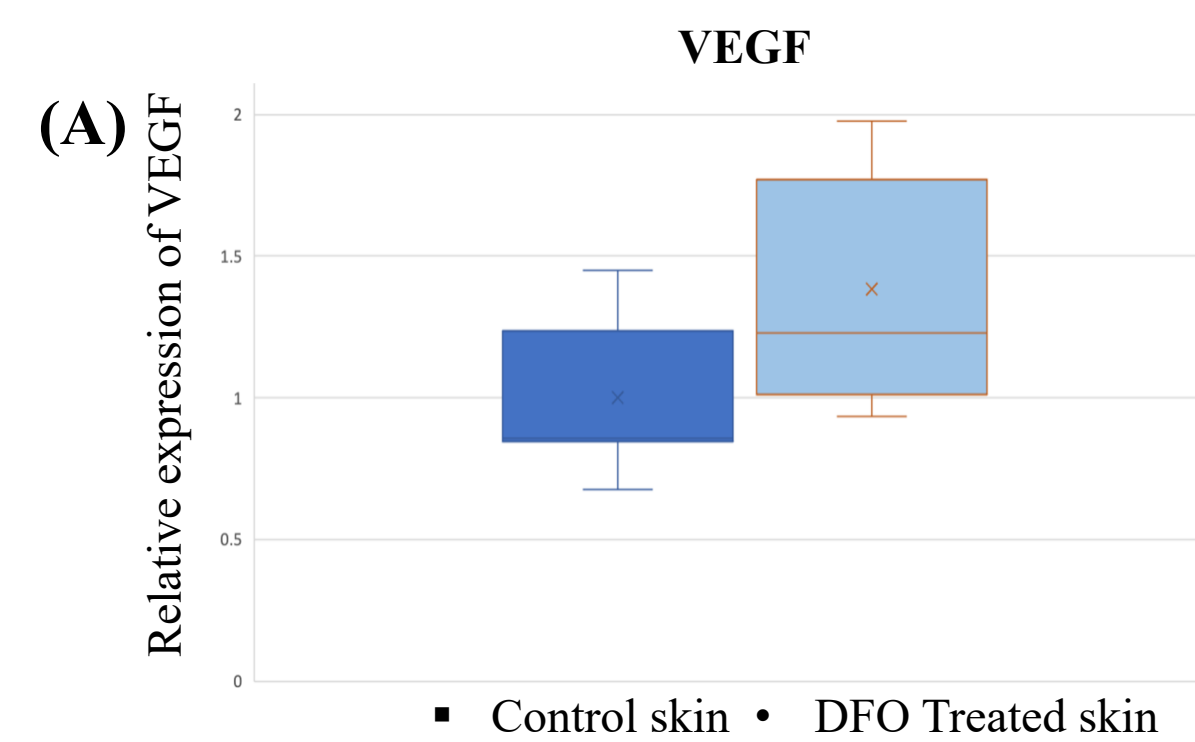


Figure 3. The qRT-PCR analysis for VEGF showed no significant statistical difference in expression of VEGF on DFO-treated skin compared to control, although staining of CD31 and ACTA2 showed increase in blood vessel formation in DFO-treated skin compared to control. (A) qRT-PCR analysis for VEGF (B) Representative images of IF staining of CD31 and ACTA2 for control and DFO-treated skin.

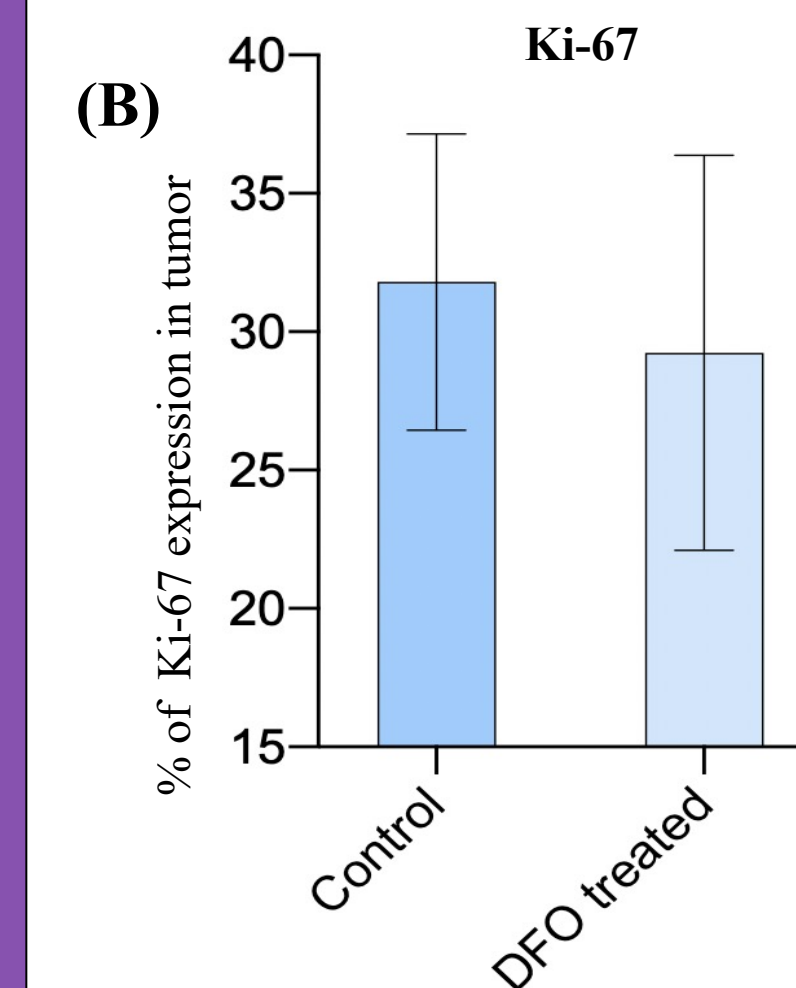
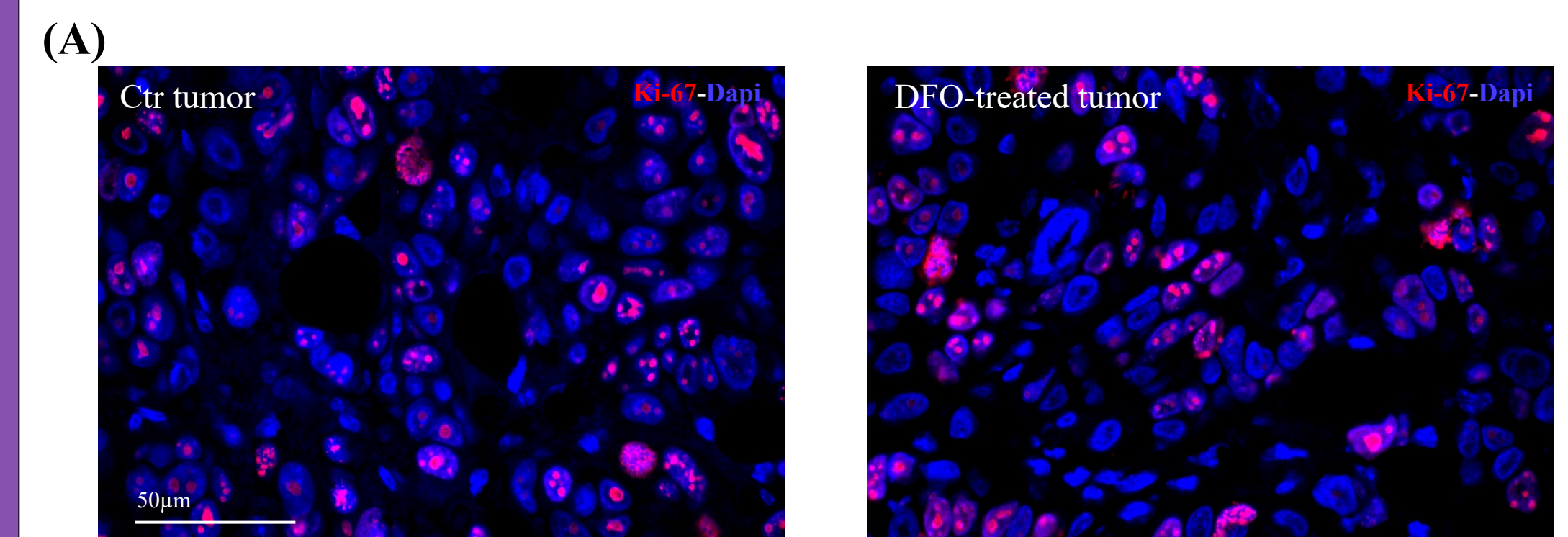


Figure 5. IF staining and quantitative analysis showed no significant changes in Ki-67 expression between untreated tumor versus DFO-treated tumor. (A) Representative images of IF staining of control and DFO treated tumor, (B) quantitative analysis of the number of Ki-67 positive cells for control and DFO treated tumor.

CONCLUSIONS

- This study suggests that transdermal deferoxamine patch treatment has potential to improve the regenerative processes in skin, by stimulating blood vessel formation at least partially through HIF1a stabilization.
- There is no differences in tumor growth based on cancer cells proliferation data.
- Additional data is being analyzed, including evaluation of HIF1a stabilization and blood vessel formation, to further evaluate the effects of DFO on tumor cells.
- Future direction: to evaluate the effect of DFO on radiation efficacy.