Local Inflammation Response of Salbutamol Formulations on *ex-vivo* Mouse Skin

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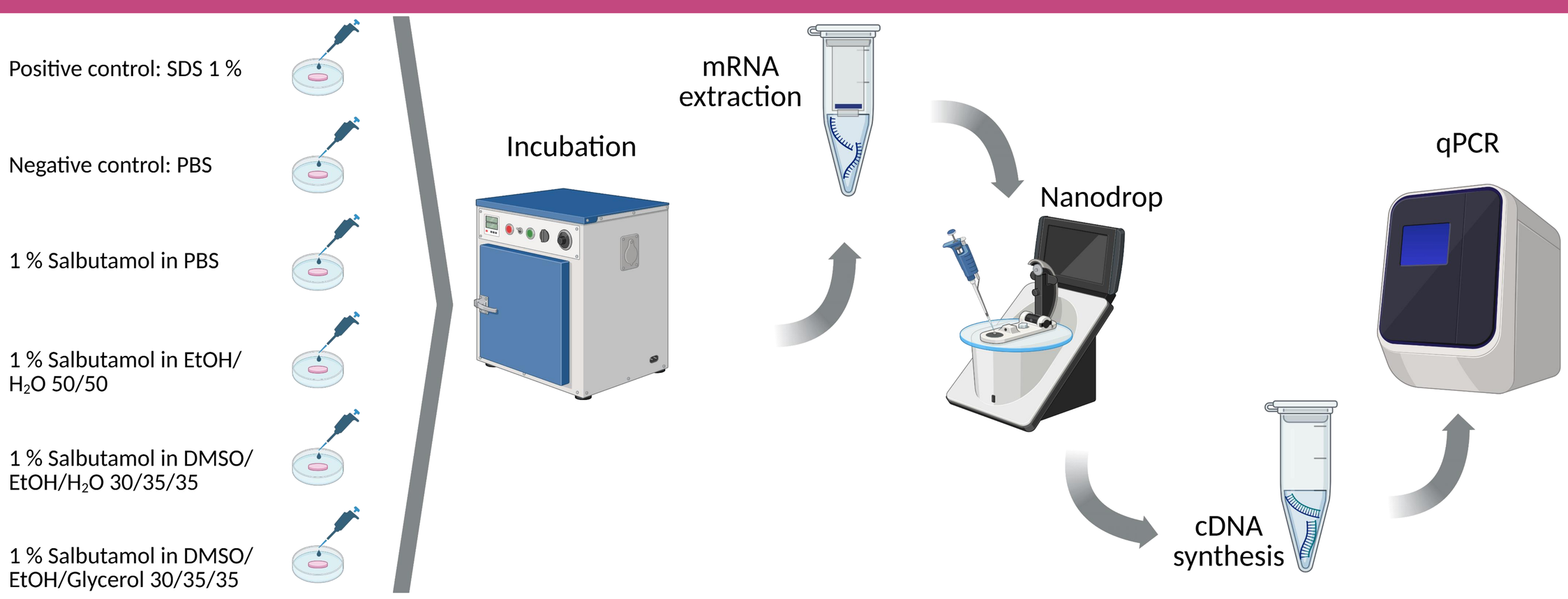
Introduction

- Salbutamol: treatment of bronchial diseases like asthma →Studies of transdermal application [1]
- Salbutamol is also a promising therapeutic agent for obesity as it is able to promote thermogenesis [2]

To ensure the safety of topical application, it is necessary to evaluate the **local skin sensitivity of salbutamol**

- different solvents with penetration-enhancing properties: dimethyl sulfoxide (DMSO), ethanol (EtOH), glycerol →all commonly used in formulations for the skin
- compared to irritant sodium dodecyl sulfate (SDS) and negative control phosphate buffered saline (PBS)

Methods



Results

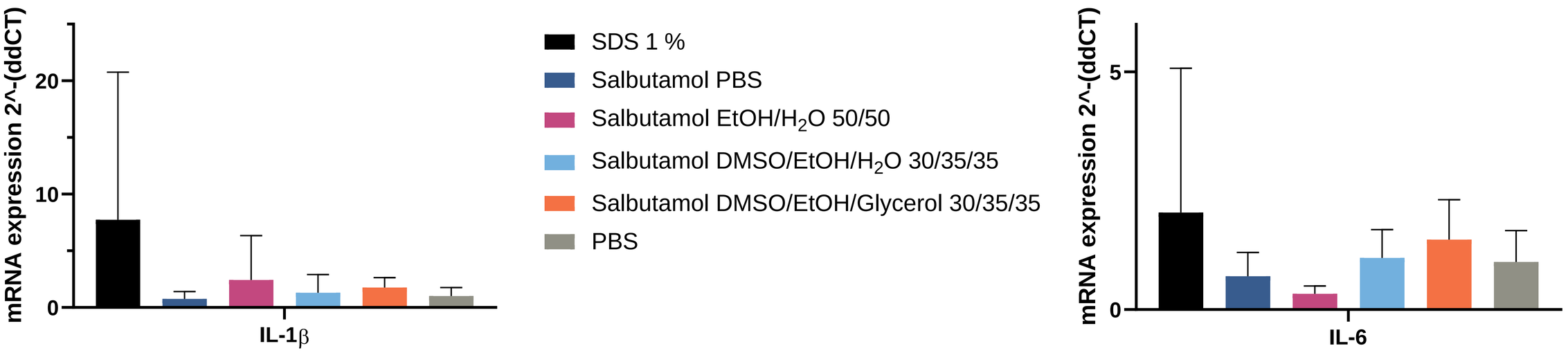


Figure 1: mRNA expression of IL-1β and IL-6 after 6 hours of treatment with 1% salbutamol formulations and a combination of different solvents on mouse skin. 1% SDS was used as a positive control and PBS as a negative control.

- Irritant SDS: mRNA expression increased 8-fold (IL-1β) and 2-fold (IL-6) compared to negative control PBS
- 1 % Salbutamol in PBS: similar to PBS alone for both IL-1β and IL-6
- Salbutamol formulations containing penetration enhancers: slight increase can be seen compared to PBS, but no difference can be seen between these three formulations for IL-1β
- For IL-6 DMSO appears to have the greatest influence on the mRNA expression; 1 % salbutamol in 50/50 EtOH/MilliQ water had no effect on mRNA expression

Conclusion

- Investigation of local inflammatory responses in an *ex-vivo* mouse skin model was successful
- Salbutamol dissolved in PBS did not lead to increased mRNA expression of IL-1β and IL-6
- Salbutamol formulations containing additional penetration enhancers showed slightly increased mRNA expressions for IL-1β and IL-6 →lower than when SDS was used

References

[1] Murthy SN, Hiremath SR. Int. J. Pharm. 2004:47–53.

[2] Straat ME et al. Cell Rep Med. 2023:4:100942.

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