

Hyaluronic Acid as Burn Healing Modulator: Experience in Rat Model

Daria Cherkashina, Olena Revenko, Serhii Balak, Oleksandr Petrenko
Institute for Problems of Cryobiology and Cryomedicine,
National Academy of Sciences of Ukraine, Kharkiv, Ukraine

INTRODUCTION & AIM

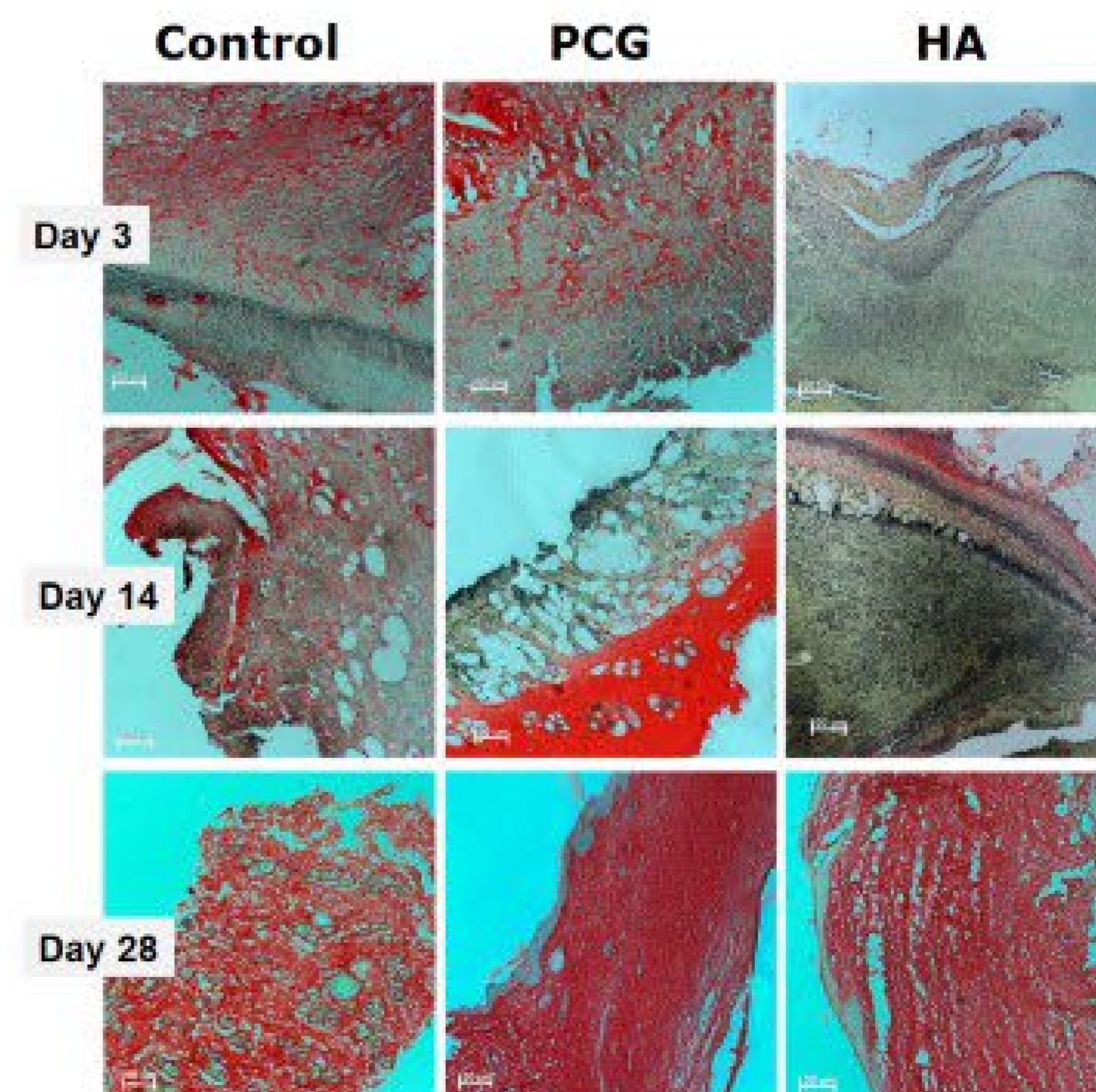
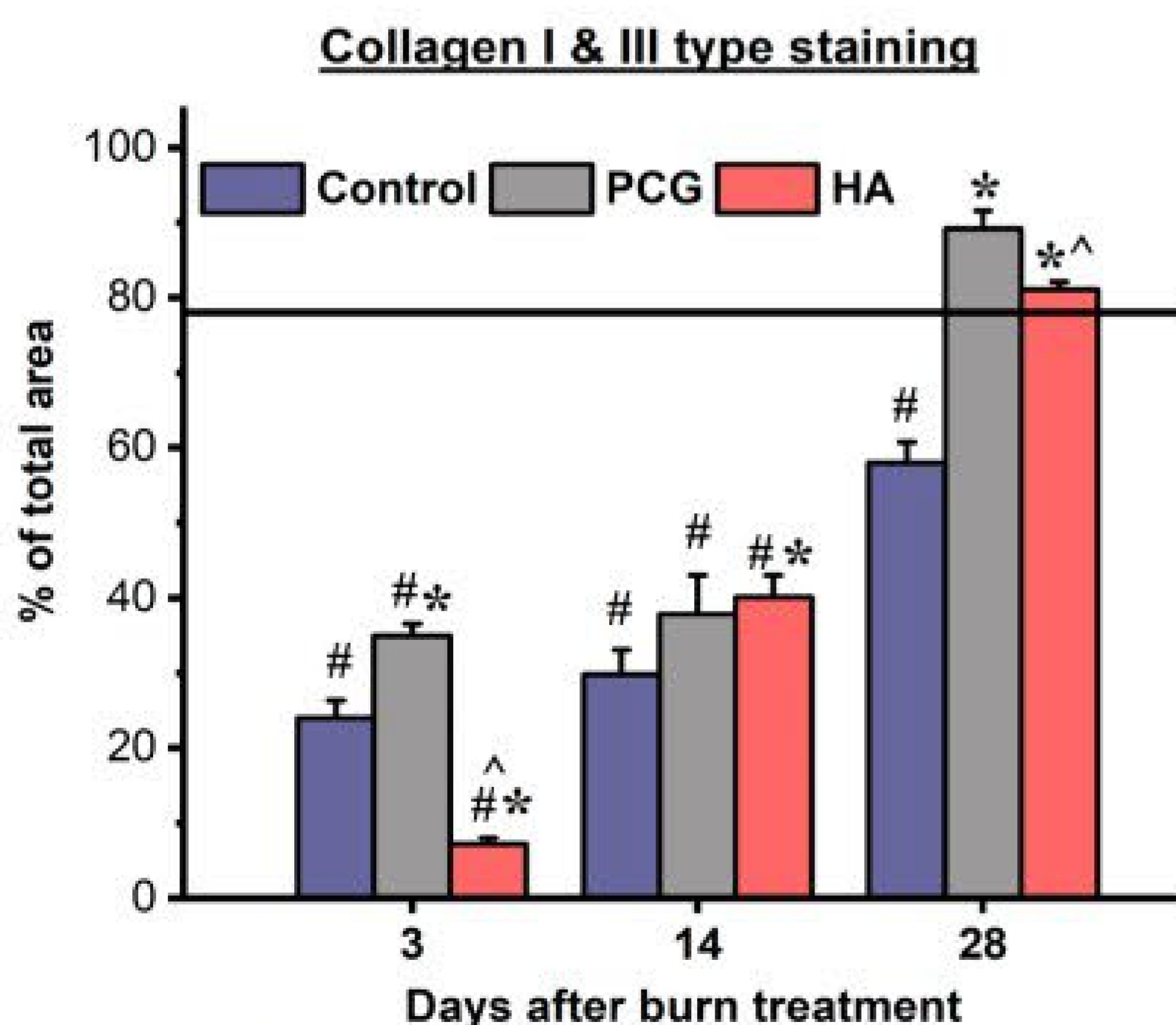
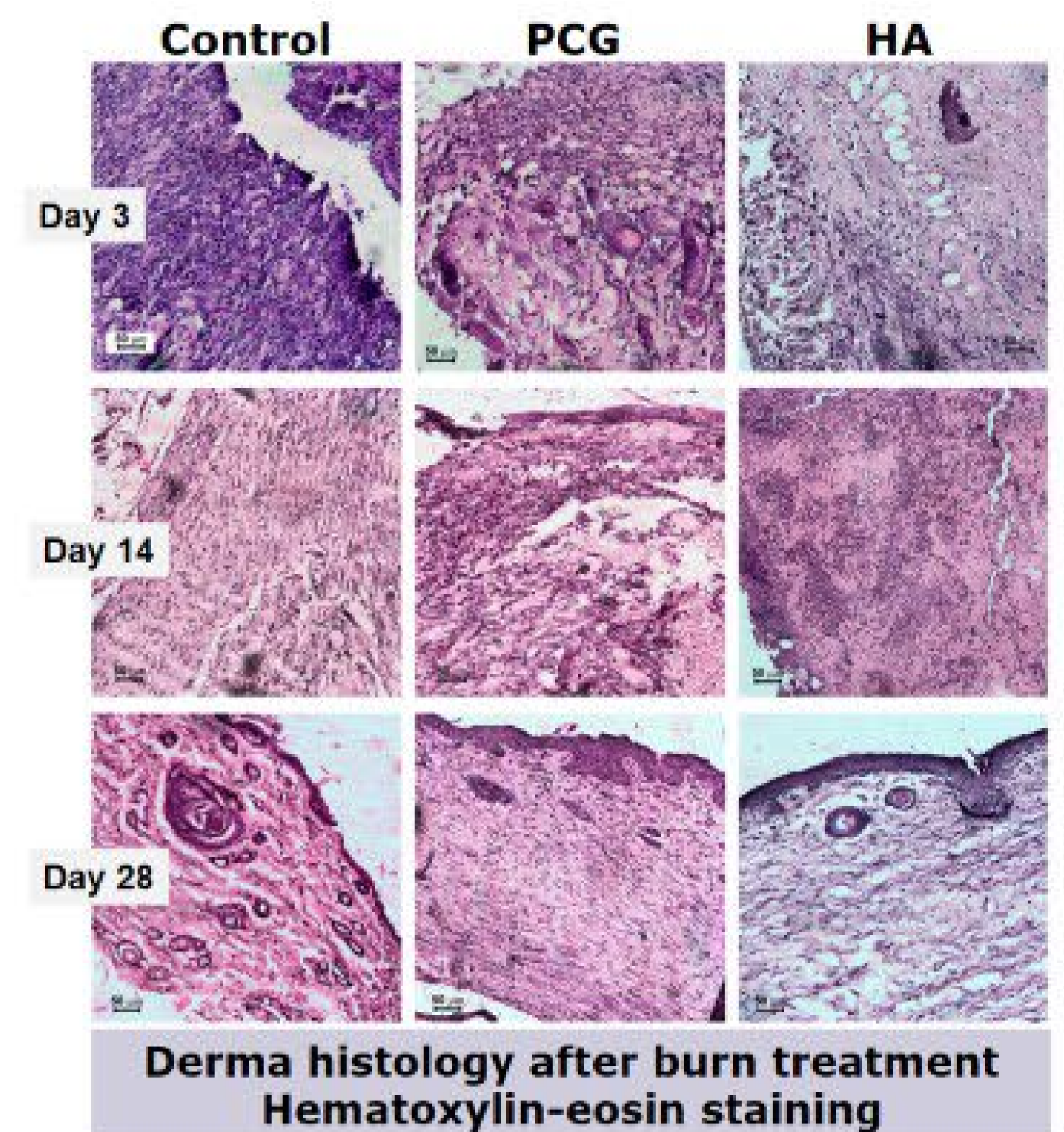
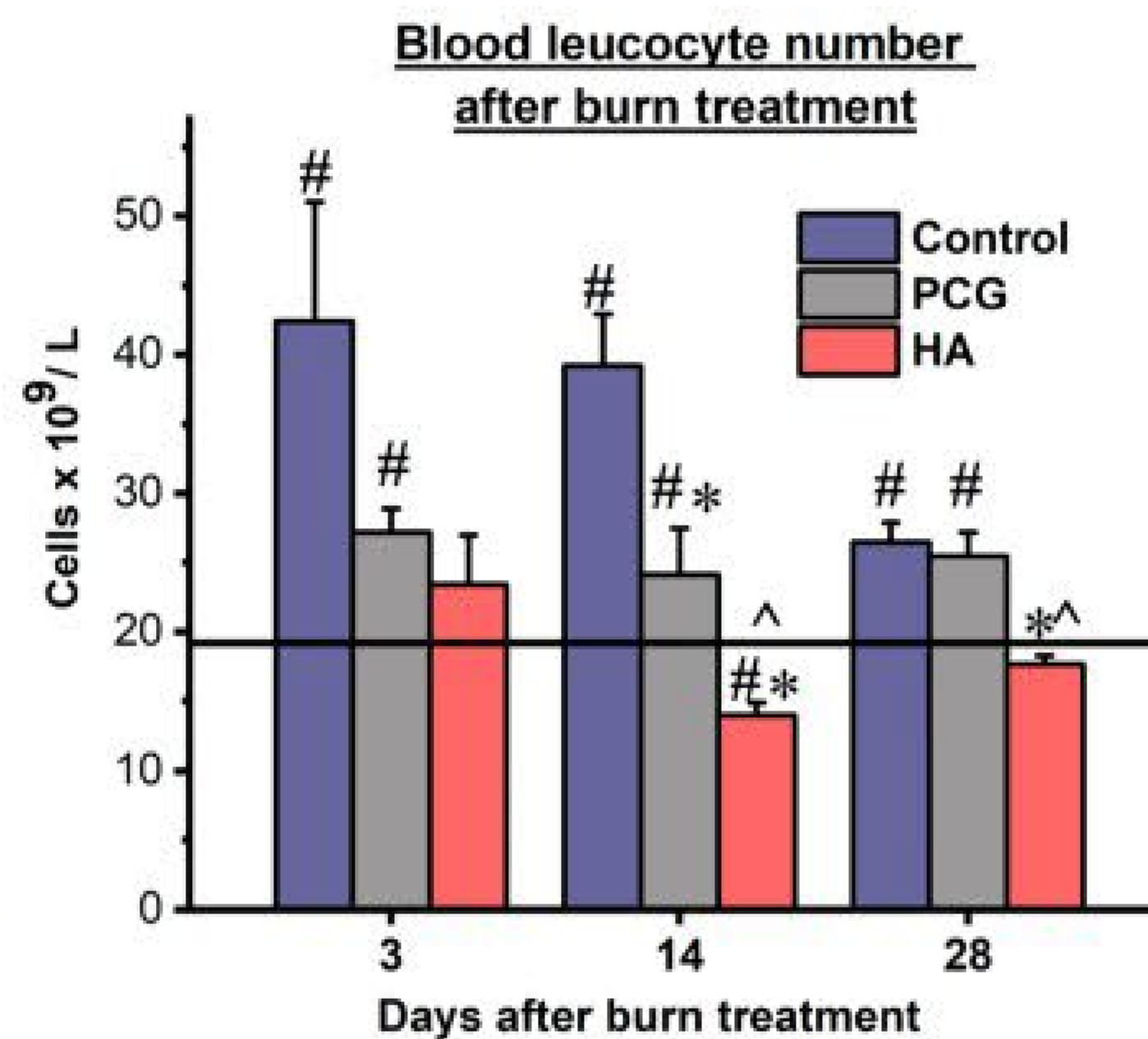
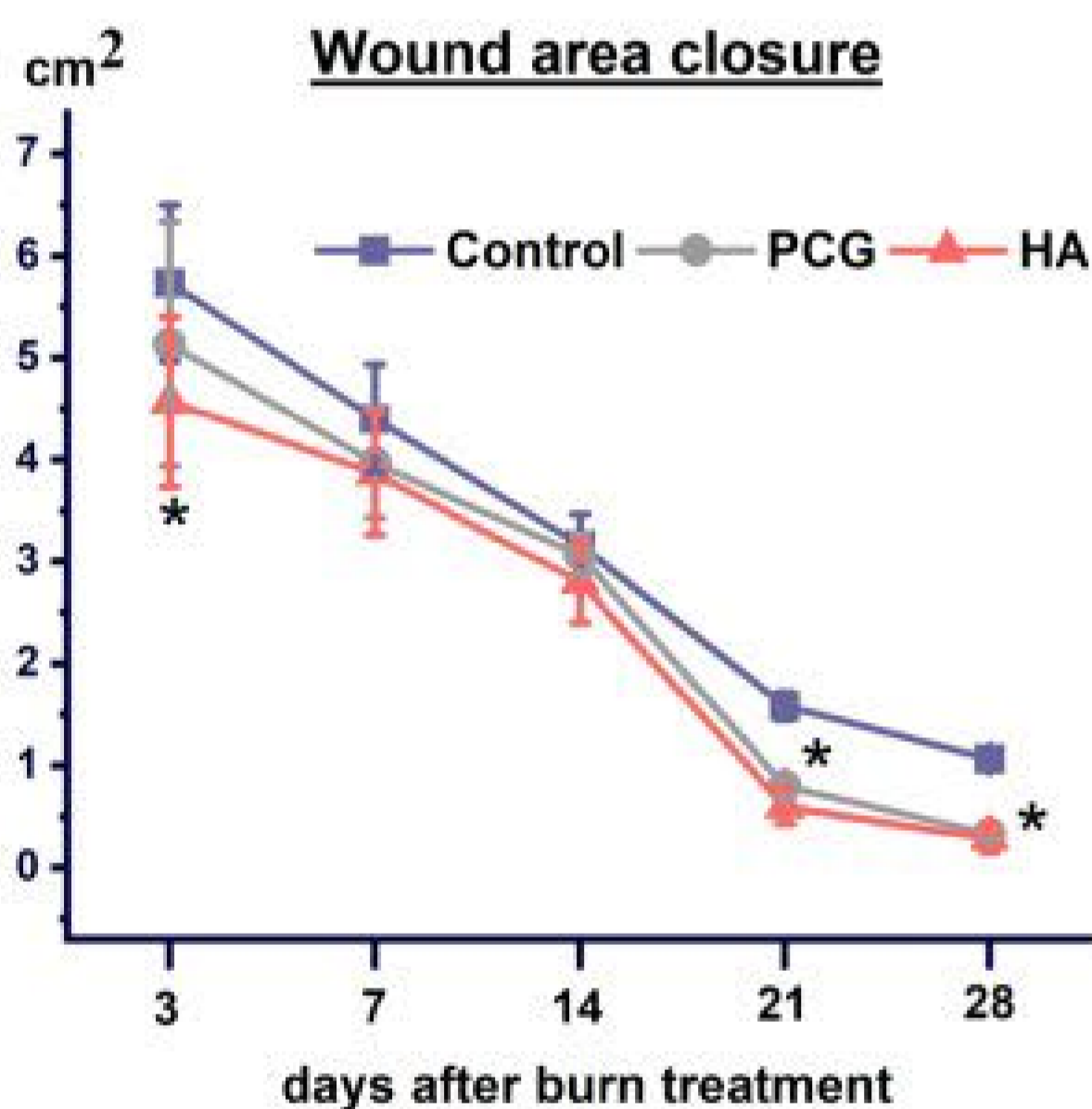
Hyaluronic acid (HA) is a well-known key extracellular matrix component, which as therapeutic agent is believed to participate in healing and may be used for treatment delivery to the injury site. Burns pose significant clinical and aesthetic challenges requiring rapid skin restoration to avoid complications. This study compares HA efficacy in burn healing in rats against commonly used panthenol-containing gel (PCG).

METHODS

Deep burns were induced in male Wistar rats with 200°C copper plate. Pharmaceutical-grade HA (1.8%) or PCG were applied 24 h post-injury with spontaneous healing as control. Wound recovery was assessed on day 3, 7, 21 and 28. Blood was collected on day 3, 14 and 28 for leucocyte number count. Histologic assessment was performed using hematoxylin-eosin staining. Collagens of I and III types were quantified using PicroSirius Red staining and ImageJ software.

RESULTS & DISCUSSION

Control and PCG-treated burns closed significantly just by day 21, remaining open till the end. HA decreased wound area a little faster from day 3, slightly outperforming PCG. Both treatments showed granulation from day 7 and epithelialization by day 28. Initial collagen content in HA-group dropped paradoxically by day 3, matched PCG by day 14 in total number, but with abnormal distribution in derma. By day 28, both groups exceeded control collagen levels. HA suppressed systemic leukocyte number to normal levels by day 14, while drastically enhancing local inflammation till this experimental point.



PicroSirius Red staining of Collagen I & III types in derma after burn treatment

- p>0.05 as compared to normal level; * - p>0.05 as compared to Control group; ^ - p>0.05 as compared to PCG-group

CONCLUSION

Observed strong stimulation of local inflammatory reaction with HA can be explained by some data suggesting that HA can either stimulate or suppress immune response in skin, depending on its source and physicochemical characteristics; therefore, further research is needed for wide clinical applications of HA as a wound cover