An H2S donor S-propargyl-cysteine Gel Improve Skin Wound Healing

Yao Chen [1,2,†,*],Xiaoqing Zhao [1,†], Yi Zhun Zhu [1,3,*]

[1] Department of Medical Cosmetology, Affiliated Hospital of Nantong University, Nantong 226001, Jiangsu, China; doctorcy@ntu.edu.cn (Y.C.)
[2] State Key Laboratory of Quality Research in Chinese Medicine, Faculty of Chinese Medicine, Macau University of Science and Technology, Macau 999078, China; [2]
[3] School of Pharmacy, Macau University of Science and Technology, Macau 999078, China
* Correspondence: yzzhu@must.edu.mo; doctorcy@ntu.edu.cn
† These authors contributed equally to this work.

Abstract:

Common skin injuries that significantly disrupt people's life include burns, diabetic ulcers and traumatic wounds. Burn is a common injury to the skin or other organic tissue, caused by a variety of etiologies, such as thermal injuries, electrical injuries, chemical injuries, and so on. The systemic inflammatory response brought on by severe burns can lead to immunological imbalances, respiratory distress syndrome, metabolic abnormalities, end-organ hypoperfusion, and systemic hypotension .In recent years, substantial research on SPRC as an endogenous H_2S donor has revealed that it possesses pro-vascular production, anti-inflammatory, and immunological homeostasis regulating effects. Several physiological processes may support wound healing and reduce the risk of scarring. SPRC was loaded on carbomer gel and a copper sheet rat burn model was developed. Commercially available basic fibroblast growth factor gel (bFGF) was used as a positive control group. The effectiveness and molecular mechanism of action of SPRC in the treatment of burn injuries were examined using histology, immunohistochemistry (IHC), and quantitative real-time chain polymerase reaction (qPCR). Skin wound healing rates were over 96% in the SPRC group and no statistically significant distinction from the bFGF group. The findings demonstrated that the collagen layer was thicker in the SPRC group during the proliferative phase, VEGF expression was similar to that of the bFGF group, and IL-6 expression was lower than that of the bFGF group. The SPRC group's epidermis was thinner and the wound area was smaller after wound closure, and TIMP-1 and Collagen I expressions were lower than those of the bFGF group. These findings imply that SPRC can facilitate wound healing and offer a novel approach to scar improvement.

Keywords: S-propargyl-cysteine; rat burn model; wound healing; scar