

Wound Healing in Rats Intraperitoneally Treated with Sea Cucumber *Stichopus vastus* (Glycosaminoglycans)

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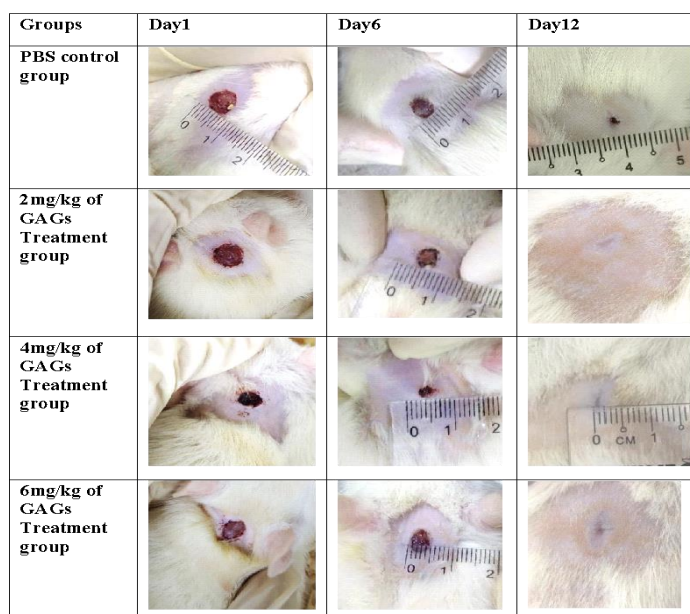
Abstract

Marine creature such as sea cucumbers are rich in glycosaminoglycans (GAGs). It is famous and has long been utilised as traditional remedies and commonly used in wound healing therapy. This study is designed to explore the effect of GAGs in sea cucumber especially GAGs from integument wall of *Stichopus vastus* for wound healing study by intra-peritoneally injected to rats daily.

Complete randomised design was used in this study where a total of twenty male Sprague-dawley rats were divided to 4 groups; 3 treatment groups of GAGs (2 mg/kg, 4 mg/kg and 6 mg/kg) and one control group of phosphate buffer saline (PBS) with sample size of n=6 rats per group. Rats weight from 250 to 400 grams were treated with GAGs daily for 12 days. An excisional wound was created using biopsy punch with diameter of 6 mm. Treatment with GAGs of *S. vastus* by intra-peritoneally injected daily and the excisional part was left opened without topically applied with antiseptic to prevent bias for 12th days' period of wound evaluation.

Result of this study was obtained by measuring the wound diameter (mm) using ruler or measuring caliper (Figure 1) and recorded on day 1, day 6 and day 12 followed by calculation of wound contraction percentage. The wound contraction percentage evaluation from this study found out that GAGs compound from *S. vastus* shows no *significant* difference between all treatment groups and control groups for day 1, day 6 and day 12. However, on day 6 of treatment, 2 mg/kg treatment group shows higher wound contraction percentage compared to other groups. The study found that 2 mg/kg of GAGs extraction can speed up the wound contraction in which can enhance and promote wound closure.

Figure 1: Macroscopic evaluation of wound healing on day 1, day 6 and day 12 for treatment and control groups in Sprague-dawley male rats



The wound contraction is one of the reliable parameters and commonly used to evaluate wound healing process in which the contraction of wound later leads to wound closure; healed ^[1]. Wound contraction can be defined as a process of shrinkage of open wound in which normal skin moves centrally to the wound site and at the end give small scar ^[2]. From previous study, the GAGs from fish showed an accelerating wound healing as the GAGs had been discovered to have good potential in antimicrobial activity. The abilities to fight against microbial mainly *S. aureus* extend the anti-inflammatory phase in an instance speed up the wound contraction in early wound healing process ^[3]. Besides, Pereira et al. (2019) ^[4] found that, *Calendula officinalis* (marigold); containing anti-inflammatory effect ^[5], was topical applied on rats' skin enhancing wound healing in acute wound as it increased the speed of epithelialisation, wound contraction, collagen formation and new vessel formation. Thus, it can be hypothesised that GAGs from *S. vastus* extract give strong anti-inflammatory effect on wound healing and has potential in enhancing wound healing by speeding up wound healing.

Keywords

Stichopus vastus, Glycosaminoglycans, Wound healing

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