# Advancing Wound Healing with Konjac Glucomannan: Mechanistic Insights and Therapeutic Potential

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**Abstract**
Repairing an extensive wound is a complex biological process involving many molecular, cellular, and regenerative pathways. Konjac glucomannan (KGM) is a natural polysaccharide derived from Amorphophallus konjac. There has been enormous interest in its applicability for tissue regeneration. Although some research has reported its favourable benefits, the mechanism and therapeutic effects of Rb2 in treating wounds have not been systematically investigated.
This study evaluated the scientific facts from the molecular mechanism of action, biomaterial properties, and its therapeutic usage regarding the action of KGM on accelerating wound healing systematically.
The literature analysis indicates that KGM increases the proliferation of fibroblasts and keratinocytes, regulates inflammatory responses, and enhances wound hydration, facilitating wound healing through many mechanisms. Moreover, its hydrophilic properties and viscoelasticity render it ideal for manufacturing biopolymer-based hydrogels and wound dressings. KGM therapy enhances epithelialisation and angiogenesis, facilitating accelerated tissue regeneration, as in vitro and in vivo research demonstrated. Konjac glucomannan is a promising therapeutic agent in wound healing, serving as a bioactive compound and a primary constituent of wound biomaterials. Further research must examine its safety, clinical efficacy, and more intricate molecular pathways to enhance its application in modern wound care.

Keywords: Glucomannan, Amorphophallus, Wound Healing, Tissue Regeneration, Biomaterials

## Introduction

Wound healing is a complicated biological process involving multiple phases: haemostasis, inflammation, proliferation, and tissue remodelling. All those processes can be disrupted, leading to delayed healing and complications like infection and excessive scar tissue deposition (Landén et al., 2016). As a result, the regenerative medicine strategies have been a primary focus in biomedicine and tissue engineering to develop therapeutic agents that can enhance the regeneration of injured tissue. Konjac Glucomannan (KGM), a naturally occurring water-soluble polysaccharide from Amorphophallus konjac, is one such material attracting considerable interest. KGM has many beneficial biological effects, including gelation, enhanced wound hydration, and facilitation of cellular proliferation and migration, all promoting tissue regeneration (Kokubun et al., 2021; Mashudi et al., n.d.). Additionally, the biocompatibility and biodegradability of KGM can make it suitable for studying biomaterials in drug therapy of wounds. Several studies have been conducted regarding the use of KGM for medical applications, including weight management and the treatment of diabetes. Its features and functions in tissue regeneration and healing have been scarcely explored and reviewed. The mechanistic, efficacious, and therapeutic efficacy of KGM in accelerating wound healing warrants more detailed investigations (Stefano et al., 2023). The purpose of this literature review is to evaluate the existing scientific evidence regarding the role of Konjac Glucomannan in wound healing. In this review, we will systematically analyze the published studies exploring the molecular mechanisms of KGM promoting tissue regeneration, its biocompatibility, and its application in modern wound care. This study attempts to assess the potential of KGM as a new therapeutic agent for tissue engineering and wound healing.

## Research Methods

This literature review used a systematic review method to examine the scientific data about how Konjac Glucomannan (KGM) might help heal wounds. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were used to ensure the data were clear and could be repeated. Data Sources and How to Search The following keywords were used to search for books in the Scopus database: Glucomannan, Amorphophallus konjac, and "wound healing," "tissue repair," "skin regeneration," and "wound closure" are all words that can be used to describe the same thing. The search included articles published within the last 5 years to ensure data currency and relevance to recent biomaterials and tissue engineering developments.

Criteria for Inclusion and Exclusion Criteria for inclusion: Articles that talk about how Konjac Glucomannan helps wounds heal or new tissue grow. Studies examine how KGM affects the mending process in the lab, on living things, or in clinical trials. Scientific magazines that are indexed by Scopus and articles written in English.

Criteria for exclusion: articles that didn't talk about how KGM directly affects wound healing. Studies only looked at the general pharmacological features of KGM without looking at how it helps cells grow back. Posters from conferences, reviews that don't follow a set method, or other researchers haven't reviewed preprints. In the selection process and looking at the data from the initial search results, 108 articles were found that matched the keywords. After being screened based on their titles, abstracts, and full-text reviews, seven articles were chosen as the major sources for further analysis. Two reviewers worked on the selection process separately so that there would be less chance of bias. If there were any differences, they were talked over, or a third reviewer was brought in. The analysis was conducted by extracting data related to the type of study, study design, wound healing parameters measured, and molecular mechanisms reported. The data obtained were then compared and synthesised to develop evidence-based conclusions.

## Result and Discussion

Table 1. A list of the latest wound care research

| No | Title and Author | Method | Conclussion |
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| 1 | A dual-modified glucomannan polysaccharide selectively sequesters growth factors for skin tissue repair (Hu et al., 2025) | Polysaccharide-based Artificial dermal matrixes (ADM) Development | SMAL-BSP-based ADMs show great potential in enhancing skin tissue regeneration through the mechanism of selectively capturing growth factors that support angiogenesis and |

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| | | | accelerate wound healing without adverse side effects. |
| 2 | Food-Derived Tripeptide-Copper Self-Healing Hydrogel for Infected Wound Healing (H. Chen et al., 2025a) | This research uses active ingredient extraction methods, Schiff base-based hydrogel synthesis, and characterisation and functional tests to develop GEK hydrogels that are antibacterial, anti-inflammatory, and accelerate wound healing. | This study shows that natural material-based GEK hydrogels have great potential as innovative wound dressings for infected wounds. The combination of OKGM, EW, and GHK-Cu provides antibacterial, anti-inflammatory and that accelerate accelerating benefits, making it an efficient and cost-effective strategy for clinical applications. |
| 3 | Bioinspired zwitterionic lysine glycopolymers: Enhancing wound repair through microenvironment modulation for bacterial elimination and optimal immunoregulation (Wang et al., 2024) | In Vivo Testing and Antibacterial and Immunomodulation Activity Testing | Zwitterionic Lysine Glycopolymers (ZLGs) accelerate wound healing due to S. aureus infection. |
| 4 | Facile and eco-friendly fabrication of biocompatible hydrogel containing CuS@Ser NPs with mechanical flexibility and photothermal antibacterial activity to promote infected wound healing (Guo et al., 2023) | Test for Antibacterial Effectiveness and Wound Healing | XK/CuS NPs hydrogels have the potential to be an effective alternative for the treatment of infected wounds, offering a new approach to wound healing without antibiotics. |
| 5 | Injectable Zn2+ and Paeoniflorin Release Hydrogel for Promoting Wound Healing (L. Chen et al., 2023) | Preparation of KGM-based Injection Hydrogel | This study shows that the developed hydrogel has promising prospects as a multifunctional wound dressing, which can be further applied in clinical medicine to accelerate the healing of chronic wounds and infections. |
| 6 | Synergy of antioxidant and M2 polarization in polyphenol-modified konjac glucomannan dressing for remodeling wound healing microenvironment (Li et al., 2023) | KGM-GA Wound Dressing Development, In Vivo and In Vitro test | KGM-GA dressings are a natural and multifunctional alternative for wound healing with anti-inflammatory, antioxidant, and biocompatible properties without the addition of external drugs. |
| 7 | Oral delivery of layer-by-layer coated exosomes for colitis therapy (Deng et al., 2023) | Development of LbL-Exos System for Oral Delivery and In Vivo Testing | LbL-MSC-Exos may be a new strategy in the treatment of UC through oral administration, offering a more effective and convenient |

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| | therapeutic alternative to conventional methods. |

The literature review results demonstrate that KGM has several mechanisms that accelerate wound healing. In a research study conducted by Ai et al. (2024), the researchers described the development of a modified polysaccharide-based artificial dermal matrix (ADM) with sulphate and acetyl groups. This matrix can specifically bind growth factors such as vascular endothelial growth factor (VEGF-A) and fibroblast growth factor-2 (FGF-2), leading to enhanced angiogenesis and endothelial cell proliferation, thereby accelerating skin tissue regeneration. The acetylation modification was also shown to promote the production and release of nitric oxide (NO) in macrophages on these KGM-based ADMs (Hu et al., 2025). Nitric oxide, as a natural antibacterial agent, helps reduce the risk of wound infection. A study published in 2025 by Chen et al. 2025proved that natural polysaccharide-based hydrogels, combined with peptides and copper ions, could help infected wounds heal faster. From this, it can be abstracted that applying KGM with other types of biomaterials can produce synergistic effects, thus improving wound treatment efficacy.

Glucomannan from konjac has several advantages over other conventional biomaterials (Zhou et al., 2022). ADMs based on modified KGM have been shown to have greater angiogenic and regenerative benefits than ADMs based on chondroitin sulfate, which have been utilized in wound treatment. Additionally, these ADMs have improved safety since they do not produce immunogenic responses, which are often associated with animal products. Other benefits of KGM include the following: In addition to facilitating the migration of fibroblasts and keratinocytes, the capability of forming a hydrogel with a high viscosity makes it possible to preserve wound hydration (Ahmed et al., 2022). In addition to preventing subsequent wound infections, the natural antibacterial activity achieved via the activation of NO by macrophages is also beneficial. It might operate as a carrier for medications or growth factors, enabling the regulated release of bioactive substances that promote scar healing.

**Challenges and opportunities for konjac glucomannan-based wound therapy**

KGM has a significant potential for tissue regeneration, but several obstacles still need to be overcome before its therapeutic use can be widely applied. Optimizing the structural alterations of KGM to improve its stability in the wound environment and boost its selectivity toward various growth factors is one of the most significant obstacles that must be overcome. In addition, additional clinical trials are required to guarantee the success and safety of the treatment over the long term in a more extensive patient group. In the future, coupling KGM with nanotechnology and tissue engineering may result in the creation of more advanced growth factor delivery systems. Additionally, it may make it possible to create smart wound dressings that can respond to the wound's milieu dynamically.

## Conclusion

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