

# The Nature of Beta-Glucans - and the Role in Wound Care of a Novel Bioactive Beta-Glucan Gel: Woulgan

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## Beta-Glucans – what are they

Beta-glucans are natural polymers found in the cell walls of: bacteria, yeast, fungi, algae, grain and seaweed. They are foreign to the human body. Not all beta-glucans are the same. Those derived from fungi and yeast with a (1,3) beta-linked backbone and with (1,6) beta-linked side chains are potent immune-modulators.<sup>1</sup>

Beta-glucans from microrganisms are active biological response modifiers and have extensive applications in healthcare, including diabetes, metabolic syndrome, and immune system modulation.<sup>2, 3, 4</sup>

## Beta-glucans and immune modulation (Figure 1)

- Beta-glucans are considered pathogen associated molecular patterns (PAMPs)
- Macrophages and neutrophils have developed cell receptors which are able to recognize and bind to the PAMPs
- Macrophages are activated by beta-glucan PAMPs through several cell surface receptors, the most important being Dectin-1
- The presence of beta-glucans through PAMP recognition alerts the host of impending 'attack'
- Macrophages surge into the area to counter microbial invasion
- Phagocytic macrophages, engulf and destroy, removing dead/senescent cells and microbes
- Macrophages support cellular proliferation, angiogenesis, and deposition of ECM through expression of growth factors PDGF, FGF, VEGF, TGF-alpha and TGF-beta and through secretion of a wide range of cytokines and chemokines

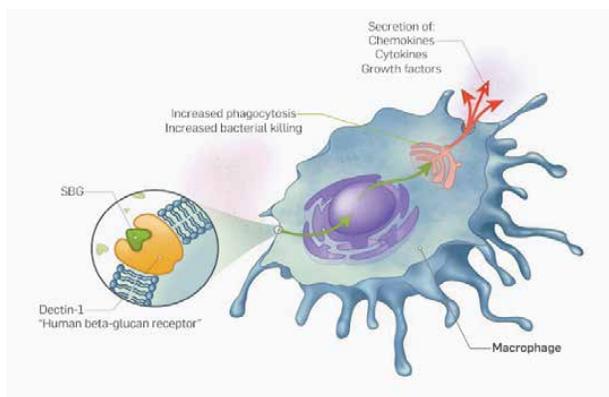


Figure 1: Macrophage and beta-glucan receptors

## Woulgan® Bioactive Beta-Glucan Gel

A sterile, homogenous viscous gel containing soluble 1,3/1,6 Beta-Glucan (SBG), Glycerol, CMC and water in a 4 g tube. Class III medical device that acts on phagocytic cells. Indications – dry and low to moderately exuding wounds where there is stalled healing. The bioactive gel is easy to apply and is available for use across specialist and generalist wound care settings including under compression or in conjunction with offloading.

## Application

- Wound cleansing according to local practice
- Debride if appropriate
- Protect the wound edges, if applicable
- Cover the wound surface with a thin layer of Woulgan
- Apply a suitable secondary dressing of choice and fixate
  - Any foam dressing or wound contact layer can be used
- Do not use superabsorbent dressings
- Apply compression or offloading if indicate
- Apply new Woulgan at every dressing change
  - Typically twice per week



## References

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4. Chen J, Seviour R. Medicinal importance of fungal beta-(1->3), (1->6)-glucans. Mycological research 2007;111(Pt 6):635-52
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## Woulgan represents a new approach in the treatment of stalled wounds

Hydrogel qualities of the gel provide a moist wound healing environment and aids autolytic debridement. The ancillary medicinal component SBG will:

- Increase wound contraction
- Activate phagocytic cells to
  - increase phagocytosis
  - stimulate macrophages
  - release signal molecules and growth factors (TNF, IL, TGF, PDGF, FGF, EGF)
- Stimulate angiogenesis
- Enhance cellular proliferation

| Wound Phase   | Cells involved  | Function and activity   | Effect of Woulgan®   |
|---------------|---|---|--|
| Haemostasis   | Platelets   | Clotting  |  |
| Inflammation  | Macrophages, Neutrophils                                | Tissue macrophages <ul style="list-style-type: none"> <li>• alarms and attracts neutrophils to the wound bed</li> <li>• phagocytise debris</li> <li>• produce cytokines and growth factors</li> </ul>   | Attracts and stimulates phagocytic cells to produce cytokines and growth factors               |
| Proliferation | Macrophages, Fibroblasts, Myofibroblasts, Keratinocytes | Macrophage Effects: <ul style="list-style-type: none"> <li>• signal molecules for angiogenesis</li> <li>• activate fibroblasts to produce collagen</li> <li>• attract and activate myofibroblasts for wound contraction</li> <li>• growth factors for cell proliferation</li> </ul> | White blood cells and fibroblasts are triggered to produce signal molecules and growth factors |
| Remodelling   | Fibroblasts, Macrophages, Fibrocytes                    | Fibrocytes are clones of macrophages and fibroblasts – collagen tissue modulation   |  |

## Summary

Woulgan Gel, containing a bioactive SBG, offers a technological advance in the management of stalled wounds. The release of signal molecules and growth factors from macrophages activates and accelerates healing in stalled wounds.

