KANE BIOTECH

DispersinB®

A Novel Anti-biofilm Enzymatic Wound Gel for Treatment of Chronic Wounds

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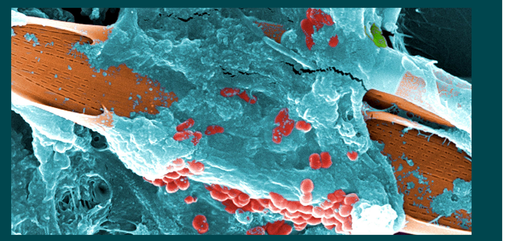
INTRODUCTION

Chronic wounds are of increasing concern due to an increase in obesity combined with an aging population. Approximately 2% of the US population suffer from chronic, non-healing wounds[1], which costs USD $20 billion to the US healthcare system, annually[1]. Recent evidence suggests that healing of a chronic wound is dependent on infections involving biofilms[2-4]. PNAG (Poly-N-acetylglucosamine) is the most common extracellular substance excreted by bacteria that is used to form the biofilm. This substance enables adhesion of bacteria to surfaces, as well as protection from detachment and antimicrobials. There has been no enzymatic method of destroying imbedded PNAG biofilms, until now. We have formulated a novel enzyme with a buffering system, preservatives, and stabilizing/gelling agents to form a wound gel. This DispersinB® Wound Gel has the potential to hydrolyze the glycosidic linkages in PNAG, sensitizes the biofilm embedded bacteria to cleansing, and provides a moist wound environment conducive to wound healing.



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1. Gottrup F (2004) Am J Surg 187:38S–43S. 2. Gjodsbol K, Christensen JJ, Karlsmark T, Jorgensen B, Klein BM, Krogfelt KA (2006) Int Wound J 3:225–231 3. James GA, Swogger E, Wolcott R, Pulcini E, Secor P, Sestrich J, Costerton JW, Stewart PS (2008) Wound Repair Regen 16:37–44, 4. Singh VA, Barbul A (2008). Wound Repair Regen 16:1. 5. Hammond, A.A., Miller, K.G, Kruczek, C.J., Dertien, J., Colmer-Hamood, J.A., Griswold, J.A, Horswill, A.R., Hamood, A.N. (2011) Burns. 37:312-321.

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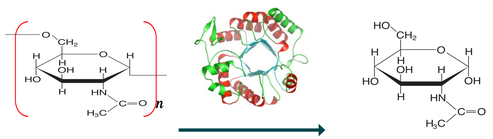
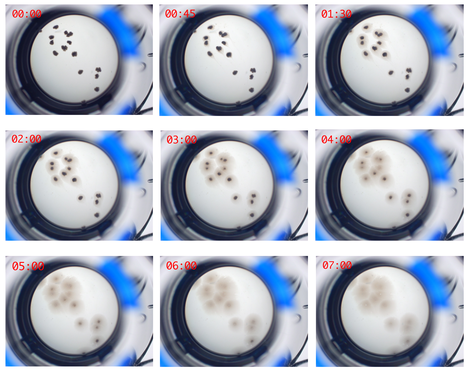
DISPERSINB® BREAK 1-6 LINKAGE OF PNAG

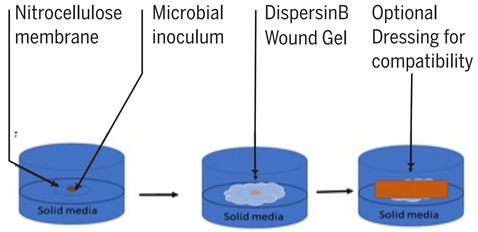


PNAG — N-acetylglucosamine

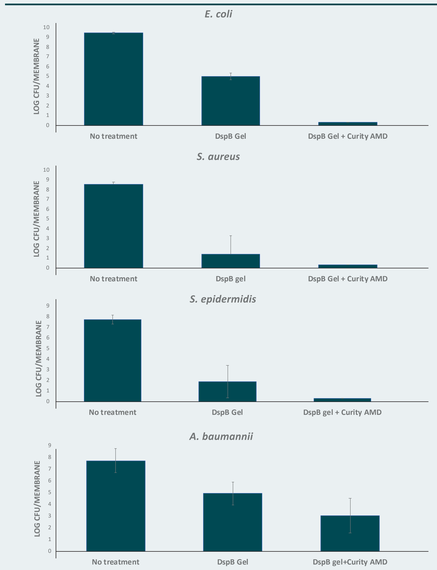


SAFETY AND EFFICACY

Biofilm in-vitro testing: Overnight cultures of test organisms were diluted to 10^7 CFU/mL. 10 µL diluted culture was added onto nitrocellulose membrane which was placed on an appropriate agar surface. Treatment regimen was applied after inoculation for inhibition or after 24 hours of incubation time at 37°C for eradication[5]. Treatment was incubated for 24 hours at 37°C for single application, while for multiple applications, treatment was removed at the 24h interval and re-applied on a new agar plate. Then viable numbers were enumerated.



BIOFILM INHIBITION ASSAY



BIOFILM ERADICATION ASSAY

INFECTION	COMMERCIAL GEL	DISPERSINB® WOUND GEL
Non-infected		
MRSA		
E. coli	3501 – Site 8 – Day 3 / 3501 – Site 8 – Day 10 / 3501 – Site 8 – Day 21	3501 – Site 1 – Day 3 / 3501 – Site 1 – Day 10 / 3501 – Site 1 – Day 21
A. baumannii	4501 – Site 10 – Day 3 / 4501 – Site 10 – Day 10 / 4501 – Site 10 – Day 21	4501 – Site 5 – Day 3 / 4501 – Site 5 – Day 10 / 4501 – Site 5 – Day 21
S. epidermidis		

Pig Wound Healing Study: DispersinB Wound Gel was applied daily for 19 days starting on Day 3. There were no DispersinB Wound Gel-related macroscopic (gross) findings, and the absence of gross findings (scabbing) was due to DispersinB Wound Gel-related complete/nearly complete re-epithelialization and improved healing of the various wound sites. Microscopic evidence of improved healing in DispersinB Wound Gel treated wounds included complete /nearly complete epithelialization with associated decreased granulocytic (acute) inflammation and serocellular crusting, and a trend towards more mature granulation tissue/collagen, and/or decreased epithelial hyperplasia/ hyperkeratosis. Wound healing was improved in DispersinB Wound Gel-treated wounds compared to commercial gel treated wounds regardless of the bacterial species used in the wounds.

Biocompatibility/safety: Through GLP in-vitro testing it was shown that the DispersinB Wound Gel is not cytotoxic or genotoxic (bacterial reverse mutation and mammalian cell micronuclease). GLP In-vivo models also showed that the gel is non-irritating, non-sensitizing, non-genotoxic, non-pyrogenic and showed no evidence of acute systemic toxicity. A pig subchronic toxicity study was also performed and no evidence of local or systemic toxicity was observed, furthermore, dramatically improved wound healing was witnessed (see pic).

CONCLUSIONS

The DispersinB Wound Gel is a novel first in its class wound gel that specifically targets the PNAG matrix holding a biofilm together. Once the matrix is weakened the surfactant gelling system in the wound gel will wash away the fragments along with any bacteria in the wound bed. This cleansing enhancement combined with providing a clean and moist wound healing environment is anticipated to show dramatically improved chronic wound healing in the upcoming human trials.