Quick-Med Technologies, Inc.

NIMBUS®

The Next Generation in Antimicrobial Protection

October, 2010

What is NIMBUS®?

NIMBUS® Technology

NIMBUS represents a breakthrough in antimicrobial technology for wound care and other medical device applications

- ✓ No leaching
- ✓ No bacterial resistance
- ✓ No toxicity
- ✓ FDA-cleared as a *de novo* device

Next-generation NIMBUS technology provides cost-efficient, broad-spectrum, rapid-acting, patented antimicrobial protection

Non-leaching

NIMBUS® Technology

- ✓ Permanently bonded to the dressing substrate
- ✓ Non-leaching
- ✓ Not depleted in use; remains at full strength. Never drops below the “minimum inhibitory concentration” level
- ✓ No migration from site to skin
- ✓ No need to discontinue use as wound begins to heal
- ✓ Designed for infection prevention in wounds

Other antimicrobials such as silver and PHMB leach from the dressing and deplete in order to work

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No Bacterial Resistance

NIMBUS® Technology

Bonded

- ✓ Active agent permanently bound to the dressing substrate
- ✓ No depletion of the biocide reservoir
- ✓ Active agent never falls below the minimum inhibitory concentration (MIC)

Large Molecule

- ✓ An extremely large molecule—molecular weight of 200,000 - 250,000 daltons.
- ✓ Too large to enter a microbe; bacteria cannot develop resistance to an agent that they cannot internalize
- ✓ Especially effective vs. resistant bacteria such as MRSA and VRE

No Resistance Developed

- ✓ Standard antimicrobial resistance assay
- ✓ *E.coli* (Gram-negative, very hardy cell wall construction, low susceptibility to quats) exposed to NIMBUS
- ✓ Survivors were isolated, cultured and re-exposed for ten successive experiments in which bacteria multiplied a million-fold in each experiment
- ✓ NIMBUS kill efficacy remained constant throughout ten iterations, demonstrating that bacteria had not increased resistance to NIMBUS

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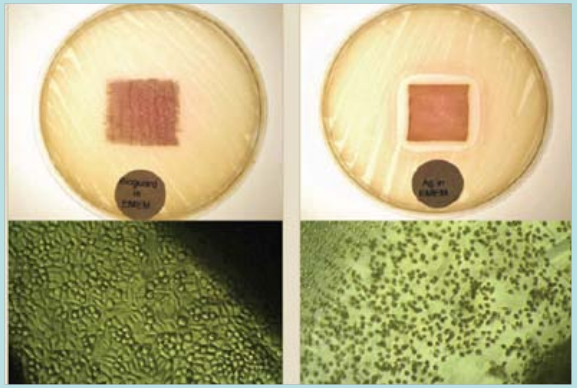
Non-toxic

NIMBUS® Technology

- ✓ Active agent is permanently bonded to the wound dressing
- ✓ It does not leach away from the dressing
- ✓ Leaching antimicrobials can be toxic to good cells.
  - FDA approved “For Use Instructions” call for discontinuing their use after a specified period of time
- ✓ NIMBUS is the first and only non-leaching antimicrobial technology available for wound care



NIMBUS Silver Dressing

NIMBUS (left) shows no zone of inhibition; direct contact testing with L929 fibroblast cells show normal healthy growing cells.

Silver dressing (right) shows a zone of inhibition where the chemical leaches out of the dressing, resulting in malformed and depopulated cells.

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De Novo Technology

NIMBUS® Technology

- ✓ FDA “de novo” clearance
- ✓ No predicate; nothing like it before
- ✓ Cleared as a device, not a drug or combination product
- ✓ Unique large molecule, permanently bound, non-leaching, non-depleting technology
- ✓ Unique FDA product code; own FDA guidance document
- ✓ Versatile
  - Absorbent dressings
  - Adhesives
  - Foams
  - Gauze
  - Hydrogels
  - Hydrocolloids
  - Polyurethane films
  - Incontinence products
  - Catheters

TIME
Microbe-Busting Bandages
Innovators Forging the Future

Wound Healing Society
Blue Ribbon Industrial R&D Awards
2006 , 2008, 2010

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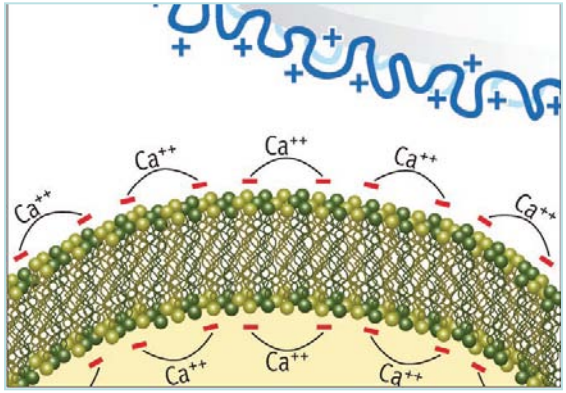
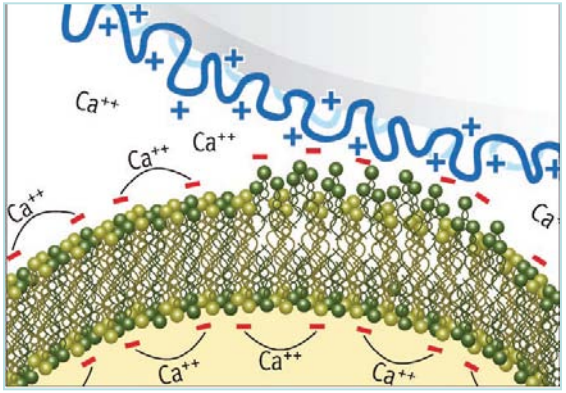
Mode of Action

NIMBUS® Technology

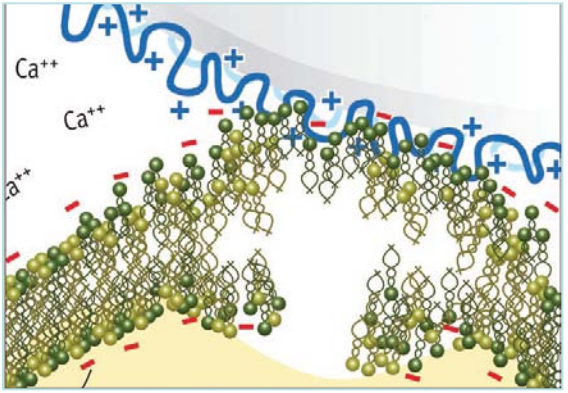
Three-stage physical method of action



Attract



Bind



Disrupt & Destroy

An advanced cationic, high molecular weight antimicrobial polymer with high charge density

- Attracts bacterial cells and binds rapidly to displace calcium ions thus physically disrupting the cell wall
- The cell membrane collapses, and the cell dies as the cytoplasm leaks out
- High charge density ensures maximum efficacy will in the presence of body fluids

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Broad Spectrum Microbicidal Efficacy*

NIMBUS® Technology

	ATCC#	Percent Reduction
Staphylococcus aureus	12600	>99.9999%
Escherichia coli	15597	>99.9999%
Klebsiella pneumoniae	13833	>99.9999%
Pseudomonas aeruginosa	51447	>99.9999%
Proteus vulgaris	13115	>99.9999%
Serratia marcescens	13880	>99.9999%
Enterococcus faecalis	19433	>99.9999%
Enterobacter aerogenes	13048	>99.9999%
Listeria monocytogenes	13932	>99.9999%
MRSA	BAA-44	>99.9999%
VRE	700221	>99.9994%
Bacteriophage MS-2 *(RNA virus)*		>99.994%
Bacteriophage PRD1 *(DNA virus)*		>99.87%

** Tested in 10% bovine serum (except viruses) after18 hours of exposure*

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Rapid Kill Rate *Starts in Minutes**

NIMBUS Technology

NIMBUS starts immediately, even in high challenge environments*…

Percentage Reduction Within Indicated Time

Time	*Staph. a.*	*E. Coli*	*Pseudo. A*
1 min	99.98780 %	96.99842%	99.98205%
10 min	99.99415%	99.99763%	99.98564%
20 min	99.99268%	99.99938%	99.99397%
30 min	99.99878%	99.99972%	99.99746%
60 min	99.9999%	99.99946%	99.99936%
4 hrs	99.9999%	99.99981%	99.99996%
8 hrs	99.9999%	99.99997%	99.99996%
12 hrs	99.9999%	99.99997%	99.99996%

*** Tested in 10% bovine serum**

… and is extremely long lasting due to its permanent bond

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NIMBUS *Competitive Comparison*

NIMBUS® Technology

NIMBUS offers a superior performance, price and safety profile

Characteristic	NIMBUS	Silver	Triclosan	PHMB	Silane Quaternary
Effectiveness	**High**	High	Medium	Medium	Low
Persistence	**High**	Medium	Medium	Low	Low
Leaching	**No**	Yes	Yes	Yes	No
Resistance	**No**	Documented[1]	Documented[2.3]	Documented[4.5]	No
Economics	**Low Cost**	Expensive	Medium Cost	Medium Cost	Medium Cost

[1] Gupta, A., et al, *Nature Medicine* **5**:183-188. (1999)
[2] McMurray L.M., et al, *Nature* **398**: 531-532 (1998)
[3] Heath, R. J., et al, *J. Biol. Chem.* **273**: 30316-30320 (1998)
[4] Moore, L.E., et al, *Appl. Environ. Microbiol.* **74:** 4825-4834 (2008)
[5] Allen, M.J., et al, *Microbiology* **152**: 989-1000 (2006)

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NIMBUS® *Summary*

NIMBUS® Technology

- ✓ Rapid acting, broad spectrum microbicide
- ✓ Highly effective against even drug-resistant bacteria
- ✓ Permanently bonded, non-leaching, no migration from site to skin, not depleted in use
- ✓ Large molecule *(2,000 antimicrobial units per molecule)*
- ✓ Not easily blocked by organics *(e.g., blood, urine, perspiration)*
- ✓ Highly cost effective relative to other microbicides
- ✓ Excellent human and environmental safety profile
- ✓ Does not induce drug resistance
- ✓ The only non-leaching antimicrobial FDA-cleared for wound healing

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Quick-Med Technologies, Inc.

Developing Next Generation Technologies