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References:

Bacteria:
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Influenza virus:
Veterinary Microbiology, 2018, 218, 78-83; doi: 10.1016/j.vetmic.2018.03.032 (link)

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Reference: Antibacterial non-wovens

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Antimicrobial Non-wovens

with applications in air filters, face masks, etc.

Overview: Auburn is seeking a licensee or development partner for chemical formulations designed to be incorporated into disposable non-woven textiles, including air filters, face masks, surgical textiles and bandages. Current alternatives, such as silver or biguanide-based systems, have the disadvantages of extremely high cost, relative ineffectiveness, lack of biodegradability, and/or induced bacterial resistance. Auburn's N-halamine-based system is very inexpensive, has been proven effective against bacteria and viruses, and is biodegradable. Further, N-halamines have been used in other applications for years with no bacterial resistance mechanism yet identified. Thus, this should be a significant improvement for disposable non-woven products to help prevent the spread of infection. This technology has potential in health care and consumer goods since it can be generally applied to any disposable non-woven product.

Advantages:

- **ANTIMICROBIAL -** Shown to kill bacteria (Gram positive & negative) and inactivate influenza virus, as much as 6 log reduction (<5 min) and over 7 log reduction (<30 min)
- **INEXPENSIVE -** COGS estimated to be 10-100x less than current antibacterial agents
- **CONVENIENT** - Biodegradable and disposable
- **VERSATILE -** Can be adapted to multiple non-woven, disposable materials, including air filters, face masks, facial tissues, disposable wipes, bandages, diapers and surgical textiles.

Description:

A constant challenge in public health is preventing the spread of pathogens. For hospital-acquired (nosocomial) infections, the focus is on 6 species of bacteria, collectively known as the ESKAPE pathogens, including drug-resistant variants such as MRSA. Amongst the general public, increased concerns with disease transmission have been seen with norovirus, swine flu (H1N1) and multiple coronaviruses. Currently, hospital-acquired (nosocomial) infections are one of the top 10 leading causes of death in the US. Associated costs surpass $30 billion annually worldwide. The SARS outbreak of 2003 was estimated to reduce the global GDP by $33 billion, despite having no significant footprint in the US or Europe.

This technology uses an inexpensive N-halamine antimicrobial agent that is commercially available and can be easily impregnated into non-woven materials. It's expected to be about 10% the price of biguanides and 1% the price of silver. Further, biguanides are generally ineffective against Gram negative bacteria (e.g., *P. aeruginosa*) and silver is not biodegradable. Preliminary testing has established the product's antimicrobial activity, stability and low toxicity.

Status:

- Issued patents in U.S. (10,178,866), Europe (8 countries), Canada and Australia with pending applications in US (20190160199), China, India, Japan and South Korea (allowed).
- When incorporated into standard wound dressings, significant killing achieved against two ESKAPE pathogens: *S. aureus* (6 log reduction in 5 minutes or less) and *P. aeruginosa* (over 7 log reduction in 30 minutes or less); also shown to deactivate influenza viruses in air filters
- Initial results have shown materials to be stable when stored in opaque containers, to not leach from the fabric into surrounding media, and to not induce skin irritation
- A related chemistry from Auburn has been commercialized for water purification
- This technology is available for exclusive or non-exclusive licensing

Early Stage → **Lab testing** → **Animal Studies** → **Clinical Studies**