

# Treating Pulmonary Disorders with Artificial Lung Surfactant



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**WARF: P100038US02**

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**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing methods of treating respiratory distress syndromes using synthetic nylon-3 copolymers.**

## OVERVIEW

Lung surfactant (LS) is a lipid-protein mixture that coats the internal surface of the lungs. It reduces the work of breathing by helping to keep air sacs open and stable. Deficient or dysfunctional LS results in infant or acute respiratory distress syndromes (IRDS or ARDS, respectively).

IRDS syndrome can be treated with pig- or bovine-derived surfactant replacements. But these substances are not ideal because they carry the risk of animal infection and are expensive to extract and process on a large scale. No such treatment exists for ARDS, which afflicts 190,000 people in the U.S. every year from different causes, including lung injury.

A fresh approach is to chemically mimic two important LS proteins, SP-B and SP-C, from artificial sources. Attempts have focused on step-by-step, sequence-specific synthesis. Yet this is challenging given the complexity of both proteins. Easier methods would enable large-scale pharmaceutical development.

## THE INVENTION

UW-Madison researchers and others have developed new artificial lung surfactants that mimic the SP-B protein. The materials are based on sequence-random copolymers that contain cationic and lipophilic subunits and are members of the nylon-3 family. They are prepared by ring-opening polymerization of beta-lactams. Also, *N*-terminal units can be attached to the copolymers to mimic surface tension properties exhibited by the SP-C protein.

## THE WARF ADVANTAGE

### **WARF: A Leader in Technology Transfer Since 1925**

Since its founding as a private, nonprofit affiliate of the University of Wisconsin-Madison, WARF has provided patent and licensing services to UW-Madison and worked with commercial partners to transform university research into products that benefit society. WARF intellectual property managers and licensing staff members are leaders in the field of university-based technology transfer. They are familiar with the intricacies of patenting, have worked with researchers in relevant disciplines, understand industries and markets, and have negotiated innovative licensing strategies to meet the individual needs of business clients.

### **The University of Wisconsin and WARF – A Single Location to Accelerate Translational Development of New Drugs**

UW-Madison has the integrative capabilities to complete many key components of the drug development cycle, from discovery through clinical trials. As one of the top research universities in the world, and one of the two best-funded universities for research in the country, UW-Madison offers state-of-the-art facilities unmatched by most public universities.

These include the Small Molecule Screening Facility at the UW Comprehensive Cancer Center; the Zeeh Pharmaceutical Experiment Station, which provides consulting and laboratory services for developing formulations and studying solubility, stability and more; the Waisman Clinical Biomanufacturing Facility; the Wisconsin Institute for Medical Research, which provides UW-Madison with a complete translational research facility; and the innovative, interdisciplinary Wisconsin Institutes for Discovery, home to the private, nonprofit Morgridge Institute for Research and its public twin, WID, part of the university's graduate school. The highly qualified experts at these facilities are ready to work with you to create a library of candidates for drug development.

## APPLICATIONS

- Development of therapeutic lung surfactants

## KEY BENEFITS

- Production is cheaper and more efficient.
- Effectively mimics natural proteins
- Beta-peptides are more biostable.

## STAGE OF DEVELOPMENT

Promising *in vitro* surfactant activity has been demonstrated in a mixed lipid film. Pulsating bubble surfactometry (PBS) data indicate superior adsorptive and dynamic-cycling properties.

## ADDITIONAL INFORMATION

### Related Technologies

[WARF reference number P06009US describes a robust method for the large-scale synthesis of beta-peptides.](#)

### Tech Fields

Materials & Chemicals - Synthesis

Pharmaceuticals & Vitamin D - Pulmonary

## CONTACT INFORMATION

For current licensing status, please contact Rafael Diaz at [rdiaz@warf.org](mailto:rdiaz@warf.org) or 608-960-9847.

