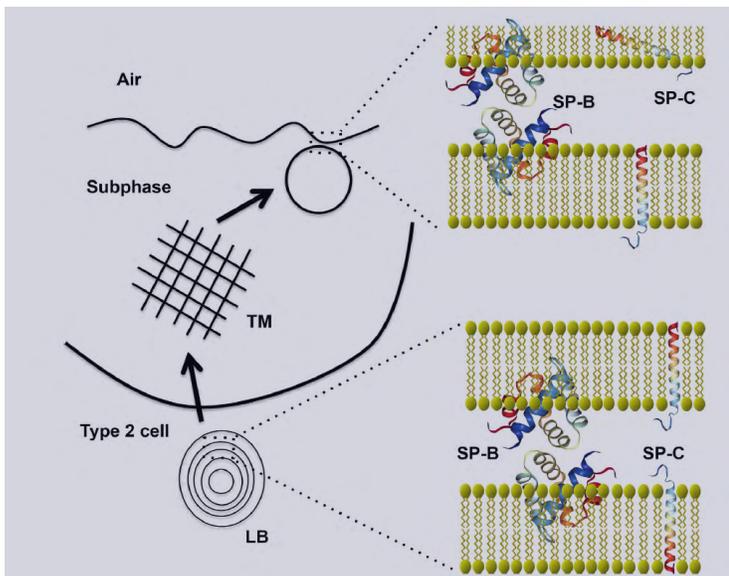


# bio superior



**Our mission is to revolutionize pulmonary care and save lives by curing lung disease.**



**Contact Information**

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**Industry**

Biotherapeutics/  
Respiratory Disease

**Development Stage**

Preclinical

**Year Founded**

2017 (company pivot 2019)

**Size of Team**

4

**Funding**

NSF I-Corps Grant:  
#1917312  
March of Dimes Grants:  
#23-FY20-221  
#23-FY21-12

**Patents**

US 8,420,080 "Methods For  
Treating Adult Respiratory  
Distress Syndrome"  
"Surfactant Treatment Com-  
positions", PCT/US21/55333

**Law Firm**

Morrison Foerster LLP

**Website**

[www.bio-superior.com](http://www.bio-superior.com)



**Russ Lehrman**  
CEO

## A Word From the CEO

Watching someone struggling to breathe is a harrowing thing to see. BioSuperior, a therapeutics company, is innovating new treatments for serious respiratory disease in pre-term infants and adults.

Our passion is driven by personal experience. One of my nephews, Everitt, was born at 7 ½ months and because he was pre-term, he developed Neonatal Respiratory Distress Syndrome (NRDS). My mother-in-law, Cindy, died in her mid-50s due to Acute Lung Injury (ALI). In both cases, a key substance called “lung surfactant” caused their illnesses. Everitt’s lungs were too young to make lung surfactant, and, in Cindy’s case, inflammation destroyed her lung surfactant.

Our team has tremendous experience in the complementary areas needed for developing new drugs and is backed up by advisors with long experience in respiratory R&D.

BioSuperior will revolutionize care, shifting the course of action from management, to cure and repair.

We invite you to join us in our endeavor to create life changing cures for lung disease.

# The Problem



**40%**

Respiratory disease is the fourth leading cause of death, behind heart disease, cancer and accidents.

Each year in the United States, 200,000 adults develop Acute Lung Injury (ALI). In addition, 60,000 pre-term infants are born with Neonatal Respiratory Distress Syndrome (NRDS). A significant percentage of these babies also develop Bronchopulmonary Dysplasia (BPD).

**About 40% of ALI patients and more than 20% of babies suffering from BPD succumb to these diseases<sup>1,2</sup>.**

ALI and NRDS are characterized by insufficient lung surfactant, a natural compound that coats lung tissue and enables proper lung function. ALI patients have damaged, porous lung tissue, leading to loss of lung surfactant and fluid accumulation in the lungs.

Without proper treatment, patients suffocate.

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1. Williams GW et al., Acute Respiratory Distress Syndrome. Anesthesiology (2021)

2. Lapcharoensap W et al., Hospitalization costs associated with Bronchopulmonary Dysplasia in the first year of life. J Perinat. (2020)

# \$30B

Infants with NRDS do not yet produce sufficient lung surfactant, which leads to inflammation and development of BPD.

In addition to the loss of life, **ALI and NRDS are costing the U.S. healthcare system more than \$20B<sup>3</sup> and \$10B<sup>4</sup> per year**, respectively. With COVID, the death toll and cost due to ALI has risen exponentially. Growing exposure to smoke, smog and other environmental factors promise to compound these numbers even more.

There is no cure for these diseases, despite decades of research and serious investment.



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3. Boucher PE et al., The Cost of ARDS. Chest (2021)

4. Beam AL et al., Estimates of healthcare spending for preterm and low-birthweight infants in a commercially insured population: 2008-2016. J Perinatol. (2020)

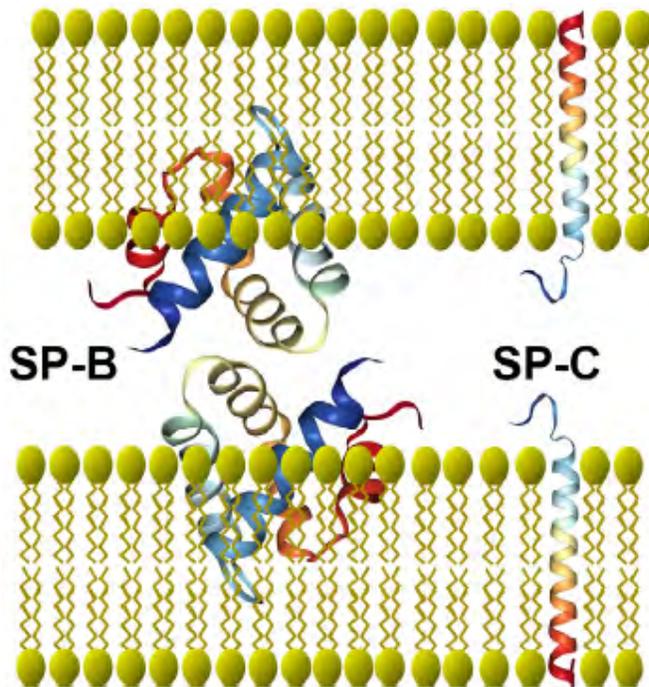
# The Solution

We are developing cost-effective, non-invasive, and easily accessible technologies to cure lung disease and repair damaged lung tissue.

We have bio-engineered a prototype synthetic pulmonary surfactant, **BioSURF™** that coats normal lung tissue. When combined with medications that reduce inflammation, **BioSURF™** helps restore normal lung function. It can be administered to the lung directly, or as an aerosol. No other synthetic surfactant exists.

## Technology #1

The composition of lung surfactant is unique.



We are also developing a gene-delivered therapeutic that halts disease progression and repairs damaged lung tissue in ALI.

Our gene therapy can be administered directly to the lung by itself or in combination with the lung surfactant.

**Technology #2:**  
Gene therapy  
for lung repair



# Business Strategy

We will initiate clinical trials on our synthetic pulmonary surfactant, **BioSURF™**, and gene therapeutic and identify a strategic partner to help us complete clinical development and commercialize the products.

Beyond the pulmonary field, we expect that our technology platforms will be applicable to the treatment of other illnesses related to the microvasculature, including hemorrhagic stroke and chronic kidney disease. In the US, over 100,000 people die of hemorrhagic stroke<sup>5</sup> and 37 million are afflicted with chronic kidney disease<sup>6</sup> each year.

## **Progress to Date**

Since the inception of the company, we have garnered \$500,000 in funding, including grants from March of Dimes and NSF I-Corps, secured two patents for the development of our prototype synthetic pulmonary surfactant, **BioSURF™**, and started animal model testing. We will raise additional funds to continue product development and conduct clinical trials for **BioSURF™** and our gene therapeutic.

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5. US Department of Health and Human Services. How many people are affected by/at risk for stroke? [https://www.nichd.nih.gov/health/topics/stroke/conditioninfo/\\_risk/](https://www.nichd.nih.gov/health/topics/stroke/conditioninfo/_risk/)

6. Centers for Disease Control and Prevention. Chronic Kidney Disease in the United States, <https://www.cdc.gov/kidneydisease/publications-resources/ckd-national-facts.html2021>

# Our Team and Advisors



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# FAQs

## **Why is now a good time to invest in the pulmonary care industry and BioSuperior?**

New lung pathogens (e.g., COVID variants) and environmental problems (e.g., smoke inhalation from wildfires, military burn pits, etc.) will continue to increase the number of patients with serious lung illness.

In 2021, the number of patients dying from lung disease rivaled deaths due to heart disease and cancer. There is heightened public awareness of these new lung pathogens and environmental problems. Gene therapy is an exciting new treatment modality and has tremendous potential for the treatment of lung disease. And the use of lung surfactant to deliver lung therapeutics is expected to enable breakthroughs in the treatment of serious lung disease.

## **How will the funds be used and what are your immediate next steps?**

We will use the funds over the next year to establish our gene therapy product candidate for the repair of injured lung tissue in Acute Lung Injury. This gene enables lung cells to

make a protein that is a key component of the “glue” that naturally adheres neighboring cells to form intact alveoli. We will test the ability of our gene therapy to repair lungs in animal models. In parallel, we will continue working on our prototype synthetic pulmonary surfactant, BioSURF™ through our secured grants.

## **What is unique about BioSuperior?**

Our technology is unique as our gene therapy candidate has a unique mechanism of action for the treatment of lung disease. It is not an antiviral or anti-inflammatory therapeutic. Instead, the treatment targets tissue repair as demonstrated by fundamental science and animal studies. And gene has been shown to produce protein for months, much longer than other delivery mechanisms. Since our lung surfactant drug-delivery platform is synthetic, it will be scalable and useful in a number of applications.

All of our drugs are localized to the site of action, thus limiting toxic side effects.

### **What makes your team especially qualified?**

Each member of the BioSuperior team has deep and complementary skills in lung biology, formulation R&D of lung products and product development. We are experienced at leading and working within teams that have developed innovative pharmaceutical products. Some of these have captured more than \$1B in annual revenue.

Collectively, we have strong skills in understanding how to develop early-stage biotech companies and a strong network of pulmonologists, thought leaders in respiratory biology research, pharmaceutical scientists and business leaders who provide meaningful perspective and insight.

### **How will the products be sold and administered, how much will they cost compared to other treatments?**

Following regulatory approval, the manufactured product will be sold to specialty pharma and ultimately shipped to hospitals. The drugs will be administered by clinicians (pulmonologists, respiratory therapists, nurses, etc.) by instillation or nebulization directly to the airway. Life-saving drugs

administered by gene therapy capture premium revenue. Life-saving drugs delivered with bioengineered lung surfactant are expected to be much less expensive than the current cost of care for infants suffering from Bronchopulmonary Dysplasia (BPD).

### **How will eligibility be determined and what will be the process?**

BioSuperior will assess safety and efficacy in different patient populations through clinical trials and will seek approval based on this data. We expect our therapeutics to far exceed the current standard of care. This will motivate hospitals and insurance companies to list our drugs on their formularies.