

Fixing Broken Lungs

Continued Clinical Development of A Novel Pleural and Tracheal Sealant

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- Medical Technology Enterprise Consortium,
- American Lung Association, Cystic Fibrosis Foundation
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- 4 patents

Collapsed Lung: A Deadly Problem



Trauma



Lung Disease
Cancer
Surgery



Combat

Thoracic injuries: 75% trauma-related deaths

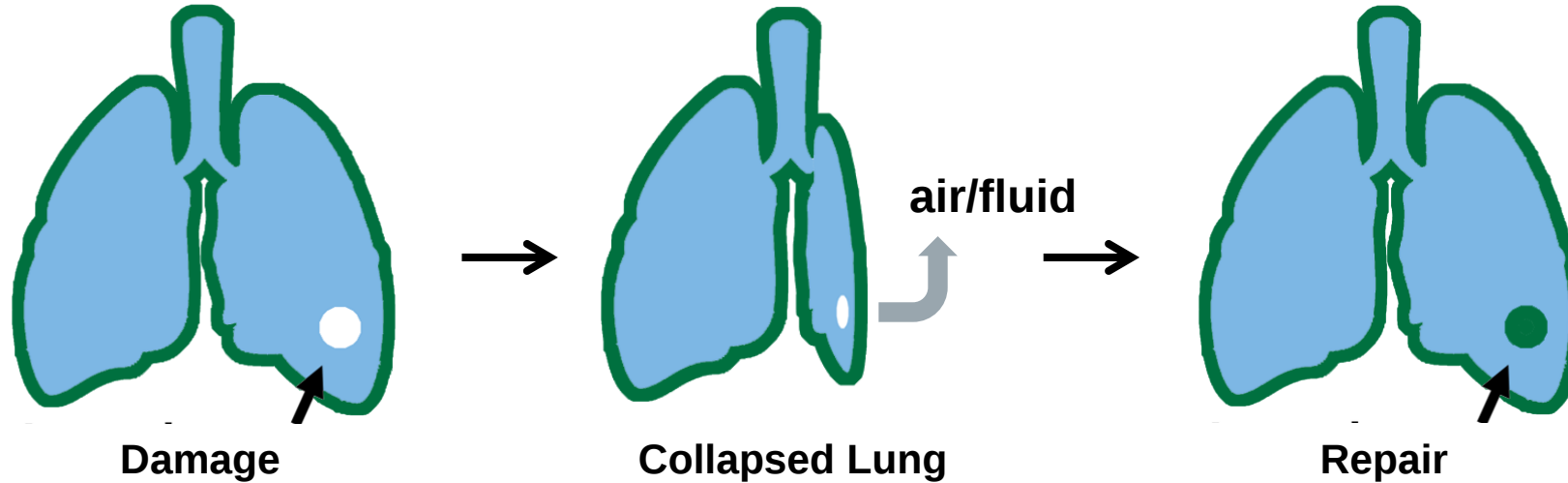


Chest tube

- **>100,000 patients per year (US)**
- **\$2.8 billion annual health care costs***
- **Long hospital stays**
- **High morbidity/mortality**

* Pneumothorax plus mean 7-day hospital stay; Am J Surg. 2004 Jun;187(6):767-74. Shahini, et al. Medscape Penetrating Chest Trauma

Current Treatment Options



- Surgical repair: cost, pain, failure rate, complications
- Glues: ineffective
- Surgical sealants: mostly ineffective

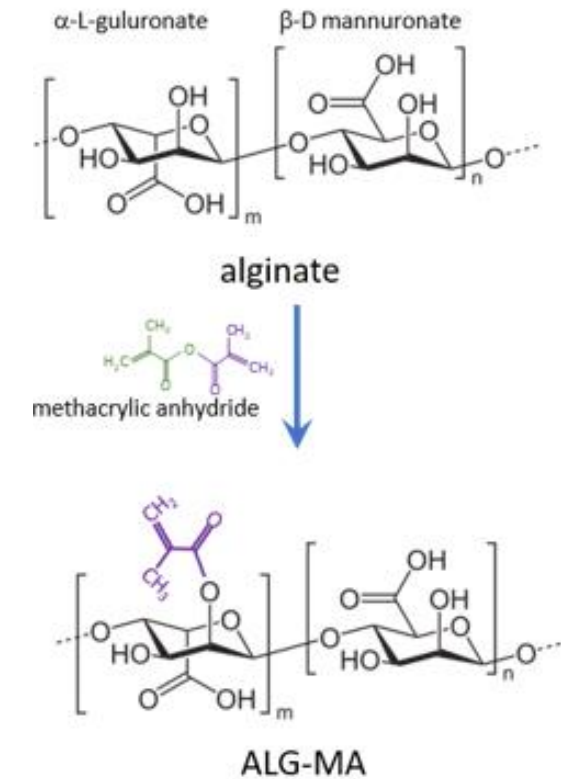
“Progel®” (Davol-Bard)

only FDA approved lung sealant

Unmet need for effective, safe, easy-to-use new lung sealant

Alginate

- Seaweed-derived
- Safe, non-toxic
 - Used in food/cosmetics
- Growing medical use
 - Wound care, implants
- Easily modified

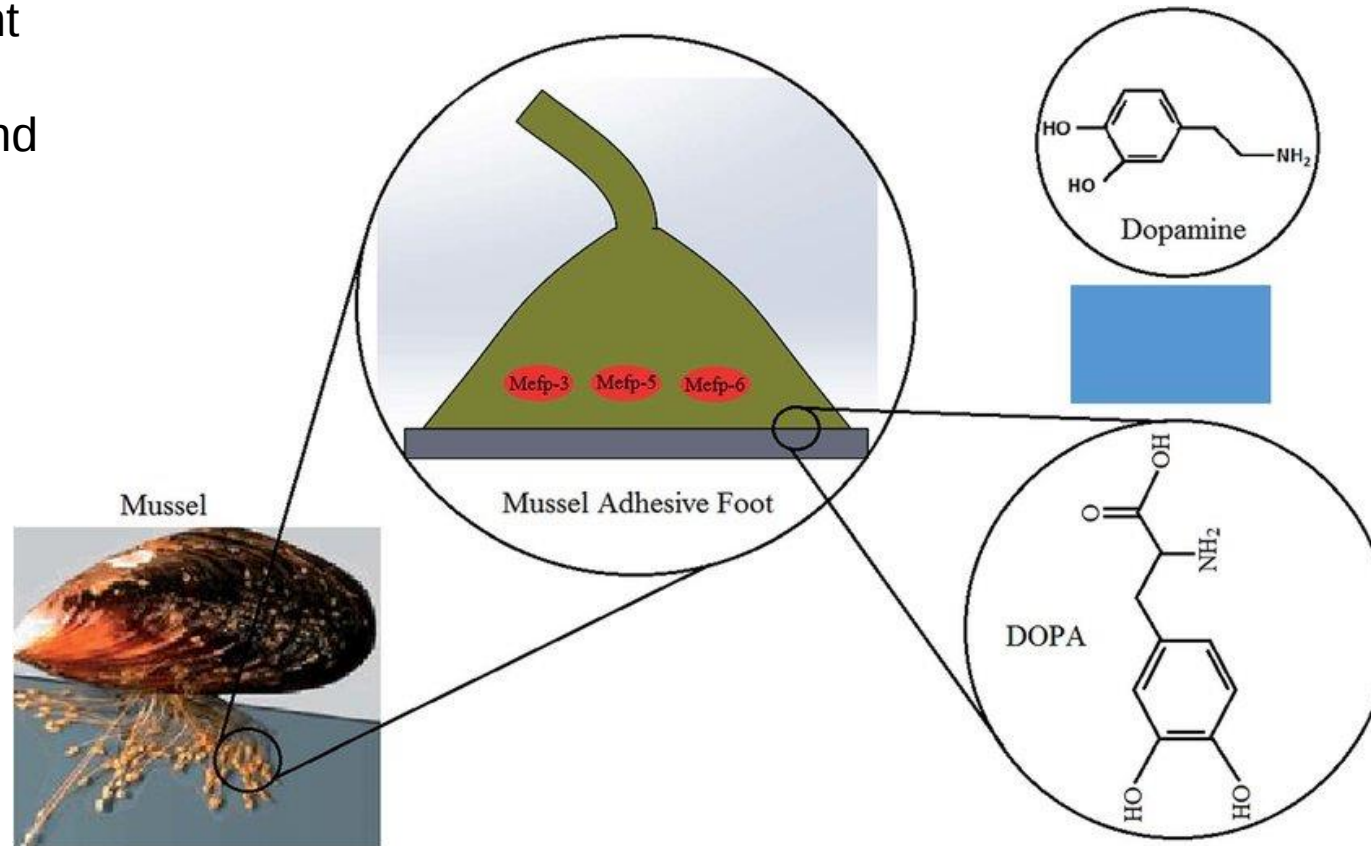


Methacrylation: Flexibility

Lessons from Nature: Dopamine Conjugation

Dopamine as a naturally occurring adherent agent

Growing use in tissue and other sealants



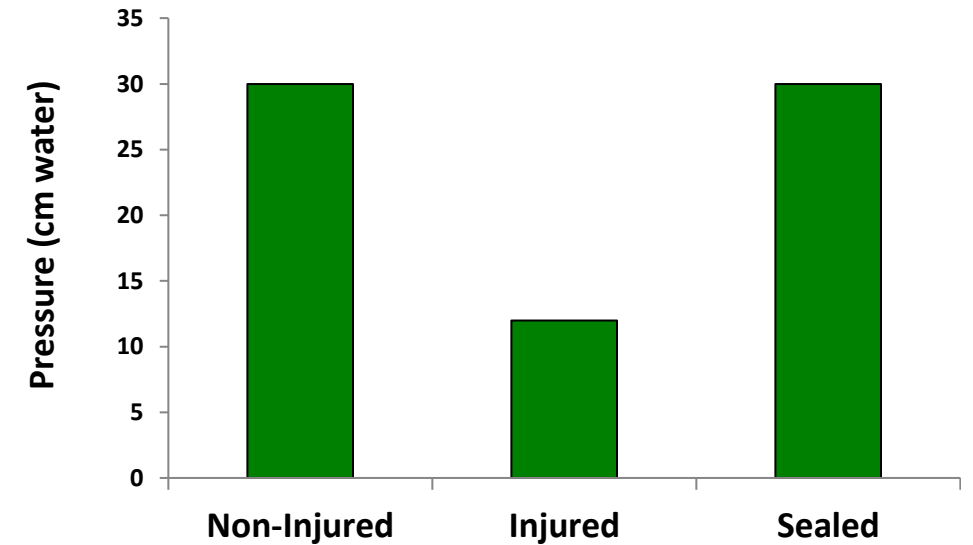
Put a Band-Aid® on it!!

Easy-to-Use Patch



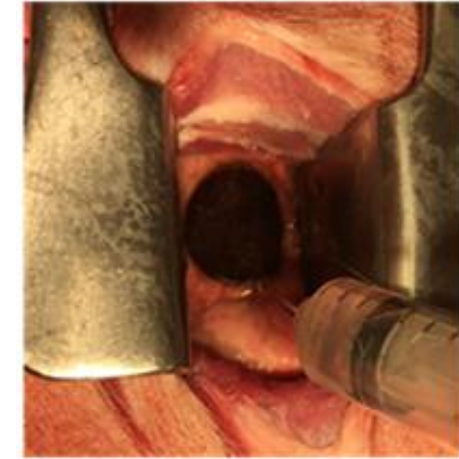
- Easy manufacture
- Shelf stable
- Ready-to-use

Alginate Patch Seals Lung After Injury



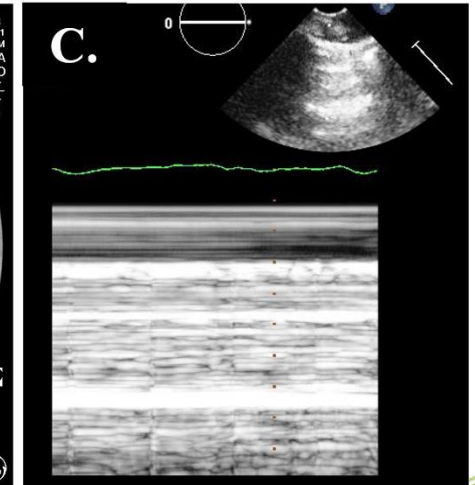
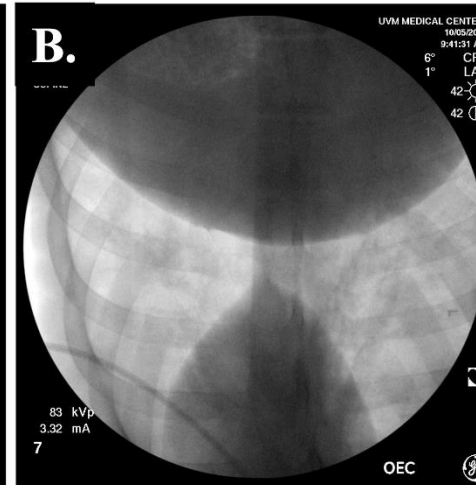
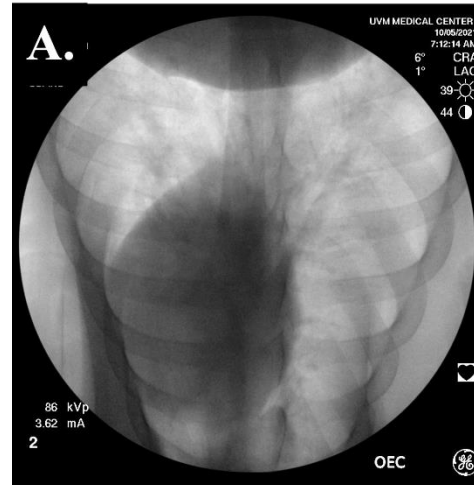
Patch Works in Longitudinal Rat and Pig Lung Injury Studies

- 1 year longitudinal studies
 - rat pleural, tracheal injuries
- Up to 6 months duration pig pleural injury
- Up to 6 weeks pig tracheal injury

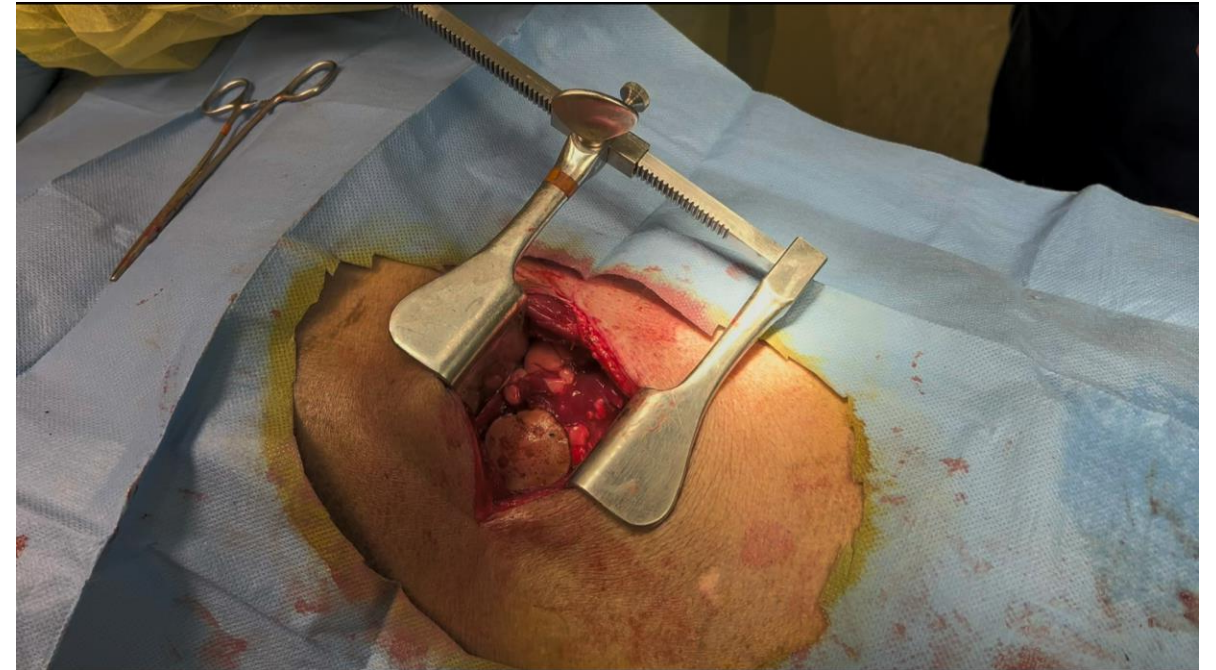
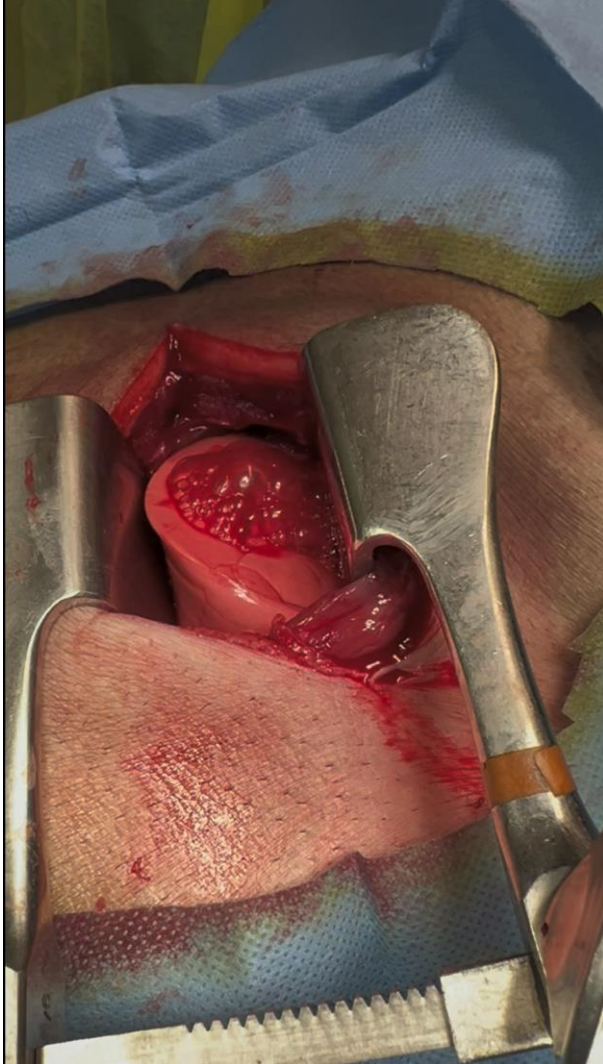


Current Studies

- DOD, NIH Funded
- Collaboration with Mayo
- Planned IDE for 2027-2028
- Storage: temperature extremes
- Juvenile animals:
collaboration with UConn



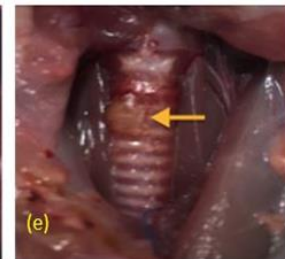
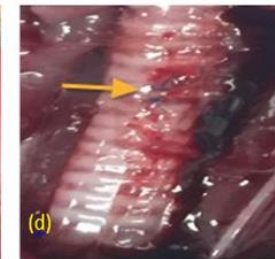
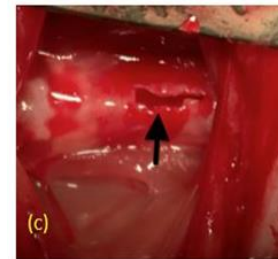
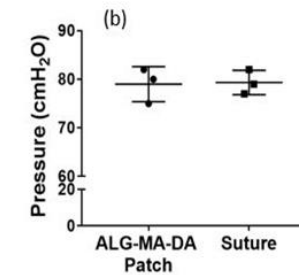
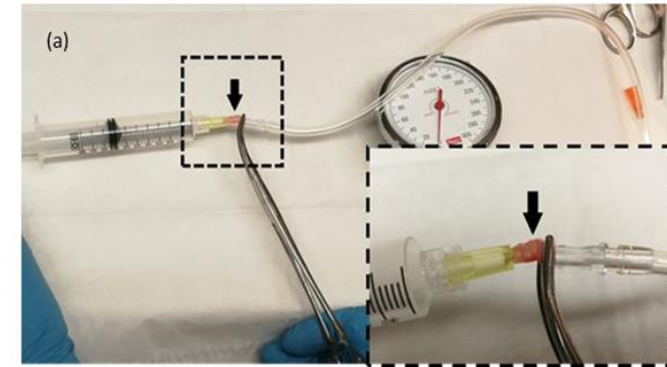
Rapid and Easy Repair of Significant Lung Injuries



Tracheal Repair: Burst Pressure is Comparable to Suture Repair Controls

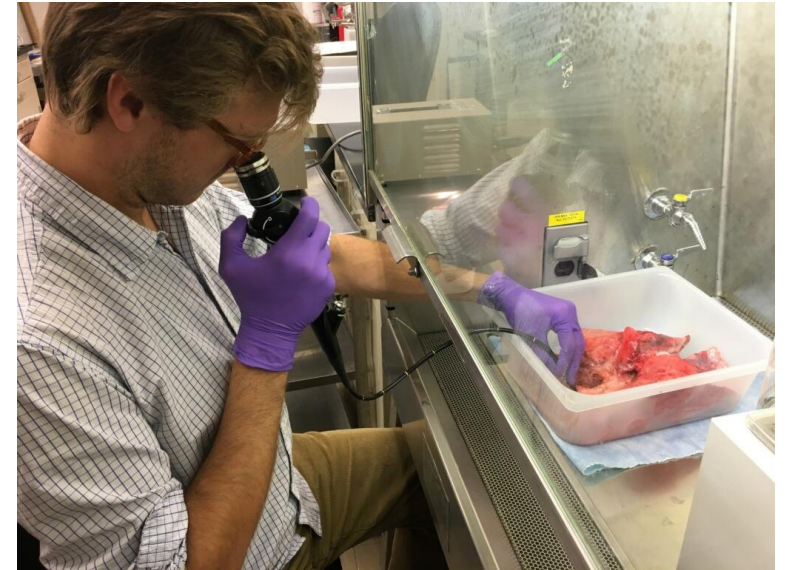


Burst pressure= 70 mmHg or 95 cm H₂O



Sealant Directions

- Initial clinical investigations 2028: lung
- Other organ/tissue systems
 - GI tract/liver
 - Fistulas
 - CNS: dural, spinal leaks
 - Cutaneous
 - Others
- Add anti-microbials, coagulants, growth factors, exosomes to patches
- Liquid formulations for endoscopic administration
- LLC incorporated 2025: AlgMaDa Tissue Sealants
 - IP under revision



Team



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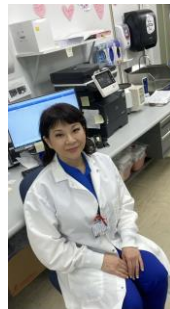
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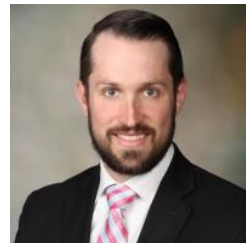


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