LEADING MEDICINE:
A TOWN HALL CONVERSATION
WITH DR. MARC BOOM

Town Hall Conversation XXXVI

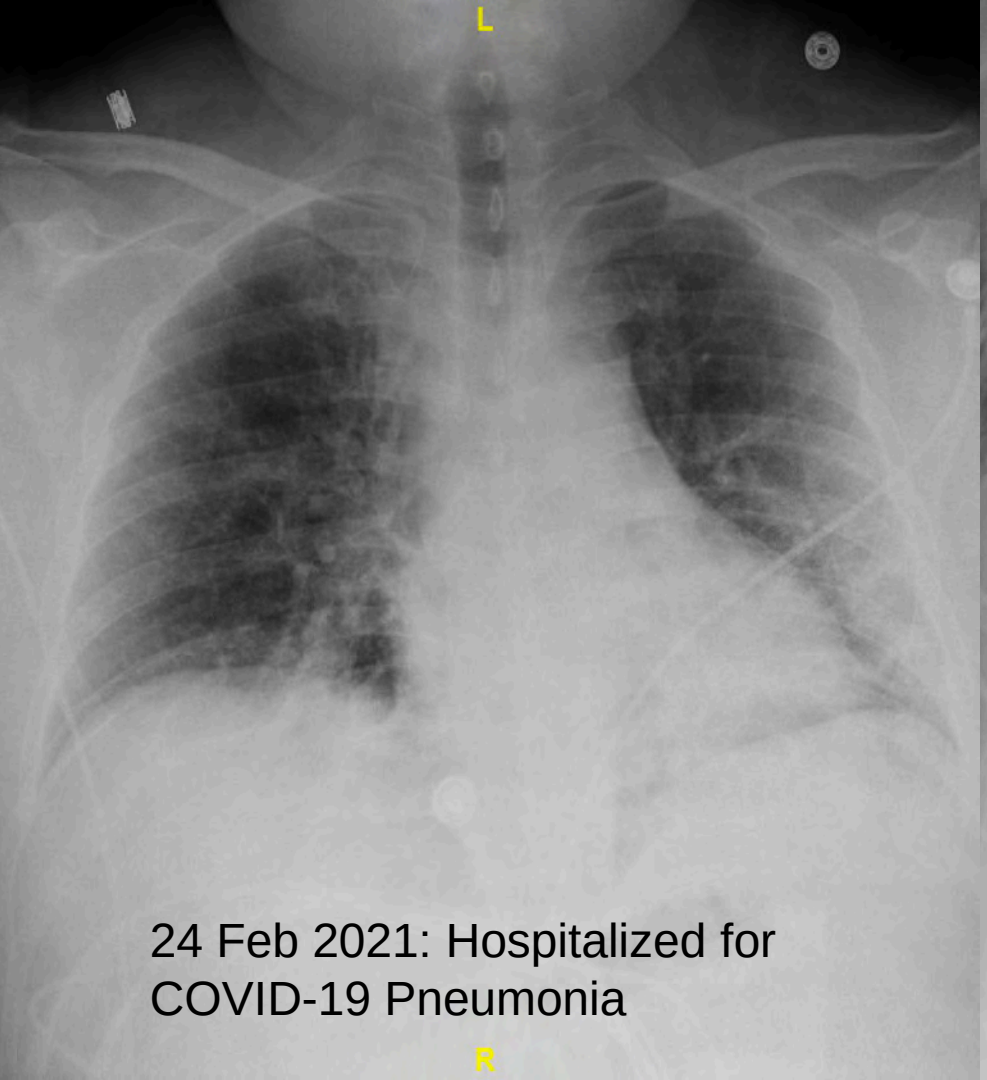
HOUSTON Methodist
LEADING MEDICINE

Current State of Lung Transplantation

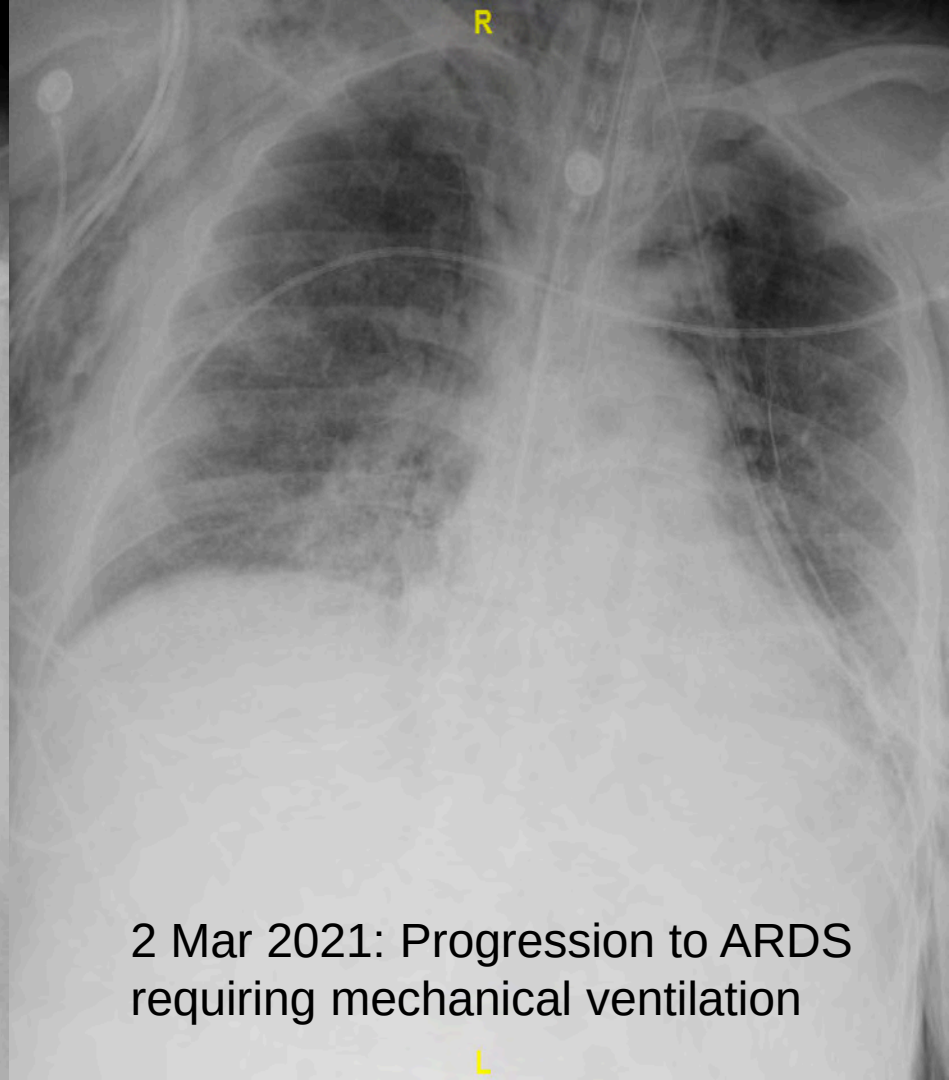
Howard J Huang MD

17 May 2023

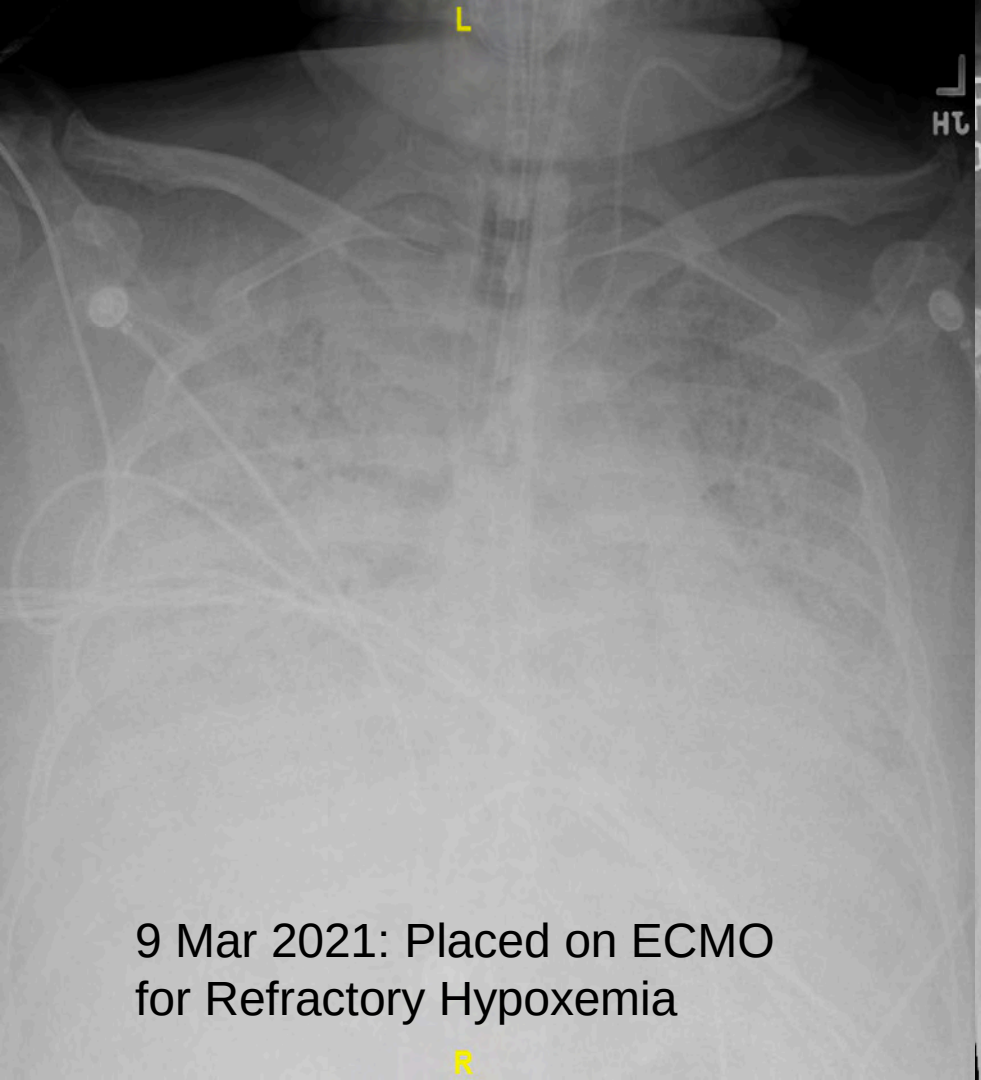
HOUSTON Methodist
LEADING MEDICINE



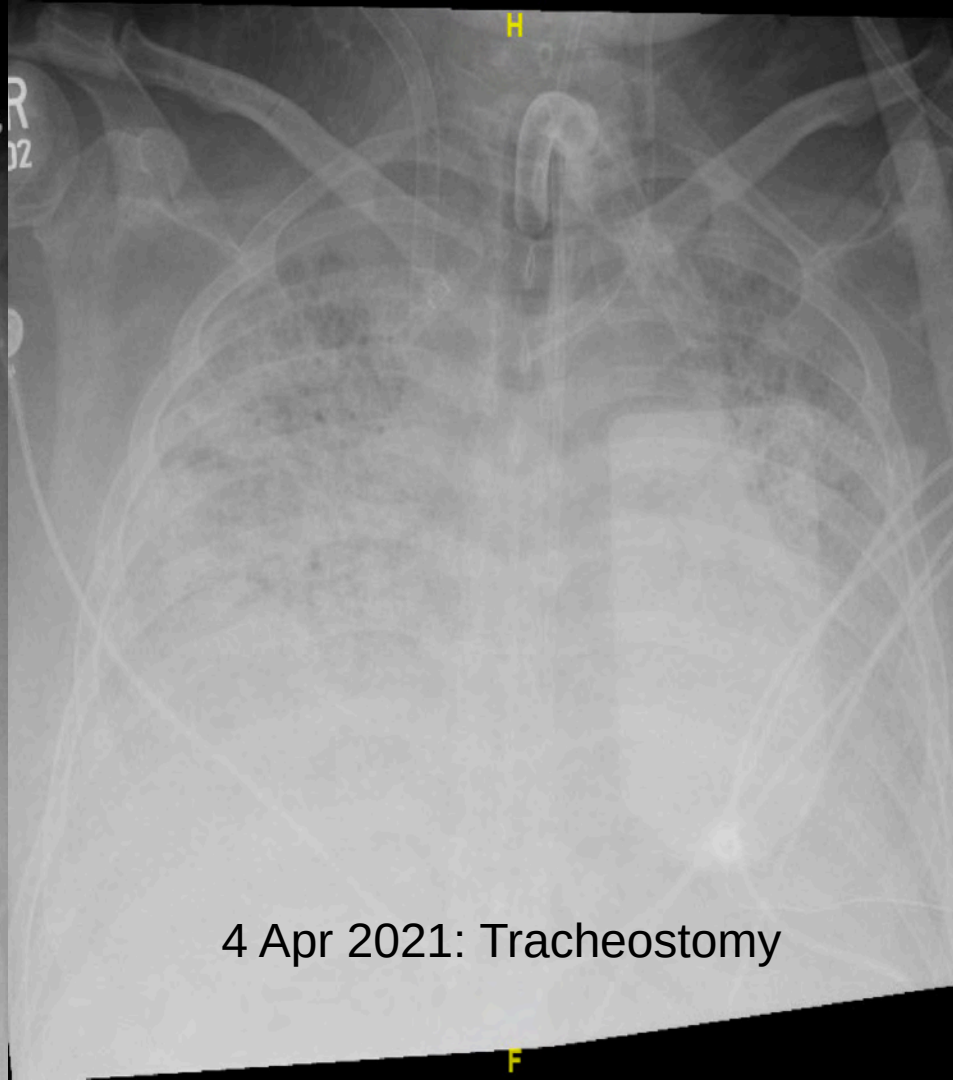
24 Feb 2021: Hospitalized for COVID-19 Pneumonia



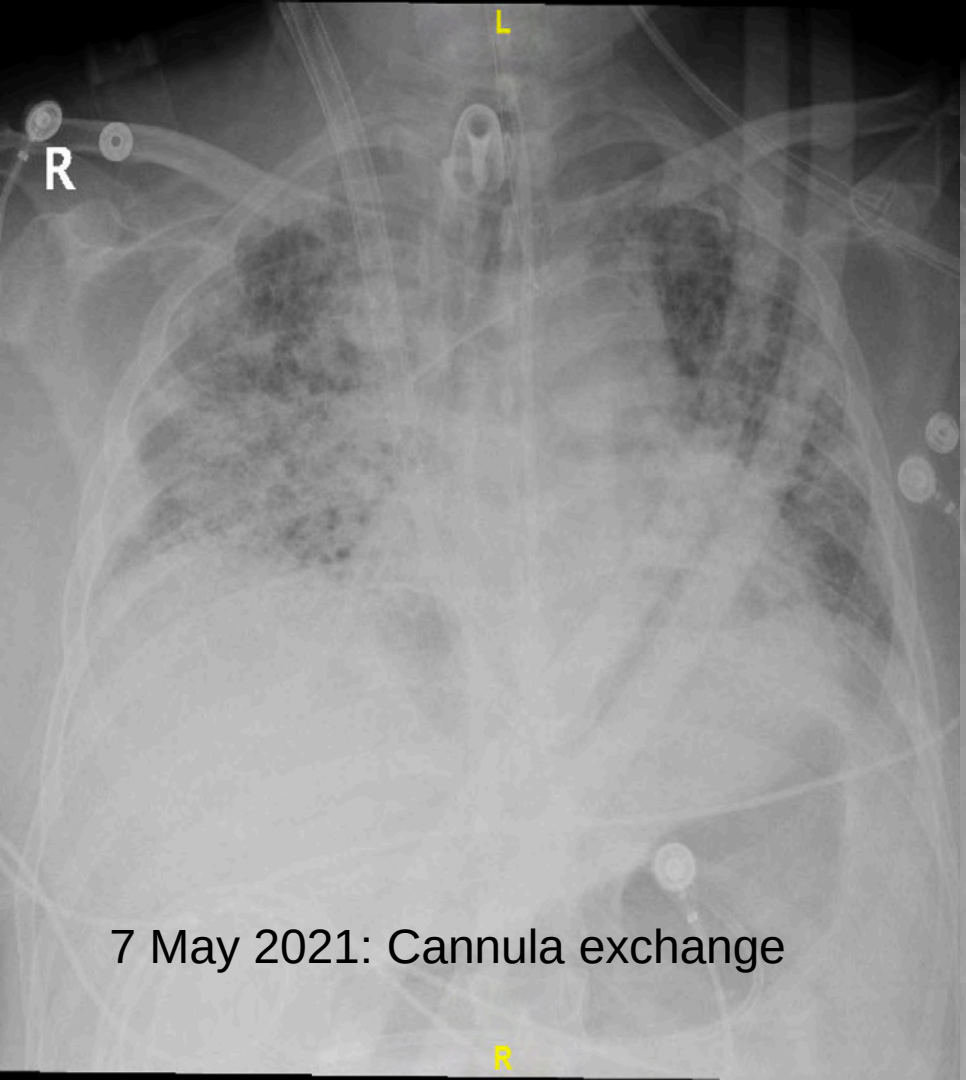
2 Mar 2021: Progression to ARDS requiring mechanical ventilation



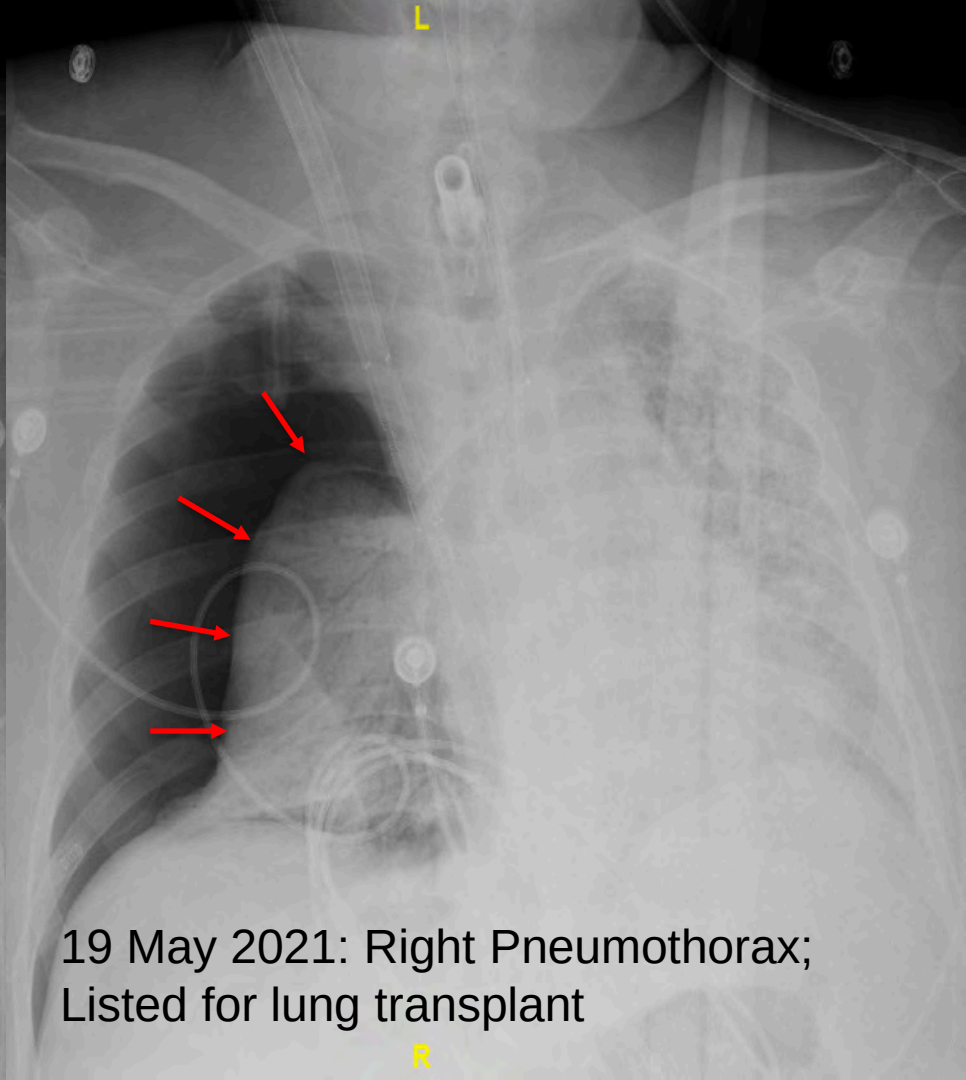
9 Mar 2021: Placed on ECMO for Refractory Hypoxemia



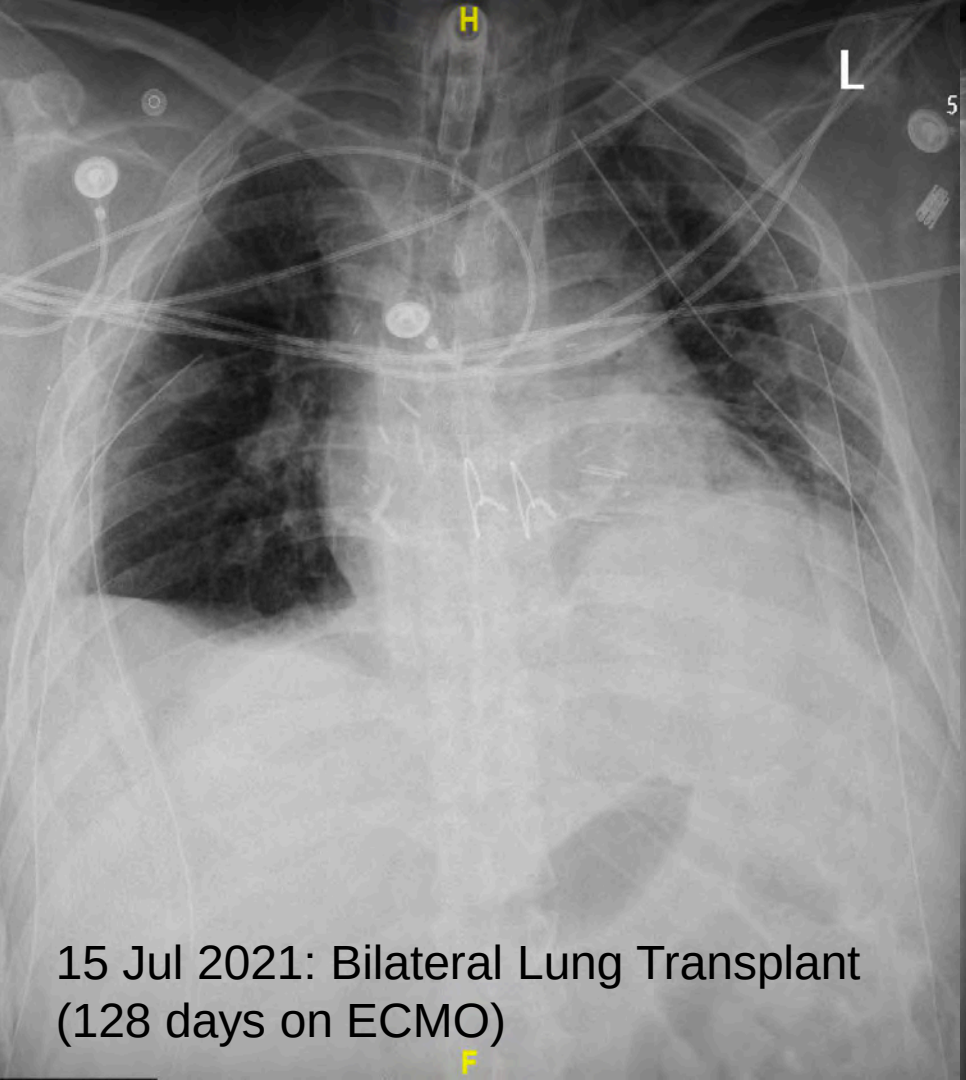
4 Apr 2021: Tracheostomy



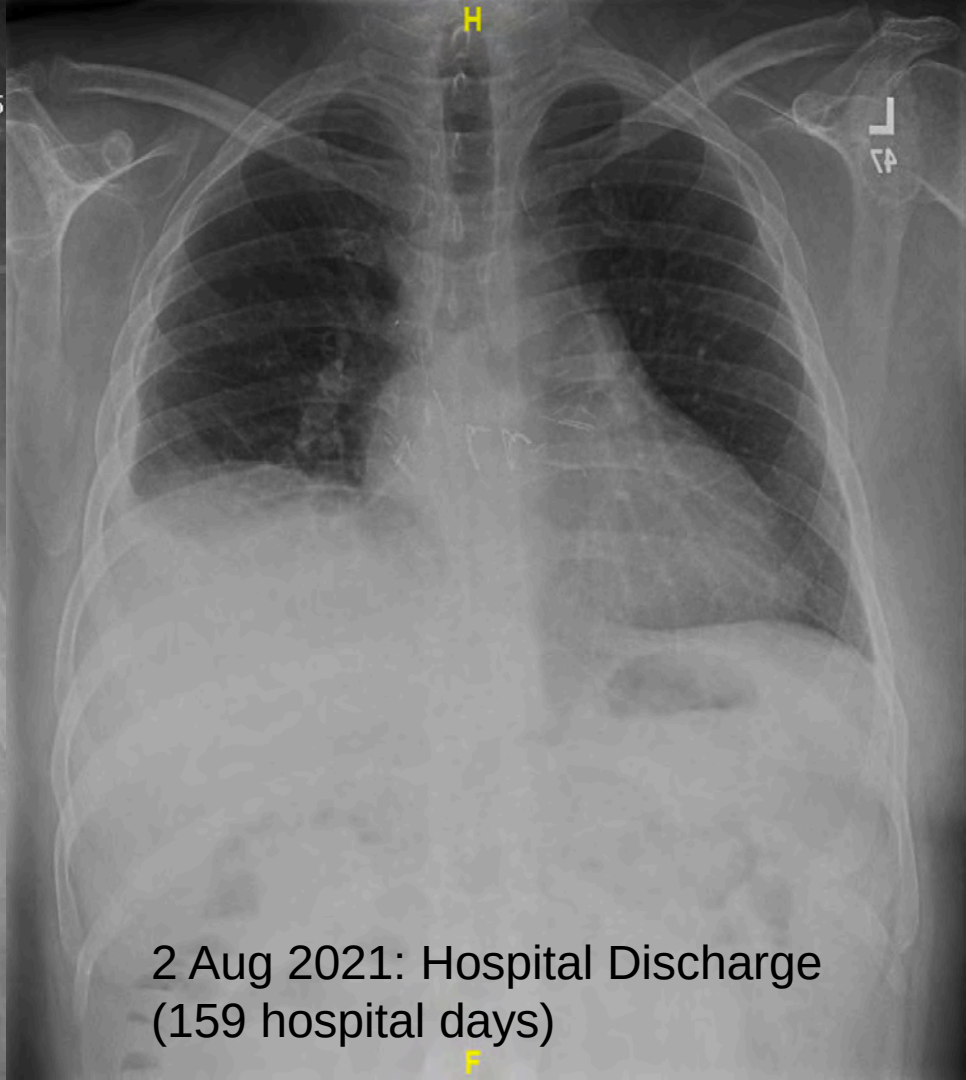
7 May 2021: Cannula exchange



19 May 2021: Right Pneumothorax;
Listed for lung transplant



15 Jul 2021: Bilateral Lung Transplant
(128 days on ECMO)



2 Aug 2021: Hospital Discharge
(159 hospital days)

Historical Perspective

Special Contribution

This patient, satisfying stringent preset technical and moral criteria for the procedure, is believed to be the first recipient of a successful lung transplant. Although the patient died of renal failure on the 18th postoperative day, the lung was demonstrated to have functioned and immunologic rejection did not occur.

Lung Homotransplantation in Man

Report of the Initial Case

James D. Hardy, MD, Watts R. Webb, MD, Martin L. Dalton, Jr., MD, and George R. Walker, Jr., MD, Jackson, Miss

THE TECHNICAL FEASIBILITY of lung replantation and homotransplantation in animals was established by the work of previous investigators.[1,2] It was found that occasionally a dog could survive temporarily on the function of the lung homotransplant alone, especially if the respiratory reflexes from the unexcised lung had been preserved. Preservation of these reflexes with exclusion of pulmonary function in this "normal" or contralateral lung was achieved by ligation of the pulmonary artery on this side. In addition to studies demonstrating that either a reimplanted lung or a homotransplanted lung could function fairly effectively to provide a significant degree of pulmonary function, the use of various agents in dogs to suppress the immune response had permitted substantial prolongation of the survival of lung homografts. In our own experience, the lung homograft had been rejected in untreated dogs in an average of from seven to eight days, whereas in dogs treated with azathioprine the lung had been rejected in an average of 30 days.[3]

For editorial comment, see page 1088.

After replantation and homotransplantation experiments involving more than 400 lungs in dogs,[3-6] we believed cautious clinical application of the procedure to be justified. A large number of possible candidates was carefully evaluated but none was selected until almost a year later, when a patient who fulfilled the criteria which had been set for the initial lung recipient was admitted to the hospital. These criteria were: (1) the patient must have a probably fatal disease, so that in the event untoward results were encountered, his life would not have been materially shortened; (2) there must be a reasonable possibility that the patient would be benefitted by the lung transplant; (3) the removal of the patient's own lung must not result in the sacrifice of any of his own functioning lung tissue; (4) transplantation of the left lung had been found to be somewhat simpler technically than transplantation of the right, and thus it was elected to initiate the clinical phase of the work by transplanting a left lung.

Clinical Evaluation of Case

A 58-year-old white man who was serving a prison sentence was admitted to the University Hospital on April 15, 1963, with the diagnosis of repeated attacks of pneumonia. He had had a productive cough and dyspnea for several months, having failed to respond satisfactorily to antibiotics administered in the prison infirmary. A heavy smoker, he had lost 26 lb (11.8 kg) since December, 1962, and recently the purulent sputum had contained streaks of blood.

In addition to the pulmonary disease, which the accompanying chest x-ray revealed to have pro-

From the Department of Surgery and University Hospital, University of Mississippi Medical Center.

"…it has been established that lung transplantation is technically feasible and that the transplant supplies a considerable degree of of respiratory activity until rejected…

…not only acute and chronic respiratory insufficiency but also cor pulmonale could be improved by lung homotransplantation if immunologic rejection could but be prevented. Thus the widespread clinical application of lung homotransplantation must await improved means of suppressing the homograft reaction."

James D. Hardy, M.D.

Hardy. *JAMA*. 1963.

THE ANNALS OF THORACIC SURGERY

Journal of
The Society of Thoracic Surgeons
and the
Southern Thoracic Surgical Association
VOLUME 9 NUMBER 6 JUNE 1970

A Review of 23 Human Lung Transplantations by 20 Surgeons

Charles R. H. Wildevuur, M.D., and John R. Benfield, M.D.

Human lung transplantation lags behind other organ transplantation in the number of patients and the degree of success. Since the first effort by Hardy [9] in 1963, only 22 additional efforts have been made in the intervening six years by 20 surgeons, and it is clear that no one has accumulated extensive experience with the problems peculiar to transplantation of the lung. In preparation for clinical lung transplantation in our institutions, and in an effort to serve others interested in this field, information available from the work of others has been accumulated.

The need for and desirability of an article of this type was probed through personal communication with several colleagues whose patients are included in this summary and with other investigators in the field who have not yet made clinical trials. Each surgeon who had performed a lung transplant was written a letter indicating our intention and requesting his cooperation. It was stressed that this publication is not intended as a replacement for any communication planned or contem-

From the Departments of Surgery, University of Groningen, Netherlands, and the University of California at Los Angeles, Los Angeles, and Harbor General Hospital, Torrance, Calif.

Presented at the Sixth Annual Meeting of The Society of Thoracic Surgeons, Atlanta, Ga., Jan. 12–14, 1970.

We wish to acknowledge gratefully the excellent cooperation given us by our colleagues in providing the data for this publication.

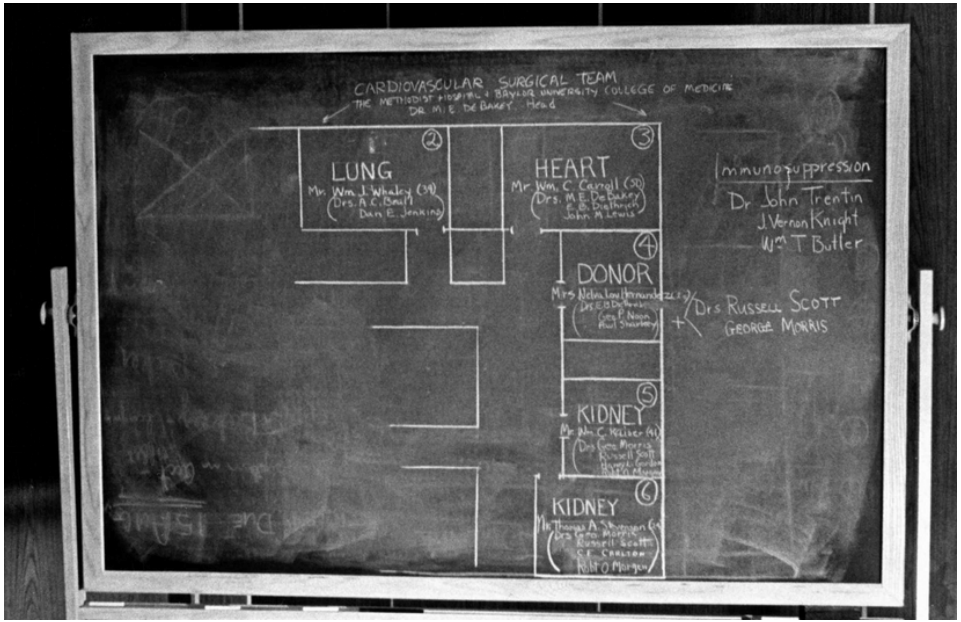
Address reprint requests either to Dr. Benfield, Harbor General Hospital, Torrance, Calif. 90509, or to Dr. Wildevuur, Oostersingel 59, Groningen, Netherlands.

The world's known lung transplant efforts, as well as the current address of each surgeon and reference to his work, are listed chronologically in Table 1…

Twenty-three human lung transplants have been done by 20 surgeons in North America, Europe, and Asia. Seventeen surgeons have each performed one lung transplant, and none has done more than two pulmonary transplants.

…the most successful effort to date was Derom's patient in Belgium, who survived more than 10 months. In all other cases the patients lived less than one month.

Wildevuur and Benfield. *Ann Thorac Surg*. 1970.



"Five surgical teams, composed of Methodist Hospital and Baylor University College of Medicine personnel, worked for 3 ½ hours to achieve the multiple transplants.

It was the first heart transplant for DeBakey and the first for Methodist Hospital.

The lung transplant was the world's sixth and the first in Houston."

Houston Chronicle. 1 Sep 1968

Agents and Actions
vol. 6/4 (1976)
Birkhäuser Verlag, Basel

Biological Effects of Cyclosporin A: A New Antilymphocytic Agent

by J. F. Borel, Camille Feurer, H. U. Gubler[1]) and H. Stähelin
Biological and Medical Research Division Sandoz Ltd, CH-4002 Basle, Switzerland

Abstract

The fungus metabolite cyclosporin A is a small peptide acting as a novel antilymphocytic agent. It strongly depressed appearance of both direct and indirect plaque-forming cells and produced a clear dose-dependent inhibition of haemagglutinin formation in mice upon oral administration. Skin graft rejection in mice and graft-versus-host disease in mice and rats were considerably delayed by cyclosporin A which also prevented the occurrence of paralysis in rats with experimental allergic encephalomyelitis. This compound was not only highly effective in preventing development of Freund's adjuvant arthritis, but in addition improved the symptoms in rats with established arthritis, although it is inactive in acute inflammation. This new agent contrasts with other immunosuppressives and cytostatic drugs in its weak myelotoxicity. Experimental evidence suggests that cyclosporin A, rather than being cytostatic or lympholytic, affects an early stage of mitogenic triggering of the immunocompetent lymphoid cell.

Introduction

In a screening program of fungus extracts, metabolites of the species *Cylindrocarpon lucidum* Booth were found to depress antibody production in mice. Further investigations led to the isolation of the active principle, a cyclic peptide consisting of 11 amino acids with a molecular weight of 1202.6 [1], to which the name cyclosporin A and experimental designation OL 27-400 were given. The compound, which is also found in cultures of *Trichoderma polysporum* (Link ex Pers.) Rifai, is a novel antilymphocytic agent. It was soon recognized that cyclosporin A differs from known immunosuppressive drugs in its mechanism of action and its low degree of myelotoxicity. It was, therefore, tested extensively for its effects on humoral and cellular immunity, on inflammatory conditions and for other pharmacological actions. Some of these results are presented here.

Materials and methods

As cyclosporin A is not water soluble, it was routinely administered as a suspension in a 0.5% solution of tragacanth. Azathioprine (Burroughs Wellcome, London) was also suspended in tragacanth, while cyclophosphamide (Asta-Werke, Brackwede) was dissolved in water. Control animals always received the solvent. The treatment schedules are indicated in the legends of each figure or table.

Mice of both sexes were usually 8–12 weeks old and female rats about 8–10 weeks; the animal strains used in the different experiments are indicated either in the method description or in the respective legend.

The assay of localized haemolysis in gel (LHG), used to detect both direct and indirect plaque-forming cells (PFC), was described previously [2]. The same developing serum as indicated in the above reference was used for detection of the IgG_{2a} PFC.

For the haemagglutination test, serum was obtained from mice immunized intravenously with 0.2 ml of a 10% suspension of washed sheep erythrocytes. Serum agglutinin titres were determined for each individual animal with Takatsy's microtechnique [3] by serial twofold dilutions. The titres are expressed as $-\log_2$.

Fitted pinch grafts of skin from male DBA/2 donors were transplanted to male BALB/c recipients according to the method of Billingham and Medawar [4]. Graft survival time was determined by daily observation, the criterion for rejection being epithelial survival.

The method of Owens and Santos [5] was used for the graft-versus-host (GvH) disease in mice. BDF1 female mice were treated with a sublethal dose of cyclophosphamide and reconstituted with spleen cells from male BALB/c mice. The animals were observed for 7 weeks and mortality recorded. The experimental procedure for GvH in rats was very similar. LBNF1 (Lewis × Brown Norway) female rats were treated with a sublethal dose of cyclophosphamide

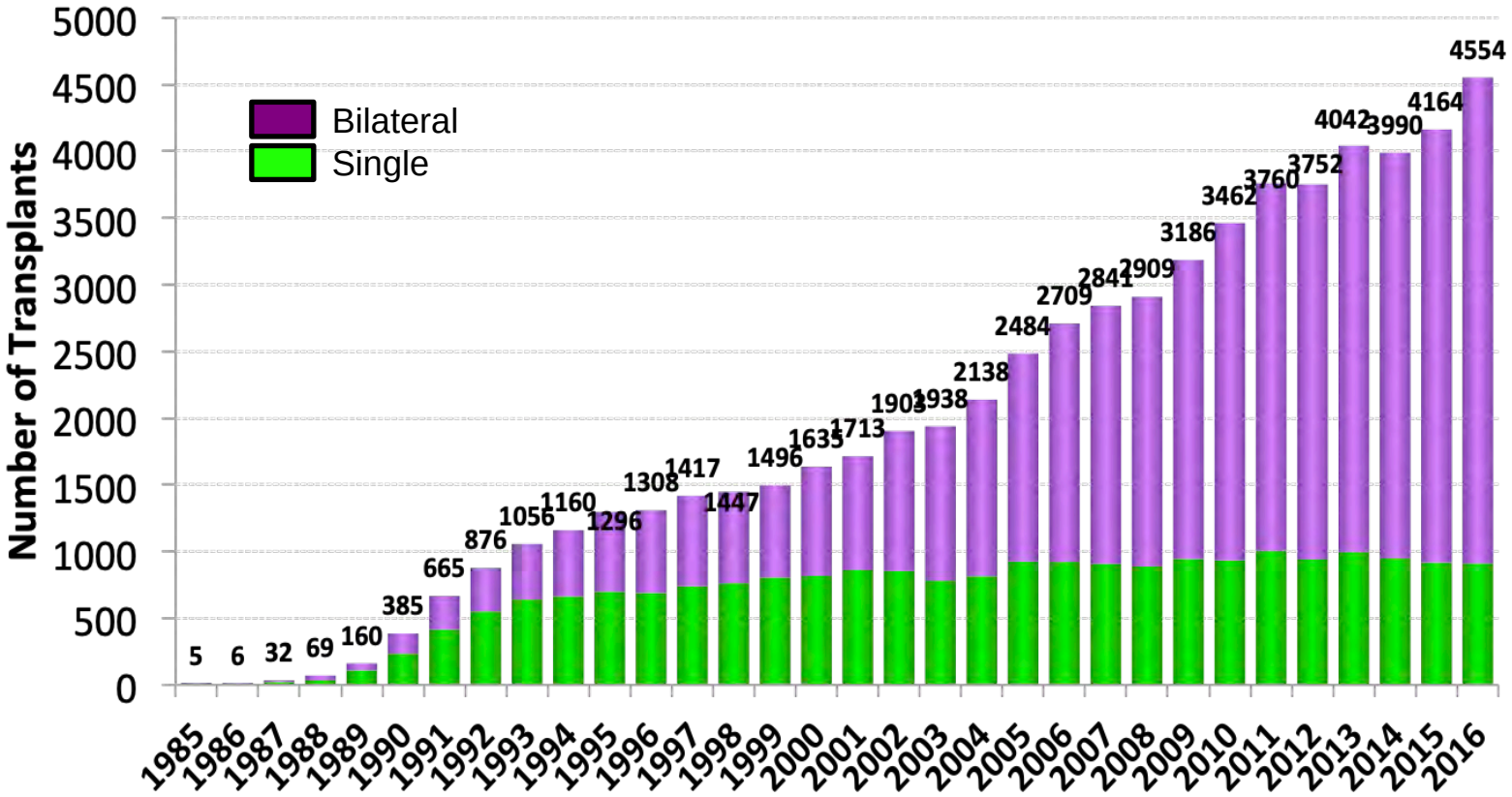
[1]) Research Institute, Wander, Bern, a Sandoz Research Unit.

Hardangervidda National Park, Norway

1969 Soil sample collected by Sandoz scientist Hans Peter Frey while vacationing in Norway
1972 Cyclosporine A (OL 27-400) isolated from *Tolypocladium inflatum* metabolite
1972 Antilymphocytic properties first described
1978 Cyclosporine enters clinical trials
1981 First successful heart-lung transplant (Stanford)
1983 Sandimmune receives FDA approval
1983 First successful single lung transplant (Toronto)
1986 First successful bilateral lung transplant (Toronto)

Borel. *Agents Actions*. 1976.

Worldwide Transplant Volume



Chambers. *J Heart Lung Transplant*. 2018.

Houston Methodist J.C. Walter Jr. Transplant Center has performed its 10,000th organ transplant. For 60 years, we have proudly served our community through lifesaving innovations in organ transplant, and we are honored to continue building on our legacy as a world leader.

1,226
HEART TRANSPLANTS

1,559
LUNG TRANSPLANTS

69
HEART-LUNG TRANSPLANTS

2,262
LIVER TRANSPLANTS

4,512
KIDNEY TRANSPLANTS

285
KIDNEY-PANCREAS TRANSPLANTS

86
PANCREAS & ISLET TRANSPLANTS

1
VCA TRANSPLANT (VASCULARIZED COMPOSITE ALLOGRAFT)

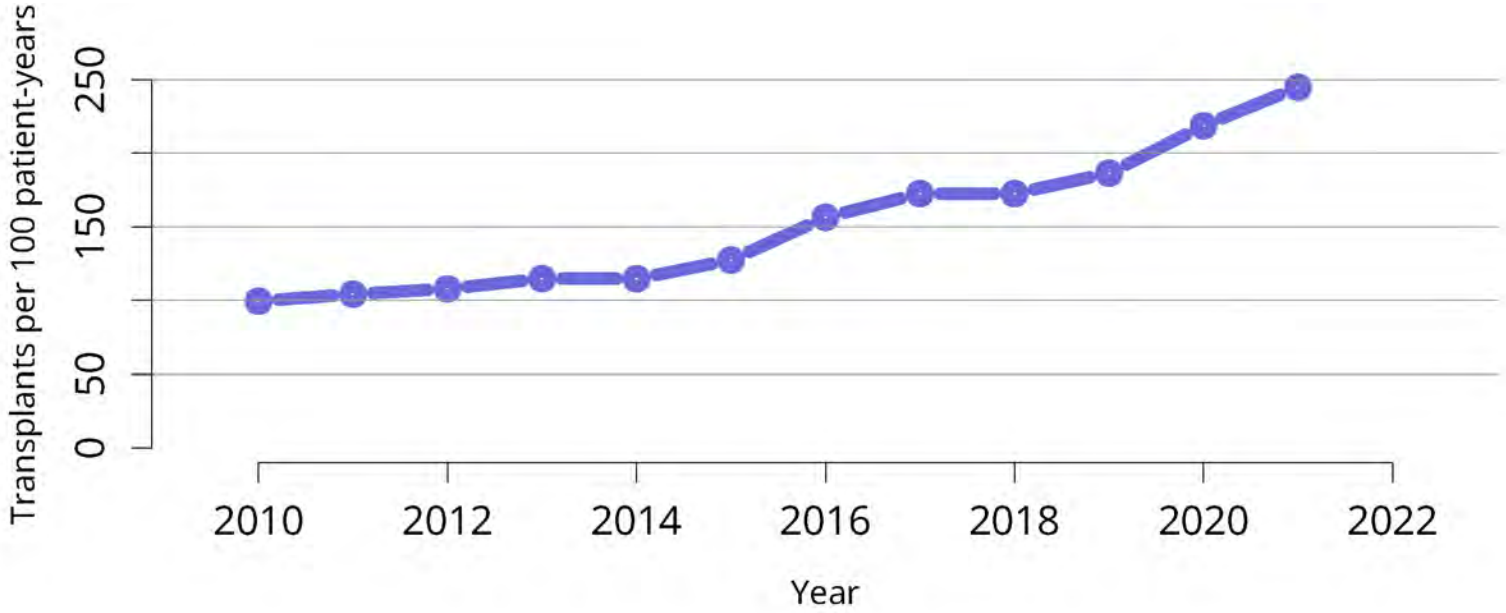
HOUSTON Methodist®
J.C. WALTER JR. TRANSPLANT CENTER

Learn More:
houstonmethodist.org/transplant

052023

Current Trends

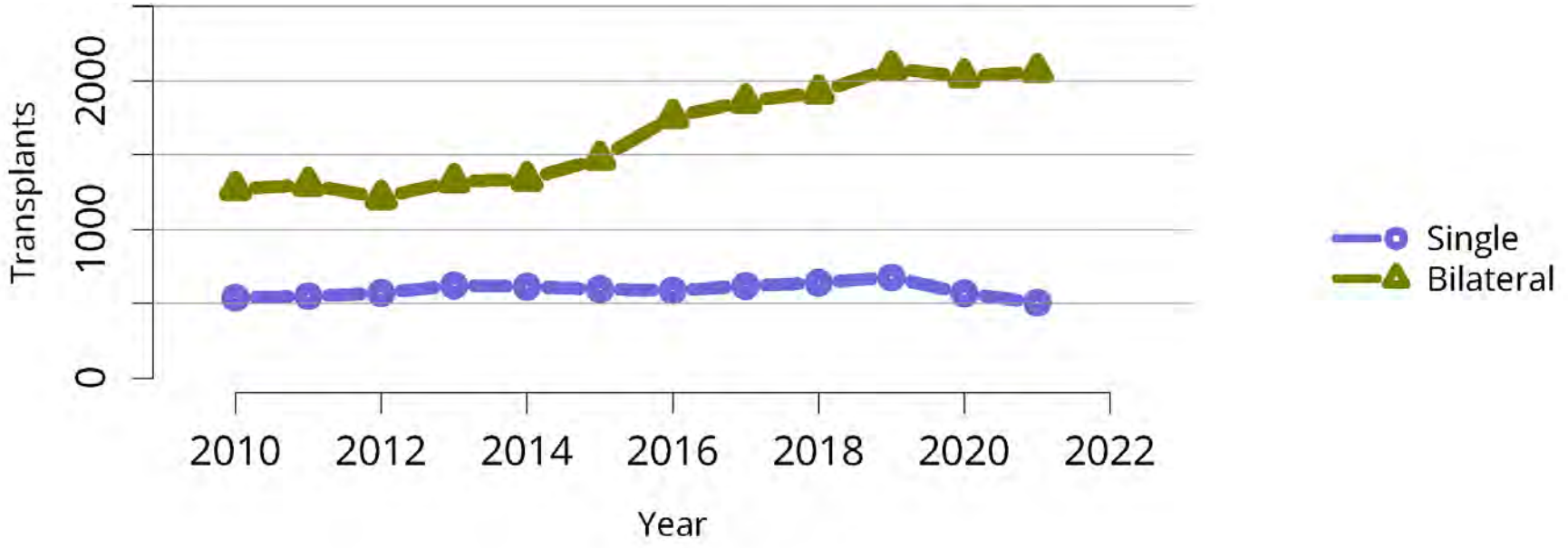
Lung Transplant Rate



OPTN/SRTR 2021 Annual Data Report

Valapour. OPTN/SRTR Annual Data Report. *Am J Transplant*. 2021.

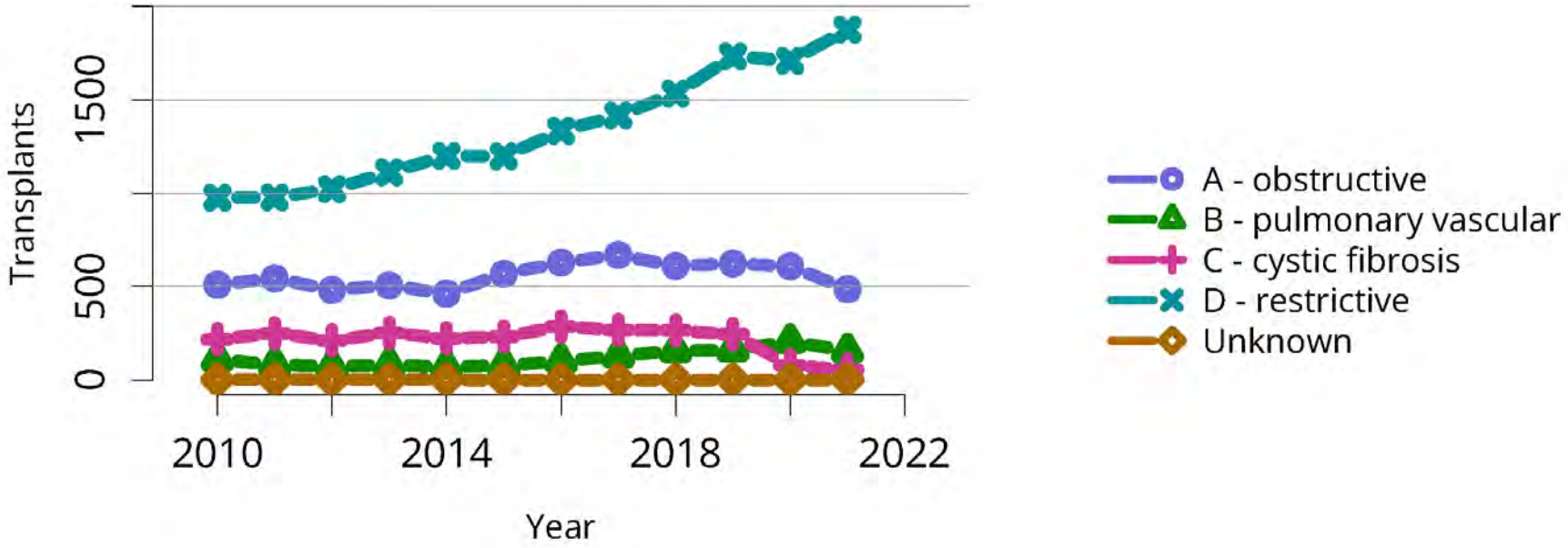
Transplant Procedure Type



OPTN/SRTR 2021 Annual Data Report

Valapour. OPTN/SRTR Annual Data Report. *Am J Transplant*. 2021.

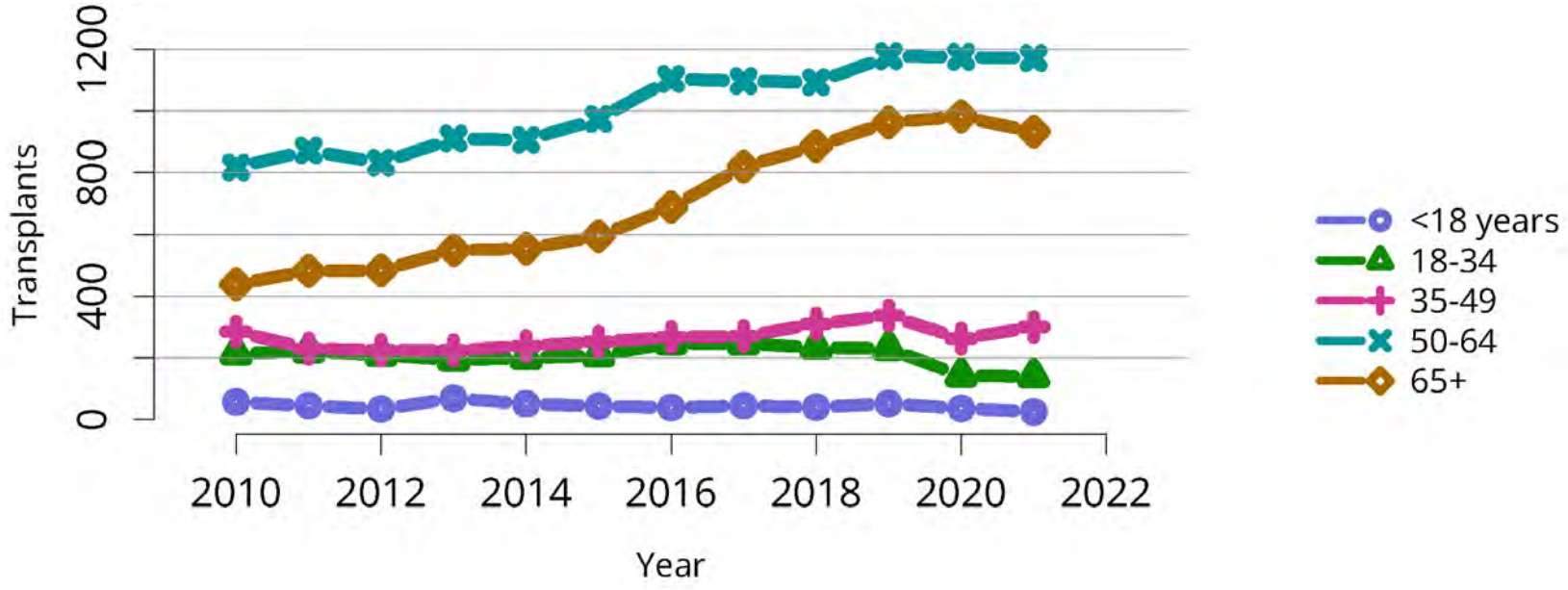
Transplants by Diagnosis



OPTN/SRTR 2021 Annual Data Report

Valapour. OPTN/SRTR Annual Data Report. *Am J Transplant*. 2021.

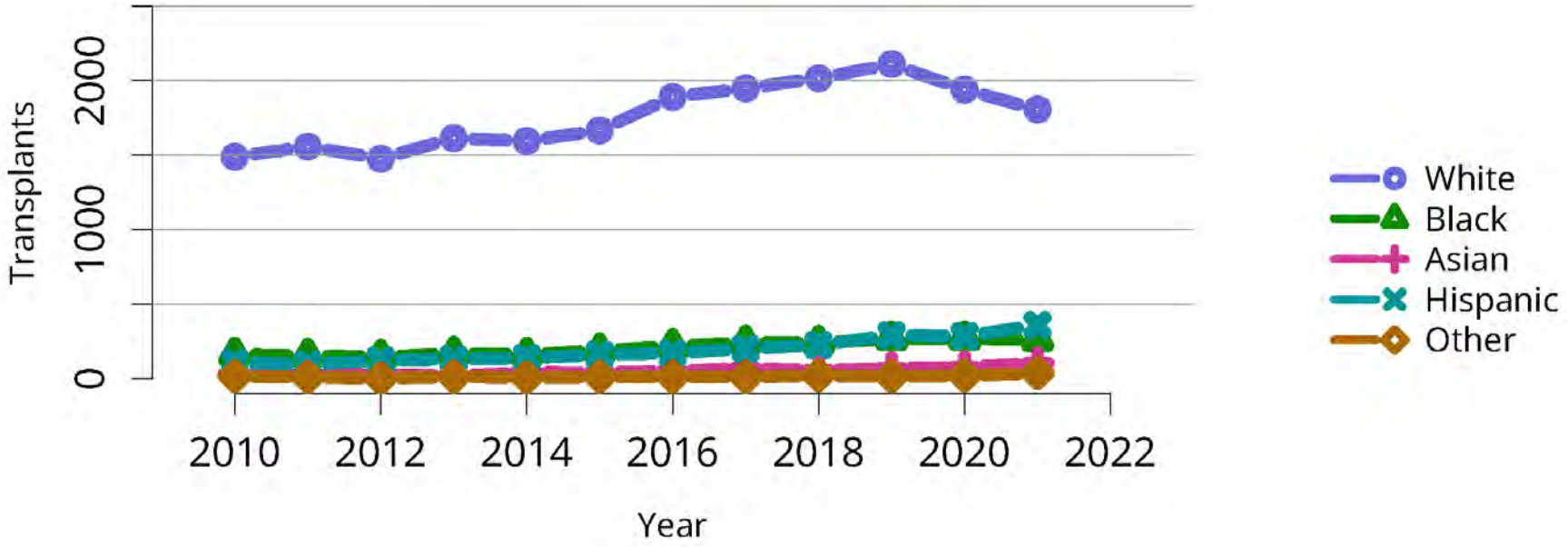
Transplants by Age



OPTN/SRTR 2021 Annual Data Report

Valapour. OPTN/SRTR Annual Data Report. *Am J Transplant*. 2021.

Transplants by Race



OPTN/SRTR 2021 Annual Data Report

Valapour. OPTN/SRTR Annual Data Report. *Am J Transplant*. 2021.

Candidate Selection

Relative Contraindications

- Physiologic age matters more than chronologic age
- Mechanical ventilation / ECMO
- Previous chest surgery – pleurodesis, lobectomy, CABG
- Colonization with highly resistant organism
- Hepatitis, HIV infection
- Marginal renal function
- Poor nutritional status
- Significant esophageal dysmotility, achalasia, gastroparesis
- Severe osteoporosis or joint disease, pathologic fractures

Leard. *J Heart Lung Transplant*. 2021.

Strong Contraindications

- Malignancy** (generally within 5 years)
- Multiple major organ dysfunction
- Acute infection or sepsis
- Coronary artery disease not amenable to revascularization
- Uncorrectable bleeding diathesis
- Morbid obesity
- Frailty with poor rehabilitation potential
- Lack of social or financial support
- Inability to cooperate with medical care, noncompliance

Leard. *J Heart Lung Transplant*. 2021.

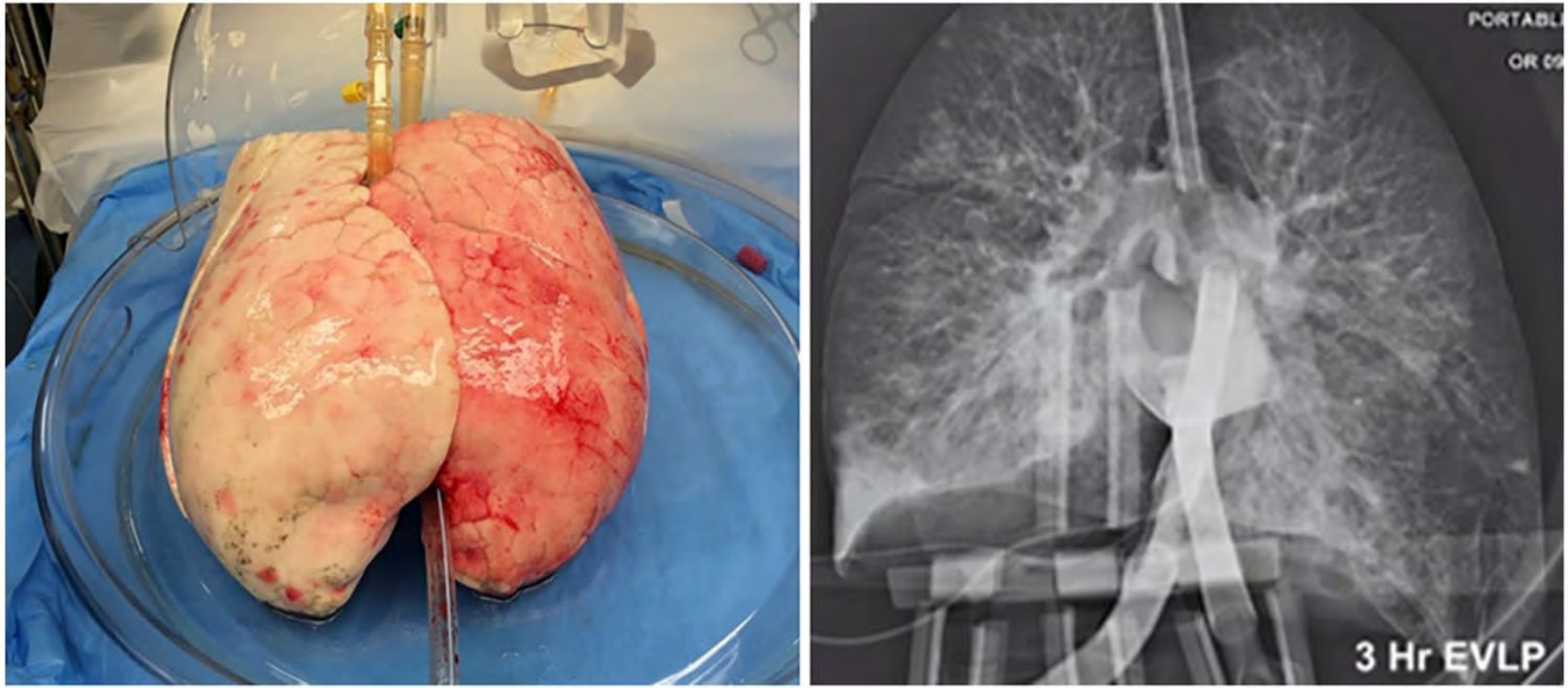
- Reason for denial is frequently multi-factorial
- Sometimes non-medical factors drive decision
- Most contraindications are relative
- Selection criteria varies between centers based on experience, volume and risk tolerance
- The envelope is expanding
- Early referral allows time to address modifiable issues

Leard. *J Heart Lung Transplant*. 2021.

Lung Preservation


PLEASE SPEAK UP WITH QUESTIONS AND CONCERNS
Purposeful Pause = EVERYONE PAUSES in the OR
OR

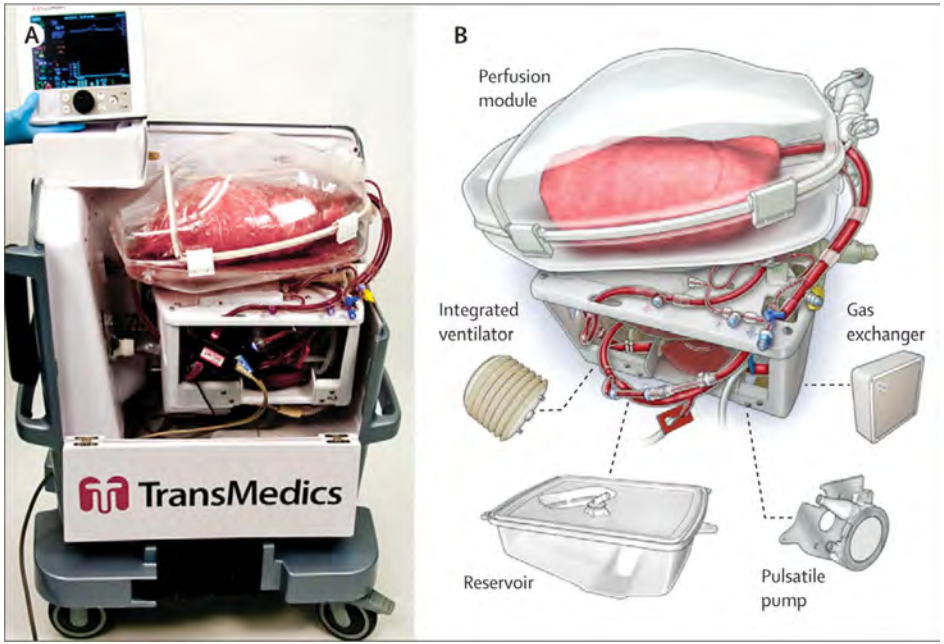
Ex-Vivo Lung Perfusion (EVLP)



(a) (b)

Chan. *Seminars in Cardiothoracic and Vascular Anesthesia*. 2020.

Current EVLP Systems



Warnecke. *Lancet*. 2012, Cypel. *New Engl J Med*. 2011.

Next Generation EVLP System

NEJM Evidence

Published April 20, 2023

DOI: 10.1056/EVIDoa2300008

ORIGINAL ARTICLE

Extension of Cold Static Donor Lung Preservation at 10°C

Aadil Ali, Ph.D.,[1] Konrad Hoetzenecker, M.D.,[2] Jose Luis Campo-Cañaveral de la Cruz, M.D.,[3] Stefan Schwarz, M.D.,[2] Mariana Gil Barturen, M.D.,[1] George Tomlinson, Ph.D.,[4] Jonathan Yeung, M.D.,[1] Laura Donahoe, M.D.,[1] Kazuhiro Yasufuku, M.D.,[1] Andrew Pierre, M.D.,[1] Marc de Perrot, M.D.,[1] Thomas K. Waddell, M.D.,[1] Shaf Keshavjee, M.D.,[1] and Marcelo Cypel, M.D.[1]

Abstract

BACKGROUND Lung transplantation is performed on a 24/7 schedule to minimize organ ischemic time. Recent preclinical studies demonstrated superior graft preservation at 10°C compared with storage in an ice cooler (gold standard).

METHODS In this prospective, multicenter, nonrandomized clinical trial, we studied transplants from donors with overnight cross-clamp times (6:00 p.m. to 4:00 a.m.) that had an earliest allowed starting time of 6:00 a.m. Lungs meeting criteria for transplantation were retrieved, transported, and immediately transferred to a 10°C temperature-controlled incubator until implantation; 70 patients and 140 matched controls were included in this study.

RESULTS Total preservation times for lungs in the study group were 12 hours, 28 minutes (interquartile range, 10 hours, 14 minutes to 14 hours, 12 minutes) and 14 hours, 9 minutes (interquartile range, 12 hours, 3 minutes to 15 hours, 45 minutes) for the first and second lung implanted, respectively. Primary graft dysfunction grade 3 at 72 hours (primary outcome) was 5.7% in the study group versus 9.3% in matched controls (difference, −3.6; 95% confidence interval [CI], −10.5 to 5.3). No meaningful differences were observed in the need for postoperative extracorporeal membrane oxygenation (5.7 vs. 9.3%), median intensive care unit stay (5 vs. 5 days), or median hospital stay (25 vs. 30 days) between the two groups. One-year Kaplan-Meier survival was similar between the two groups (94 vs. 87%; hazard ratio, 0.65; 95% CI, 0.26 to 1.6).

CONCLUSIONS Extension of cold static preservation times at 10°C appears to be safe and has the potential to improve transplantation logistics and performance. (Funded by the UHN Foundation; Clinicaltrials.gov number, NCT04616365).

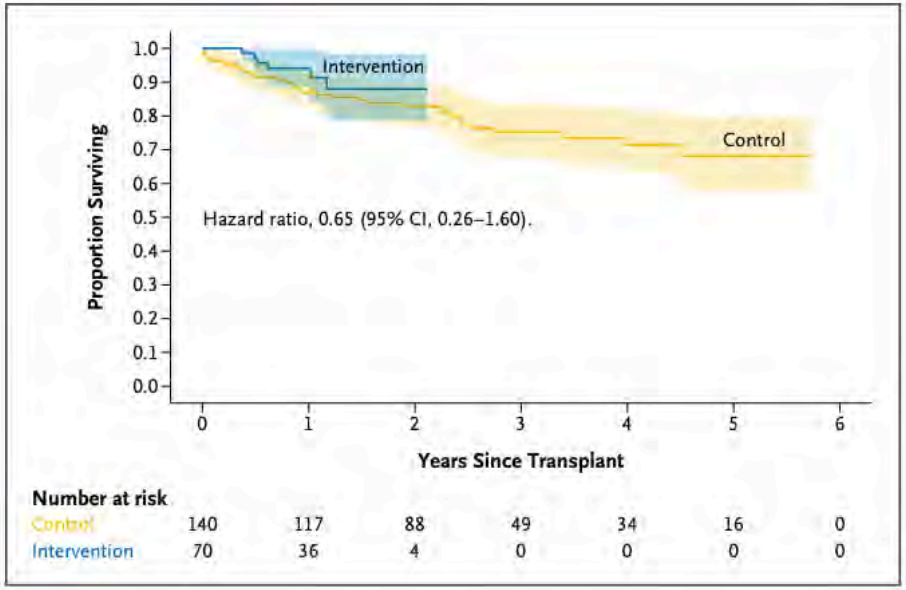
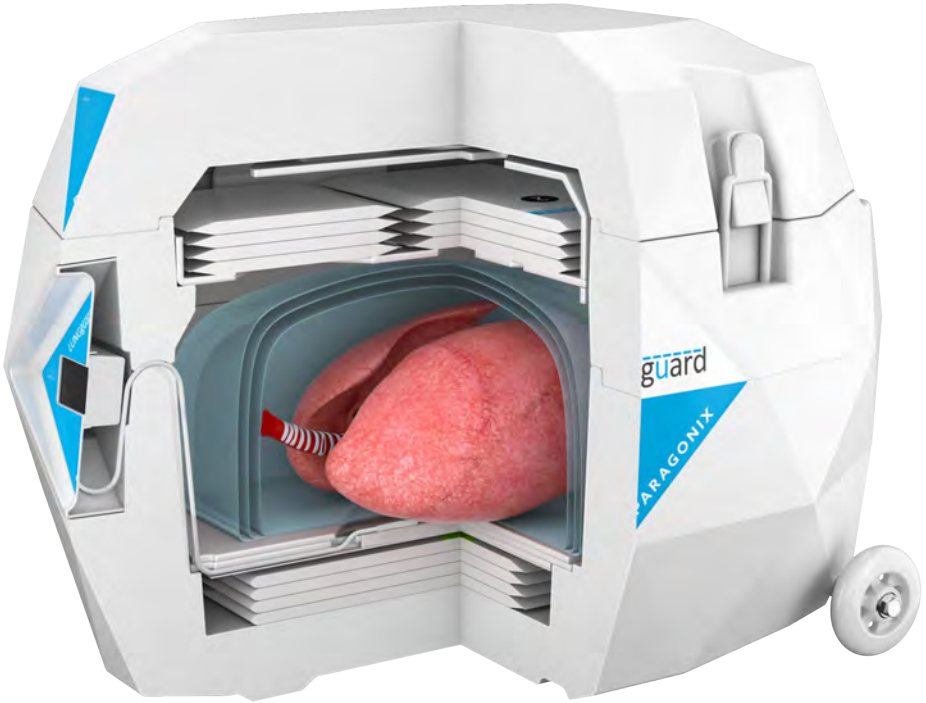


Table 3. Posttransplant Outcomes.*

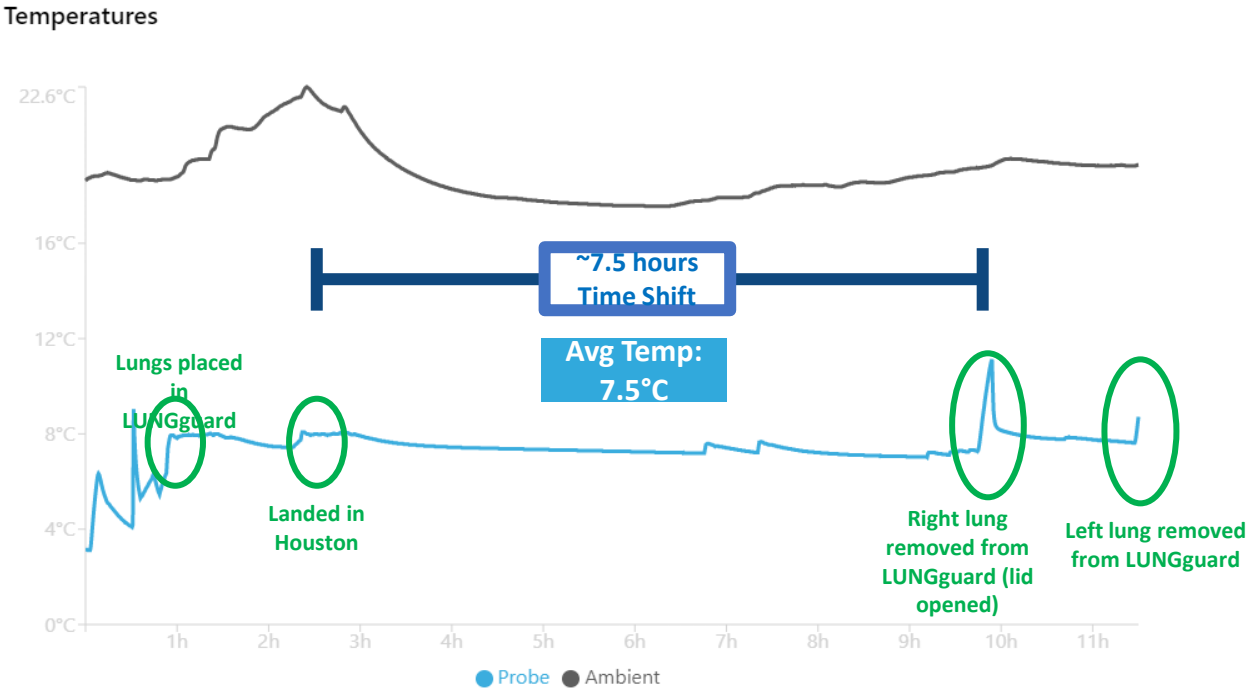
Outcome	Study Cohort (n=70)	Matched Controls (n=140)	Difference (95% CI)
Incidence of PGD3 at 72 h — n (%)	4 (5.7)	13 (9.3)	−3.6 (−10.5 to 5.3)
Recipient vent time — h, median (IQR)	49 (29–82)	52 (27–89)	−3 (−15 to 7)
ICU LOS — d, median (IQR)	5 (3–9)	5 (3–12)	0 (−2 to 1)
Hospital LOS — d, median (IQR)	25 (20–40)	30 (20–54)	−5 (−8 to 2)
Post-LTx ECMO used — n (%)	5 (7.1)	13 (9.3)	−2.1 (−9.3 to 7.2)
30-d survival — n (%)	70 (100)	135 (96.4)	3.6 (−2.0 to 8.1)

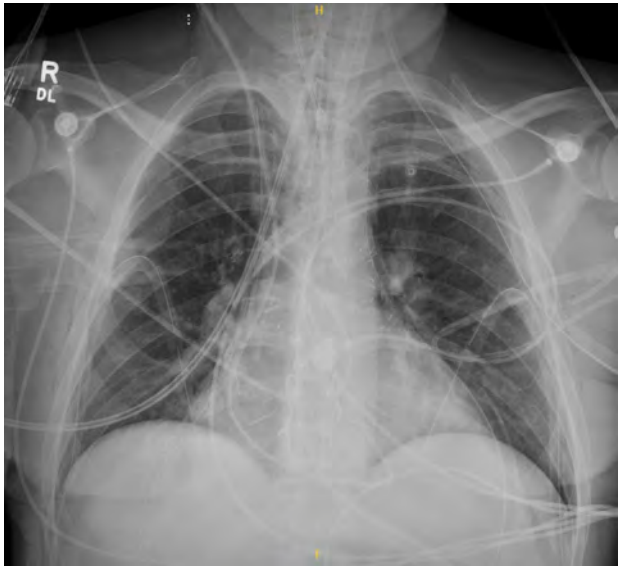
* CI denotes confidence interval; ECMO, extracorporeal membrane oxygenation; ICU, intensive care unit; IQR, interquartile range; LOS, length of stay; LTx, lung transplantation; PGD3, International Society for Heart and Lung Transplantation primary graft dysfunction grade 3; and vent, ventilation.

Ali. *NEJM Evidence*. 2023.

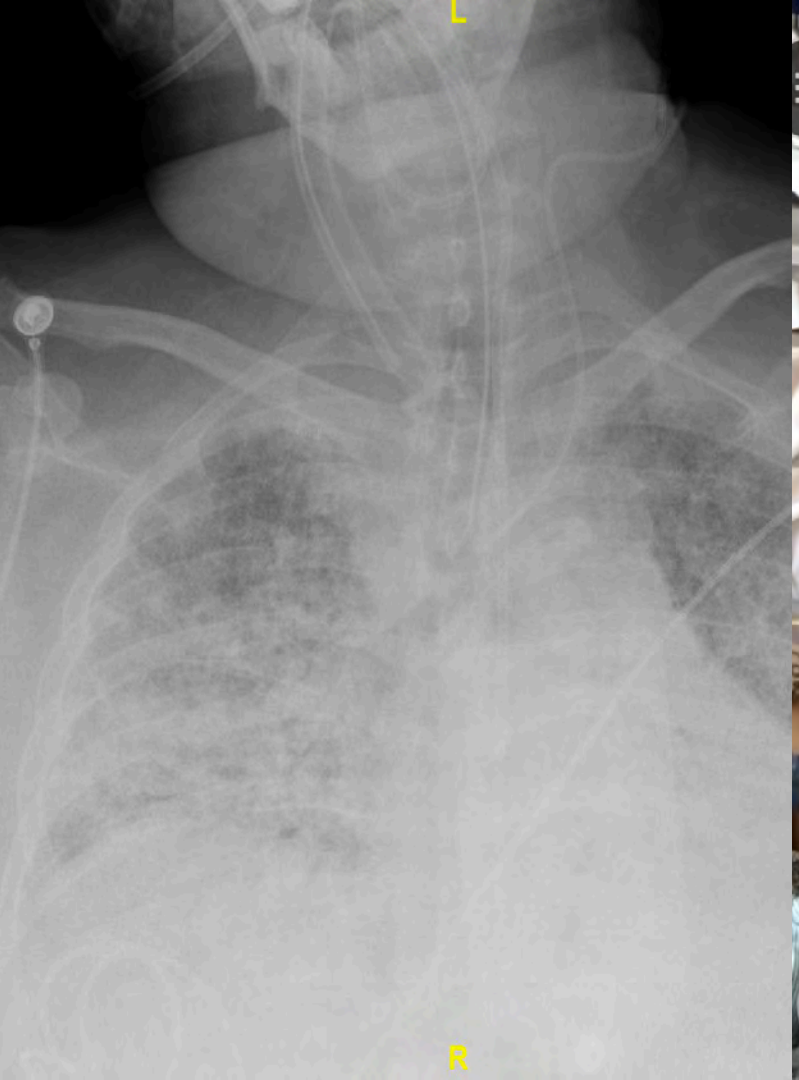

guard
ARAGONIX


N242SD

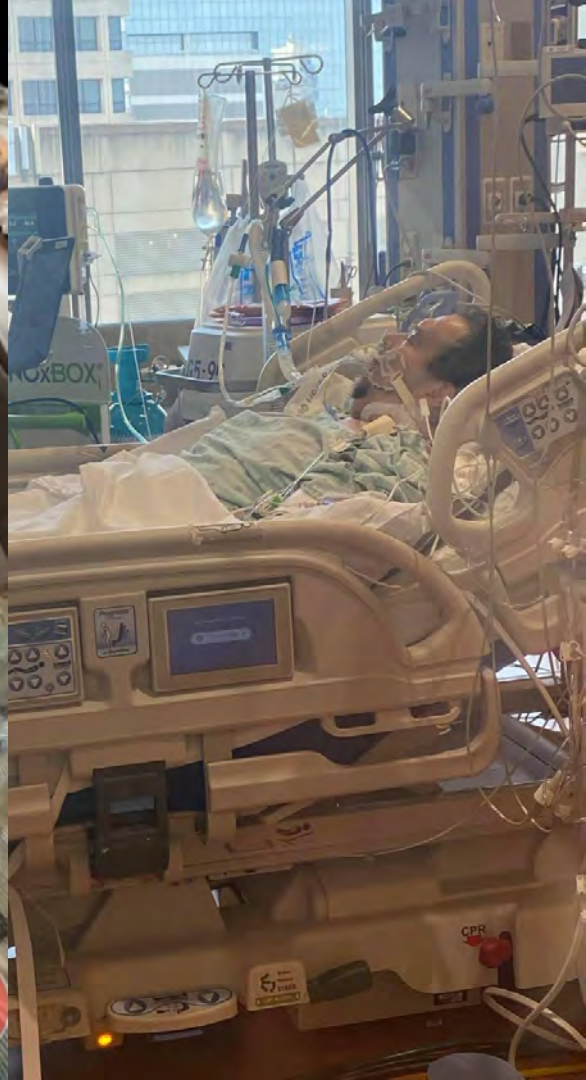




- Obliterative bronchiolitis and pulmonary hypertesion
- Heart transplant previous evening finishing after midnight
- Bilateral lung transplant off cardiopulmonary bypass, extubated post-operative day 2
- **Total Ischemic time 723 minutes**


L
R


00:05:10


CPR

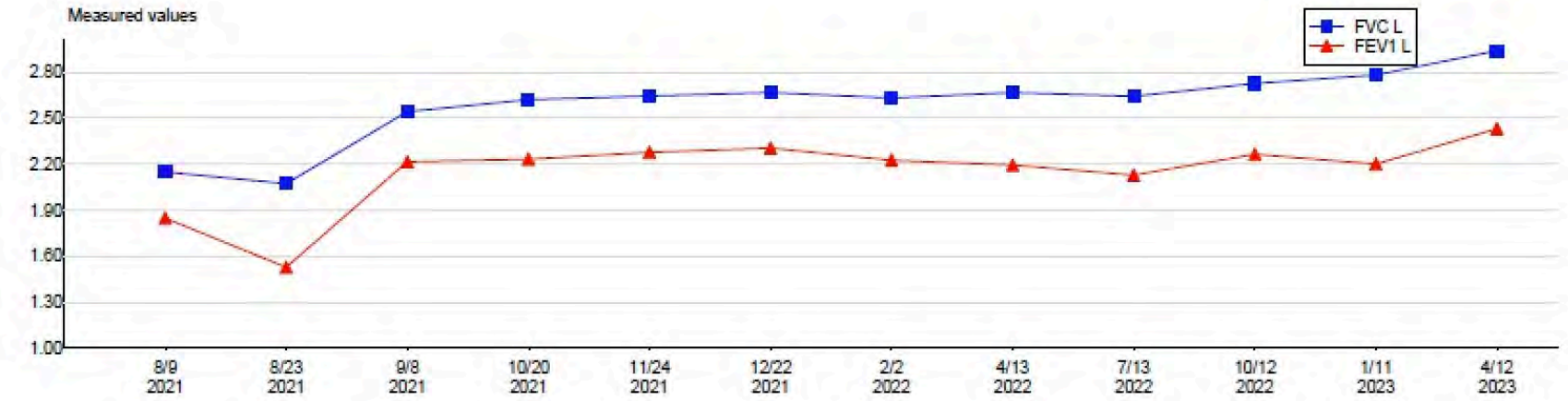



I HAVE A HERO
We Missed U
Please


NIKE


OGER


BOO


Measured values
FVC L
FEV1 L
2.80
2.50
2.20
1.90
1.60
1.30
1.00
8/9 2021
8/23 2021
9/8 2021
10/20 2021
11/24 2021
12/22 2021
2/2 2022
4/13 2022
7/13 2022
10/12 2022
1/11 2023
4/12 2023

LifeGift DONATE LIFE Texas

LifeGift Update

– FEEL GOOD FRIDAYS –

Every Friday, LifeGift shares a "lift your spirits" email with our hospital & transplant center partners. We know you're navigating challenging circumstances and we care about you!

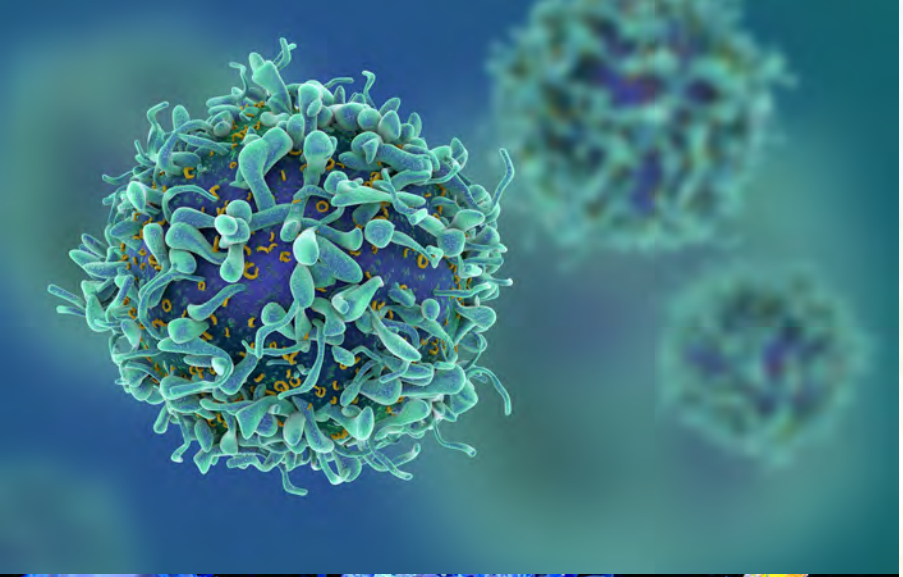
Rogelio Avila
Double Lung Recipient
Houston, Texas

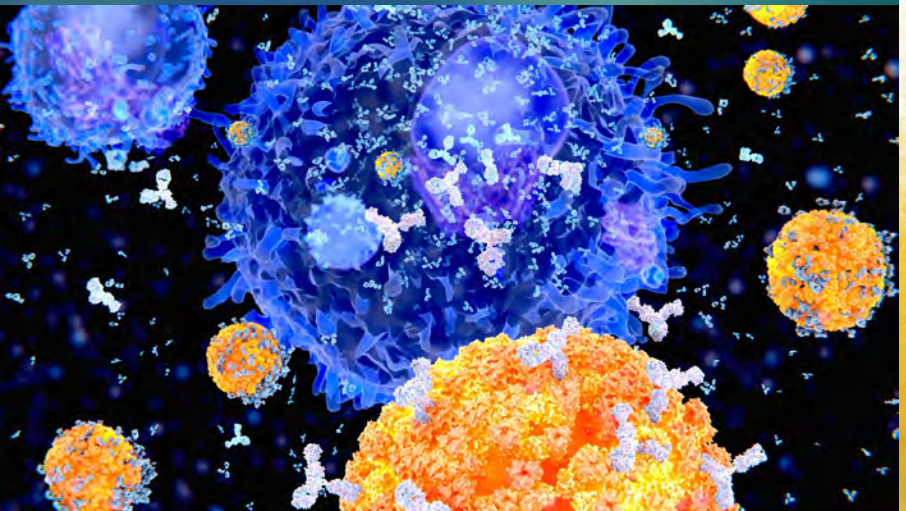
"A young teenager lost her life and thanks to her selfless decision to donate, I'm able to breathe again."

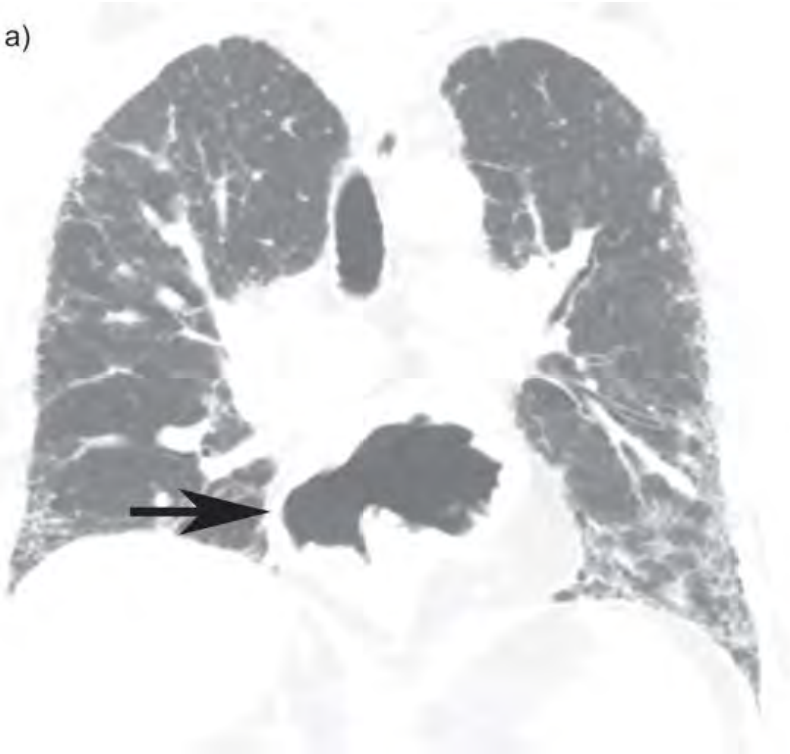
Double Lung Transplant Recipient Grateful to Attend Houston Astros' Victory Parade

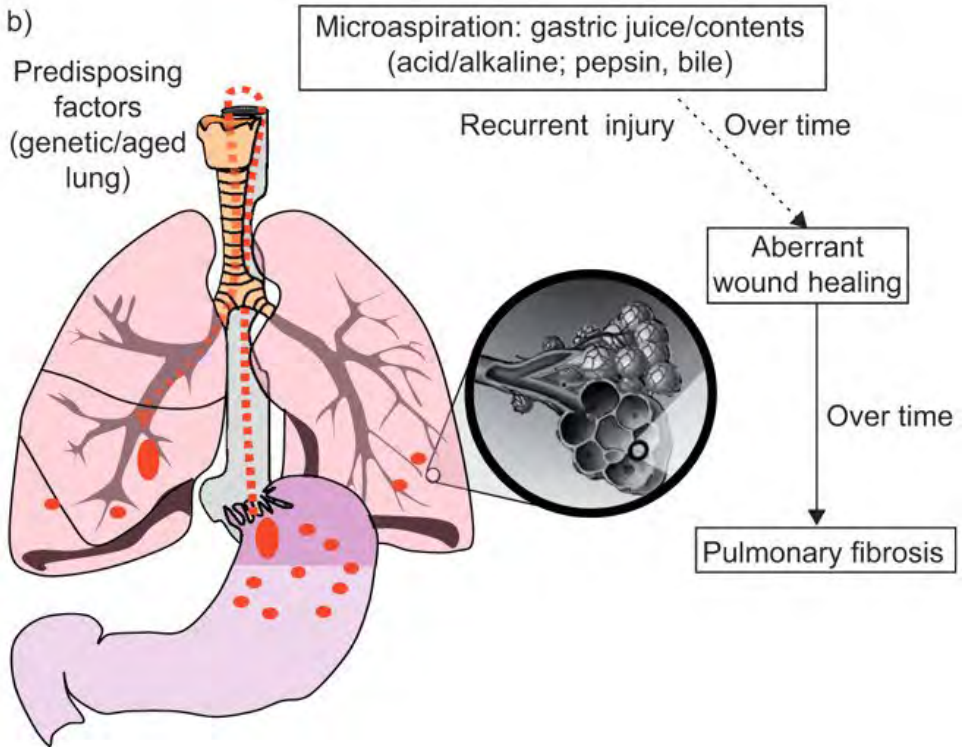
During Rogelio Avila's hospitalization in 2021, he received a special message from Houston Astros' Jose Altuve. More than a year later, Avila, a double lung transplant survivor, was grateful to be a part of the crowd cheering the Astros' World Series victory at the parade.

An exchange, not a cure









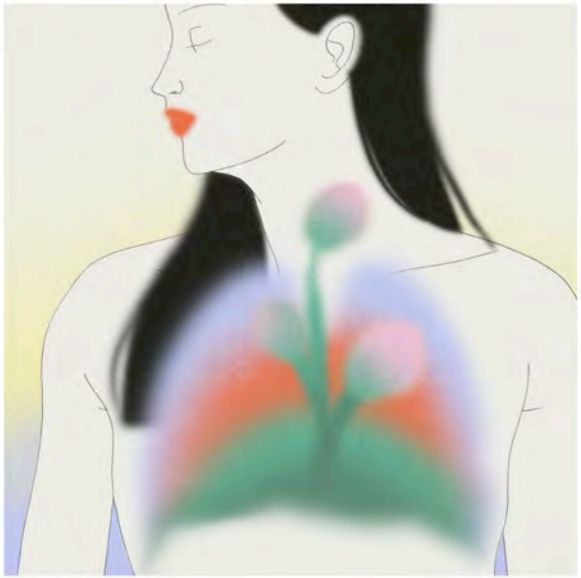
Raghu and Meyer. *European Respiratory Journal*. 2012.

OPINION

GUEST ESSAY

My Transplanted Heart and I Will Die Soon

April 18, 2023



By Marine Buffard

Give this article

By Amy Silverstein

Ms. Silverstein is the author of "Sick Girl" and "My Glory Was I Had Such Friends."

"Over the last almost four decades a toxic triad of immunosuppressive medicines — calcineurin inhibitors, antimetabolites, steroids — has remained essentially the same with limited exceptions. These transplant drugs (which must be taken once or twice daily for life, since rejection is an ongoing risk and the immune system will always regard a donor organ as a foreign invader) cause secondary diseases and dangerous conditions, including diabetes, uncontrollable high blood pressure, kidney damage and failure, serious infections and cancers. The negative impact on recipients is not offset by effectiveness: the current transplant medicine regimen does not work well over time to protect donor organs from immune attack and destruction.

My first donor heart died of transplant medicines' inadequate protection of the donor heart from rejection; my second will die most likely from their stymied immune effects that give free rein to cancer."

Silverstein. *New York Times*. 2023.

Current State

- Lung transplantation is a life-saving therapy in select candidates with advanced lung disease unresponsive to medical therapy
- Advances in candidate selection and pre-operative medical management enable rescue of gravely ill candidates
- New ex-vivo perfusion platforms and organ preservation technologies enable increased donor lung utilization

Challenges

- Demand for transplants exceeds supply of transplantable lungs from deceased donors
- Access to transplant is not equitable
- Low utilization and placement efficiency
- Median survival 6.5 to 7 years after transplant
- Chronic rejection remains the greatest barrier to long-term survival. Nearly 50% incidence at 5 years.
- Current immunosuppressive drugs associated with infection, cancer, cardiovascular, renal and metabolic disease

The Future of Transplantation: Production of Bioengineered Tissues

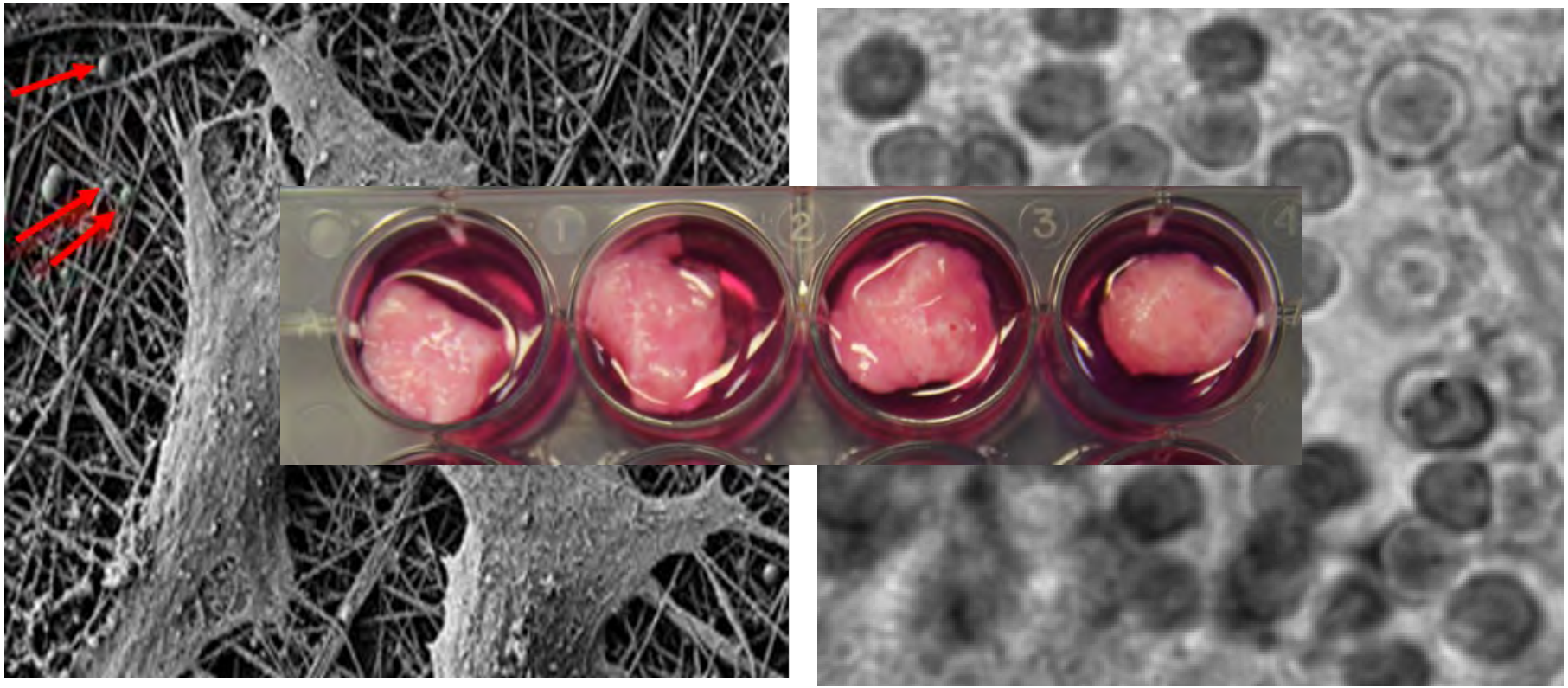
Joan E. Nichols MA, PhD

Director, HM Center for Tissue Engineering

HOUSTON Methodist
LEADING MEDICINE

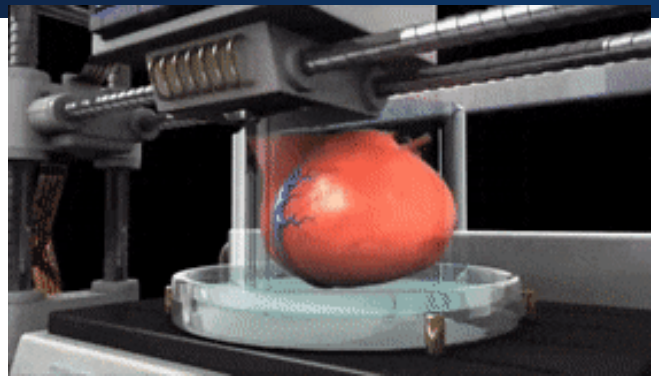
What is Tissue Engineering

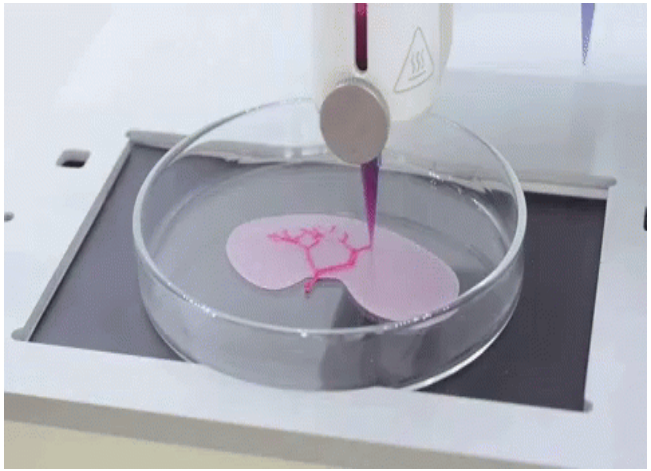
HOUSTON Methodist LEADING MEDICINE

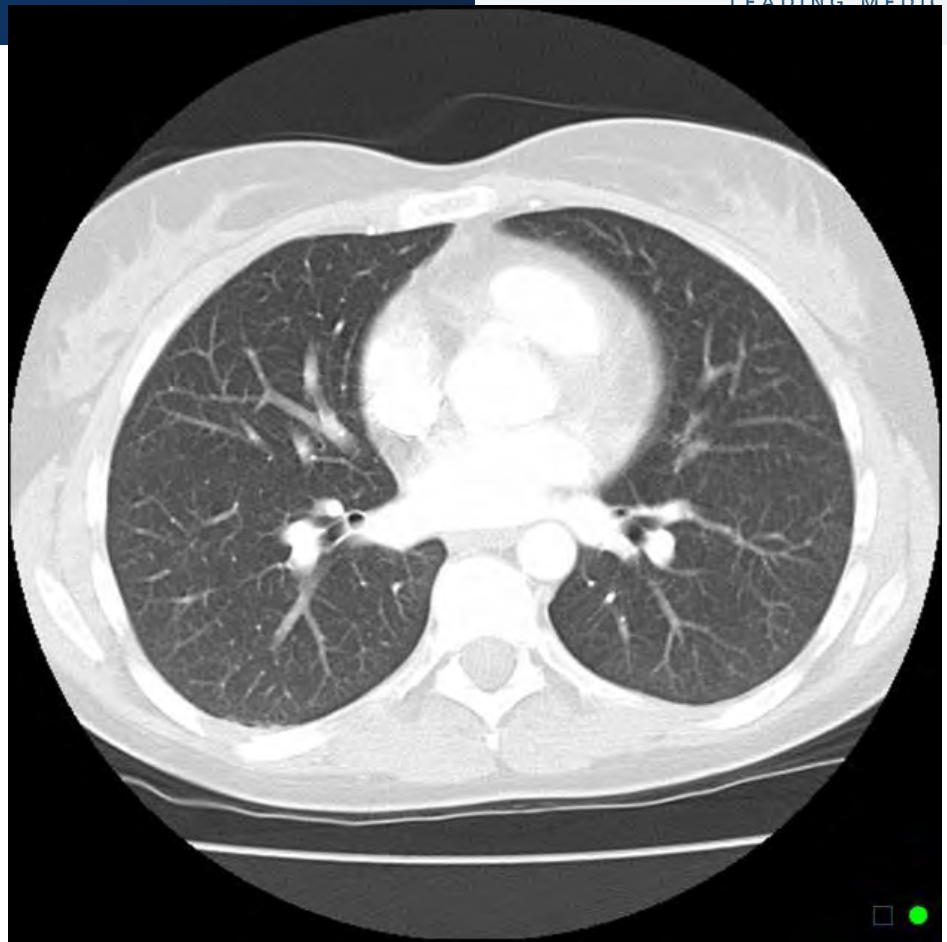


Nichols JE, La Francesca S, Vega SP, Niles JA, Argueta LB, Riddle M, Sakamoto J, Vargas G, Pal R, Woodson L, Rhudy J, Lee D, Seanor D, Campbell G, Schnadig V, Cortiella J. Giving new life to old lungs: methods to produce and assess whole human pediatric bioengineered lungs. J Tissue Eng Regen Med. 2016 Jan 12.

Scaffold Production

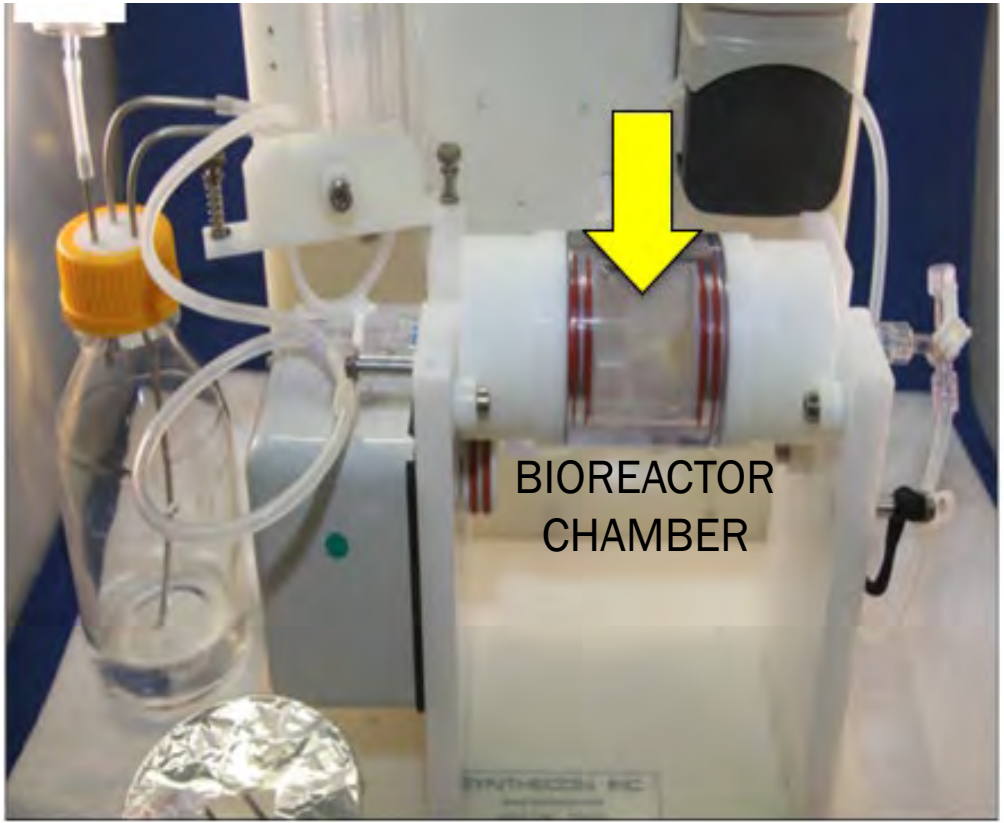


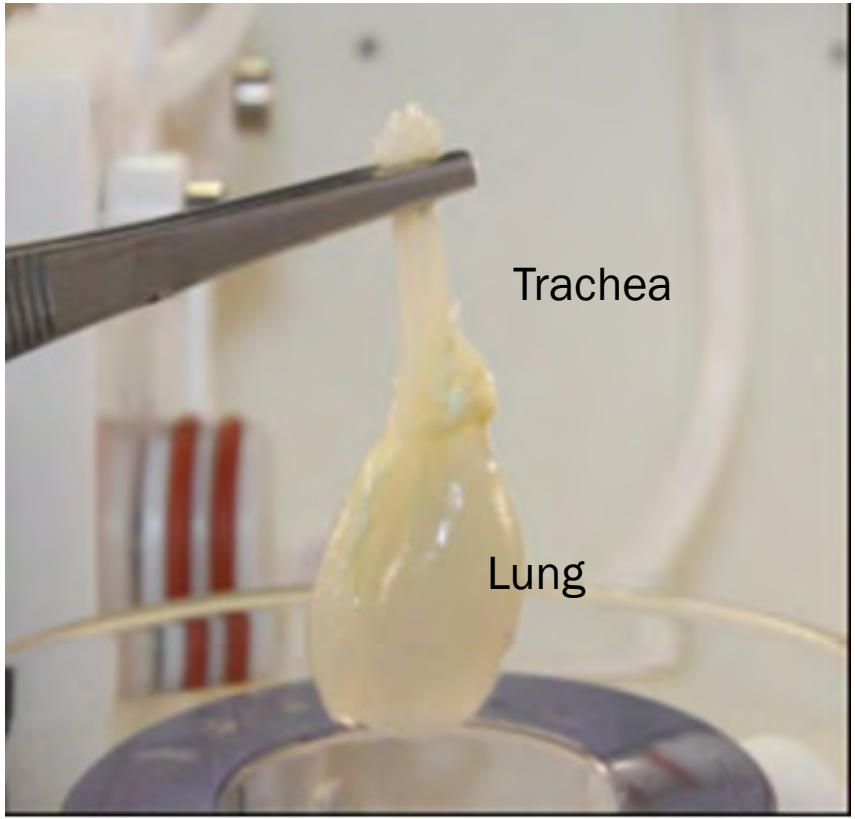




Native Lung Scaffolds

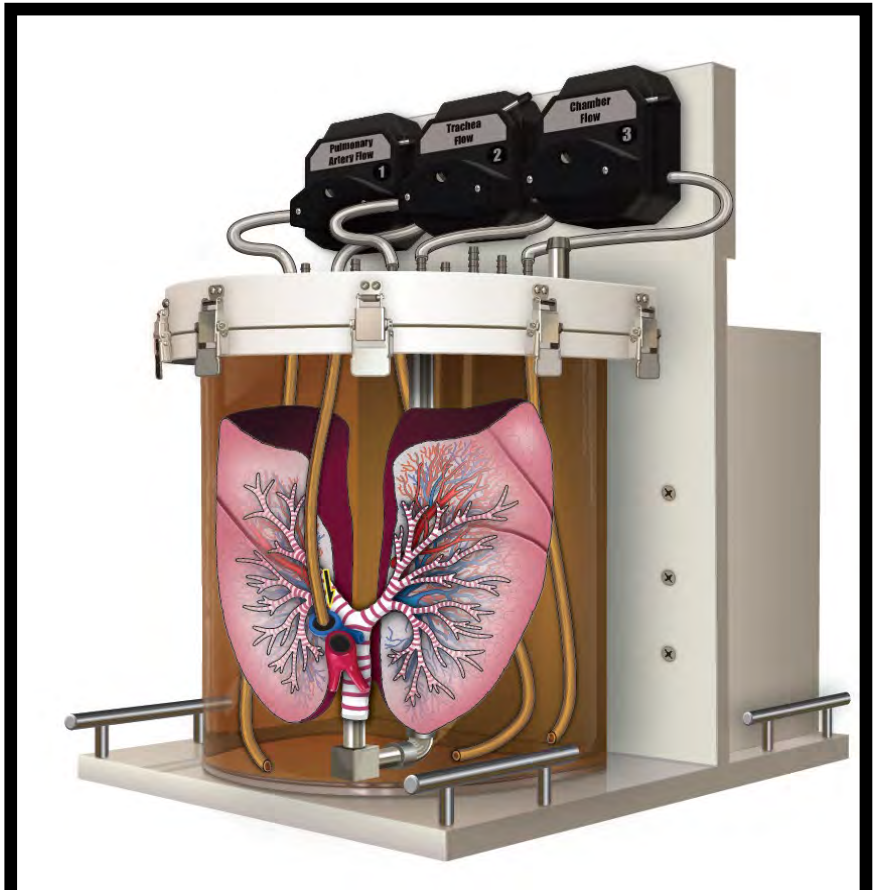
HOUSTON Methodist LEADING MEDICINE

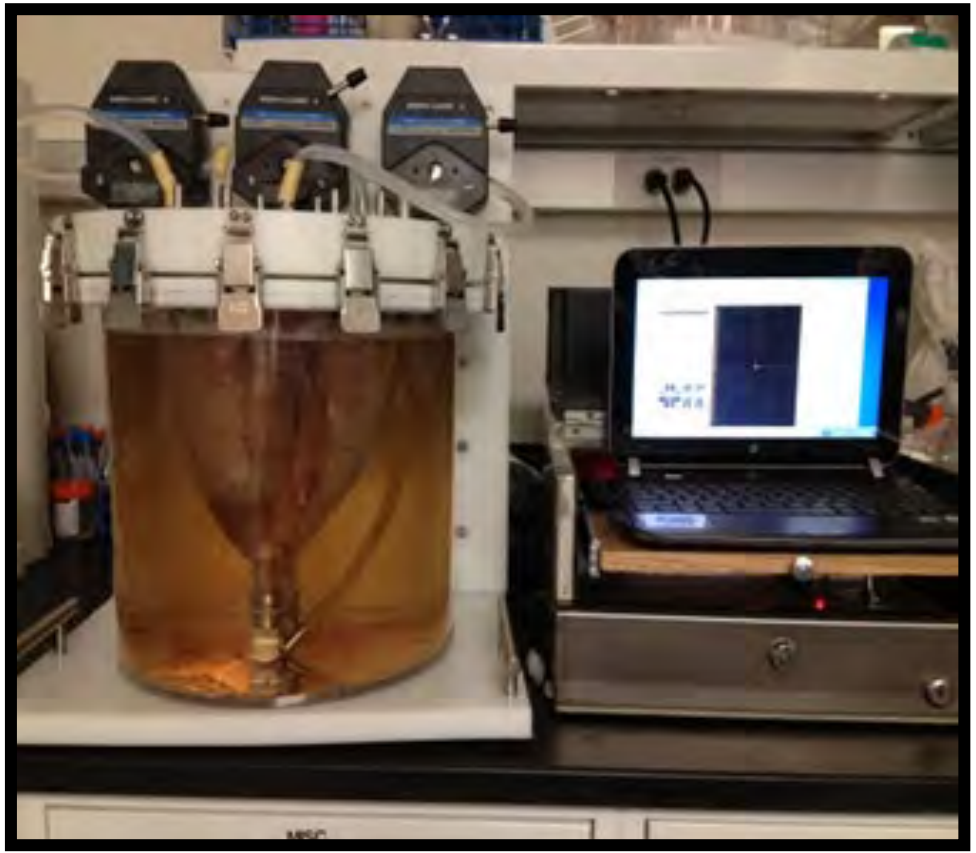




Production of Acellular Scaffolds

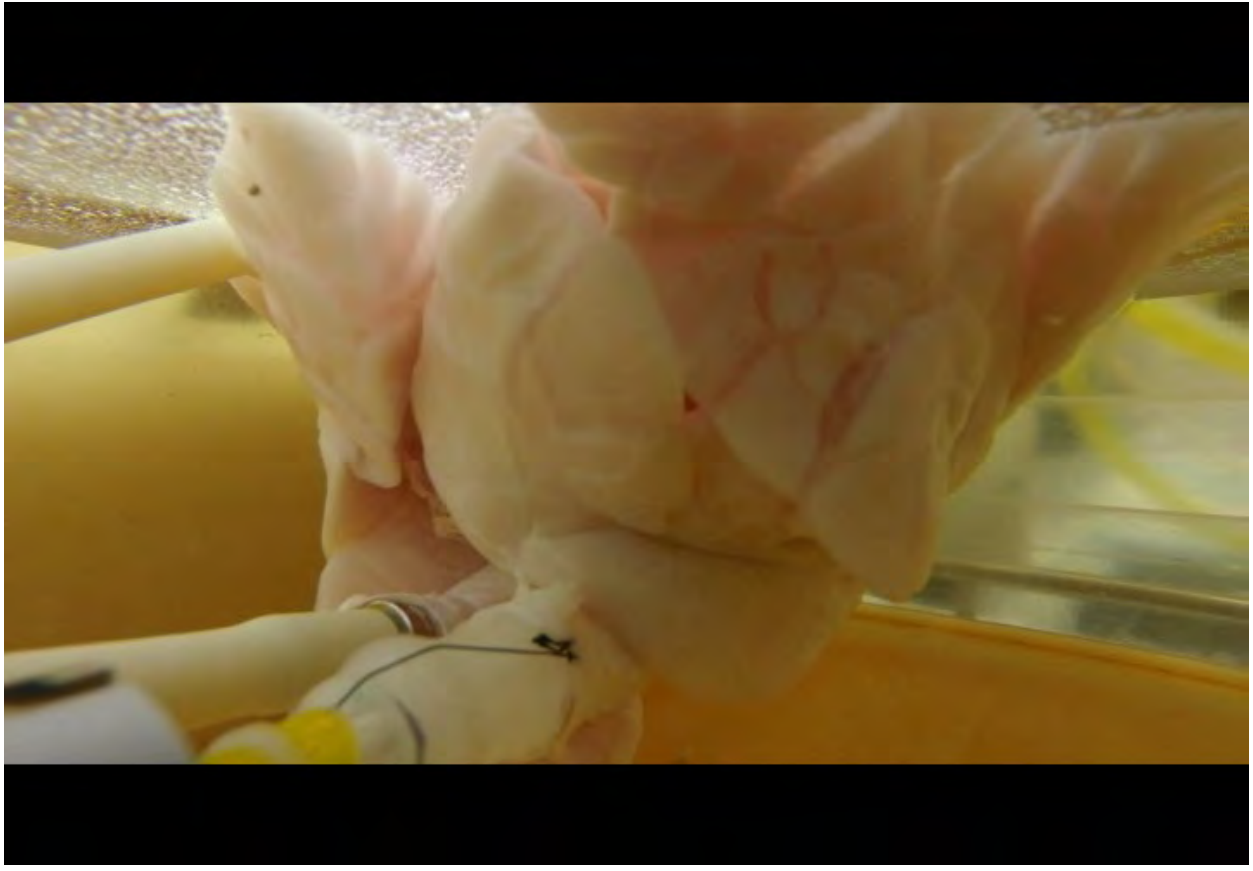
HOUSTON Methodist LEADING MEDICINE





Decellularization of Whole Organs

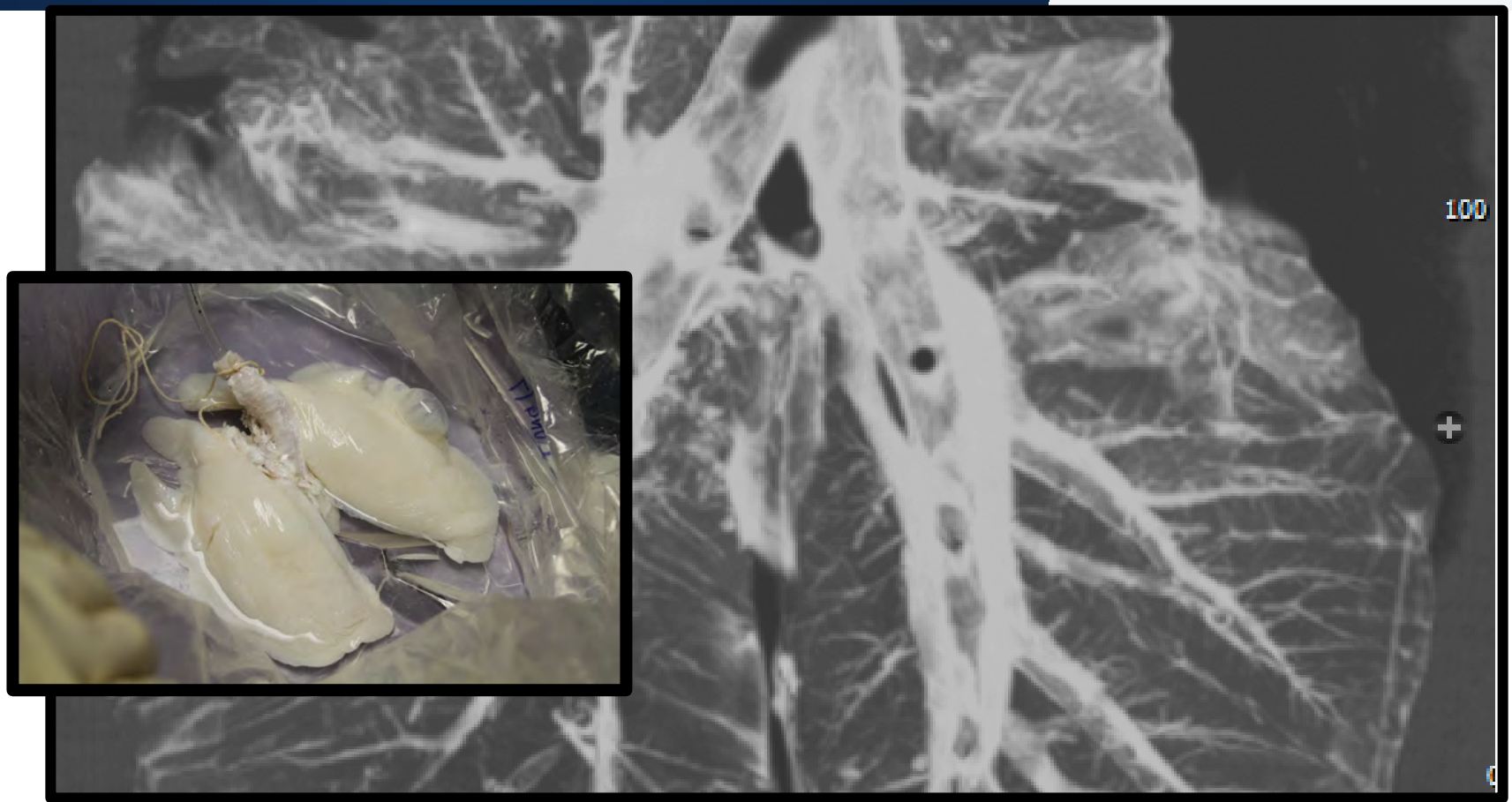
HOUSTON Methodist LEADING MEDICINE

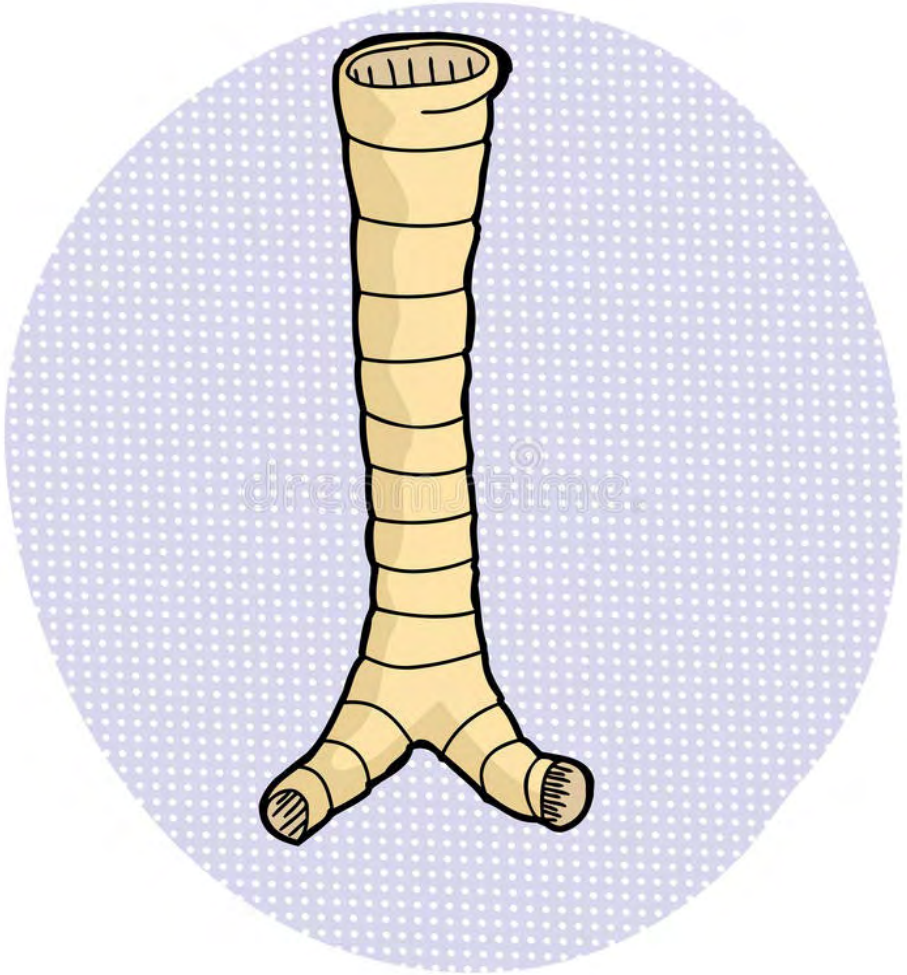


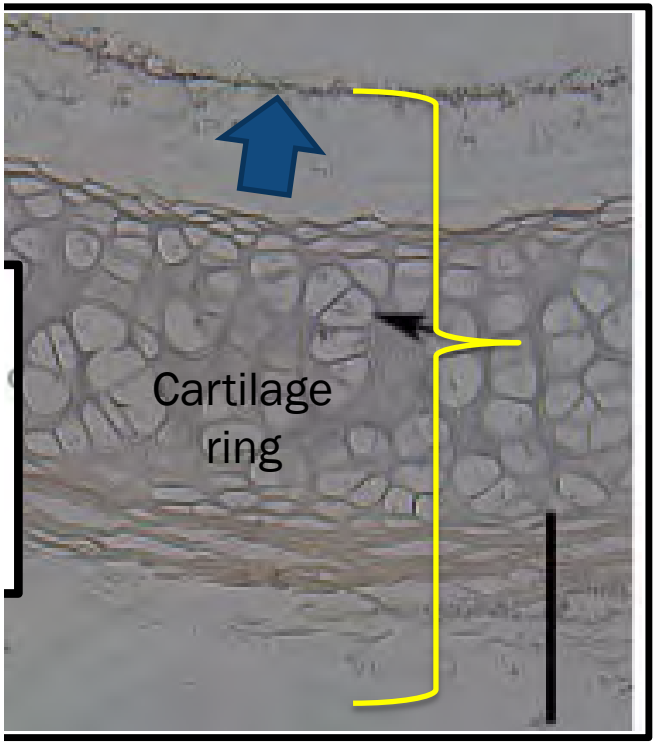
Whole Lung Scaffold

Skeleton of the Lung

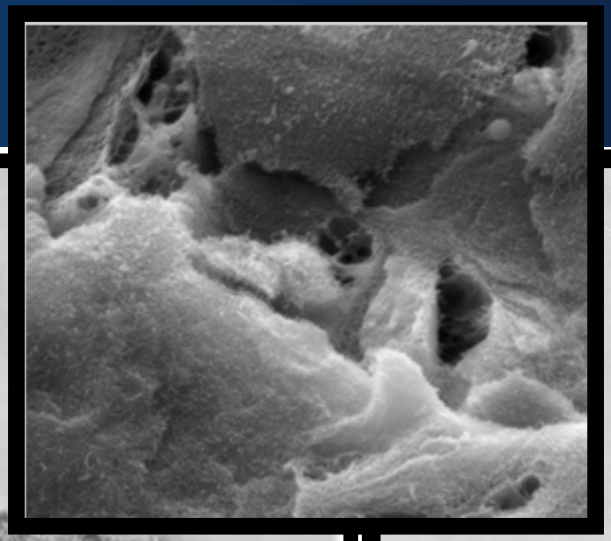
HOUSTON Methodist LEADING MEDICINE

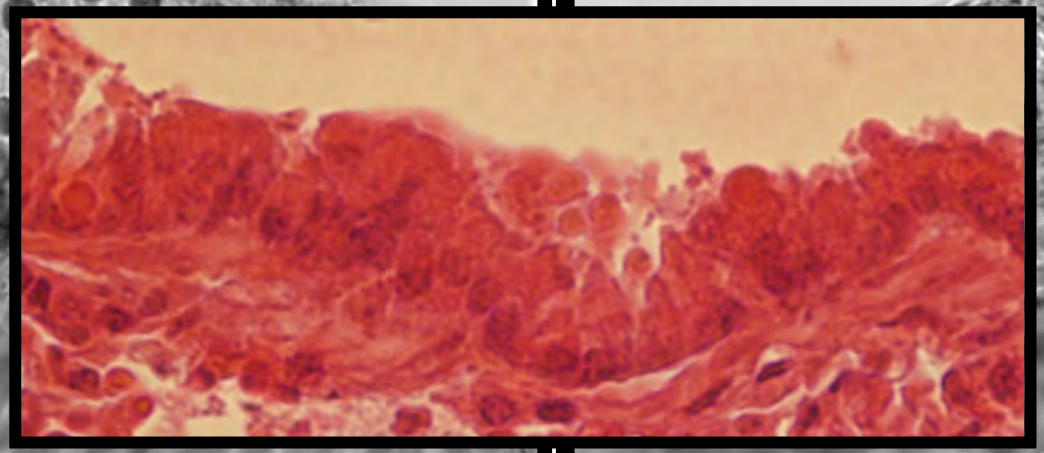





Cartilage
ring

HOUSTON Methodist
LEADING MEDICINE

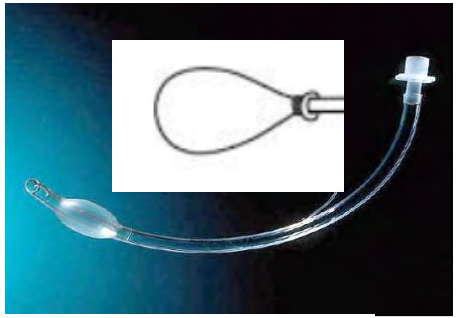


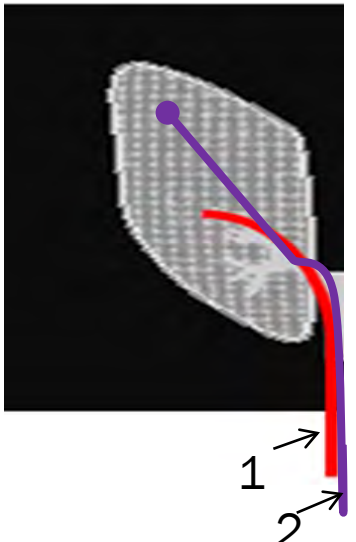


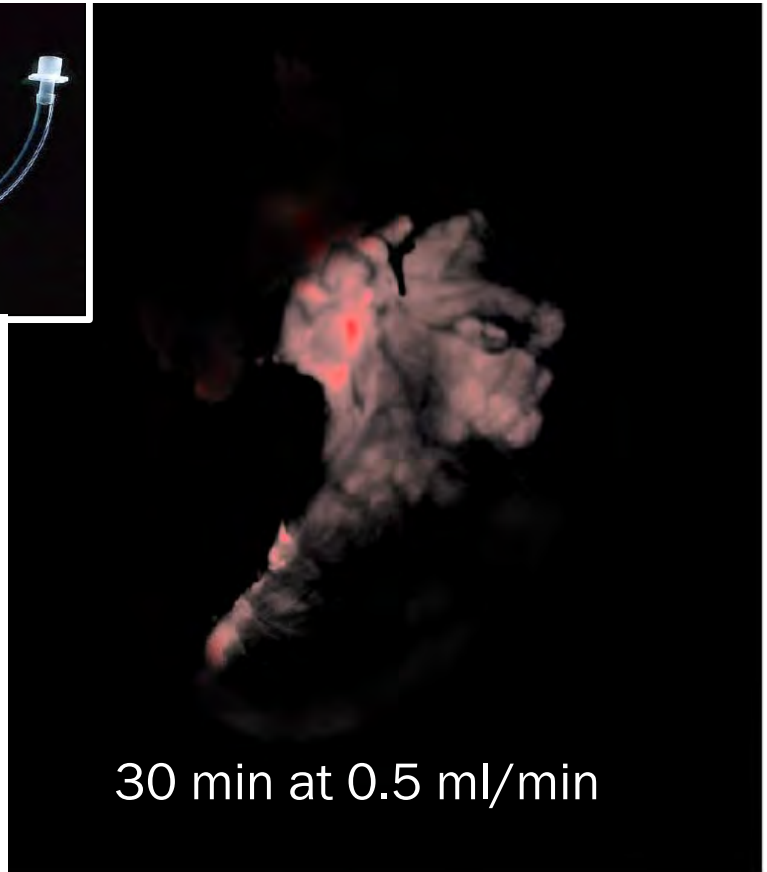
Cell Delivery Methods

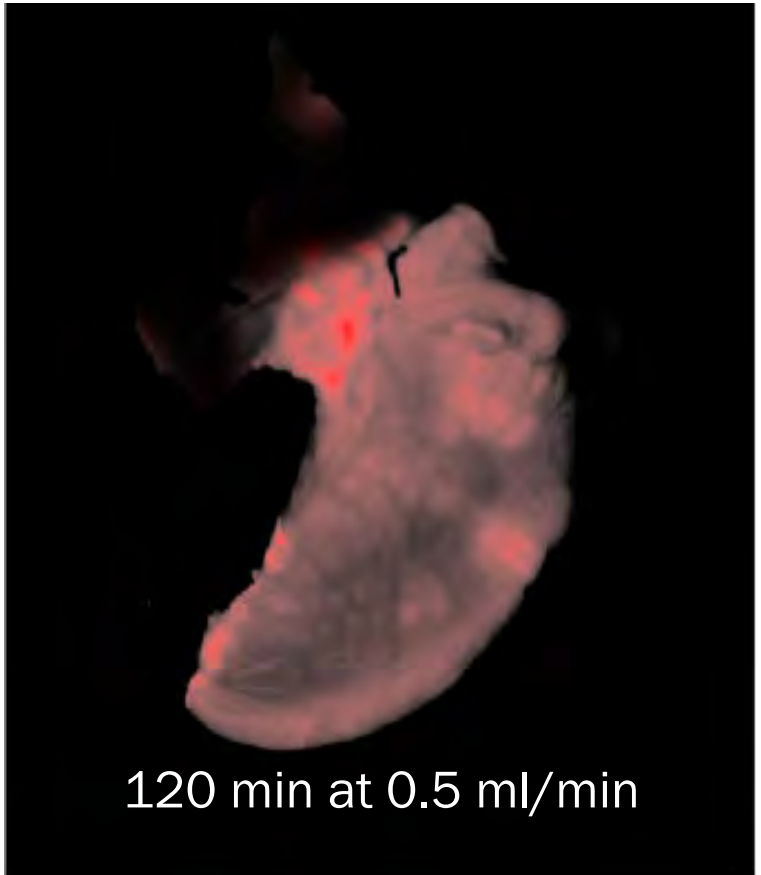
Cell Delivery Methods

HOUSTON Methodist LEADING MEDICINE



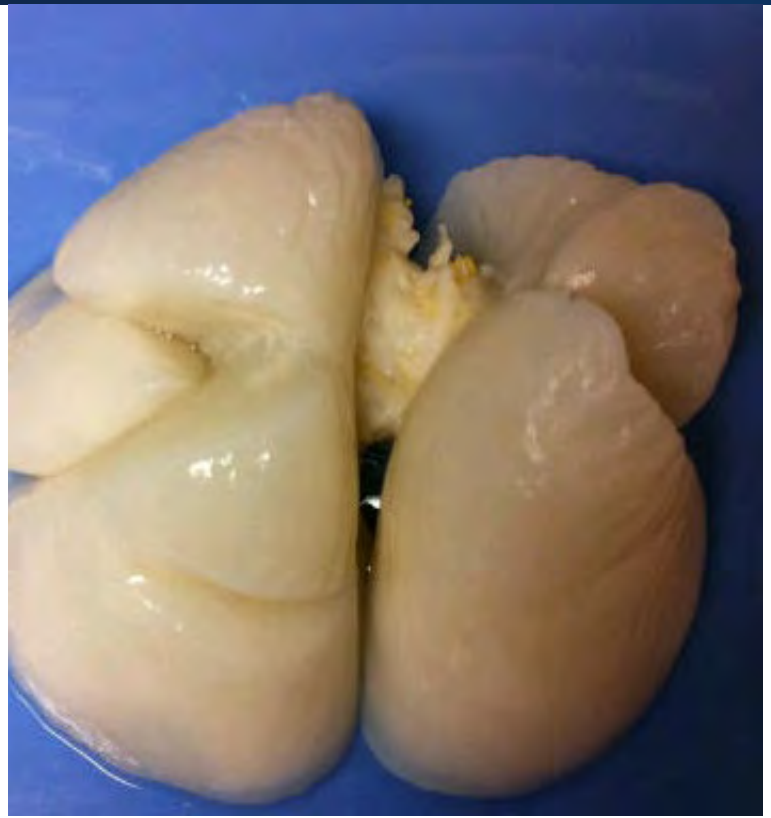


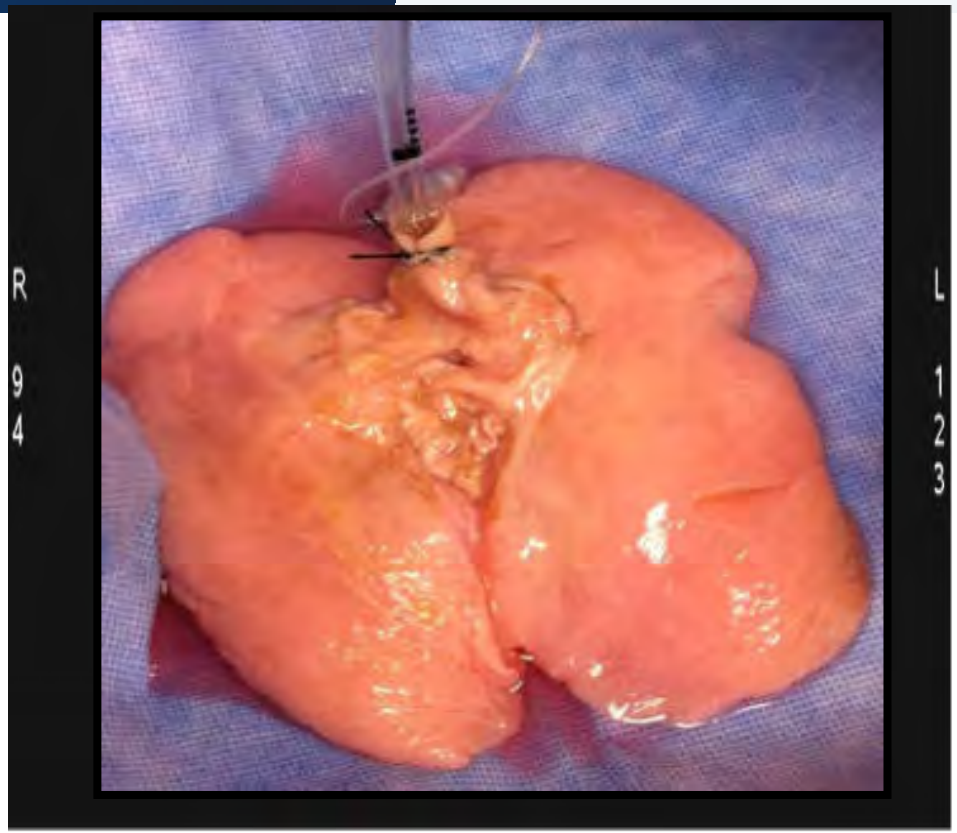




Production of Human Bioengineered Lung

HOUSTON Methodist LEADING MEDICINE





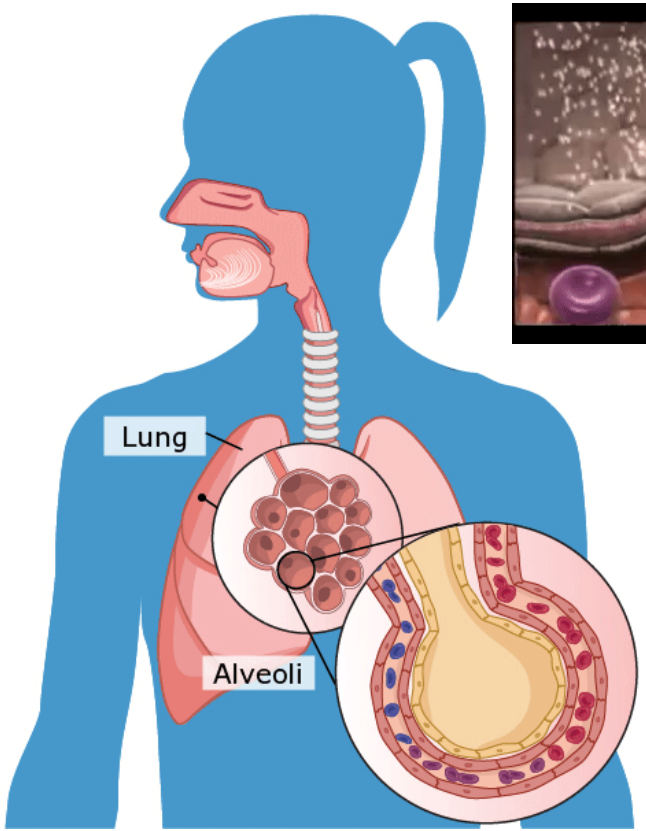
Nichols JE, La Francesca S, Vega SP, Niles JA, Argueta LB, Riddle M, Sakamoto J, Vargas G, Pal R, Woodson L, Rhudy J, Lee D, Seanor D, Campbell G, Schnadig V, Cortiella J. Giving new life to old lungs: methods to produce and assess whole human pediatric bioengineered lungs. J Tissue Eng Regen Med. 2016 Jan 12.

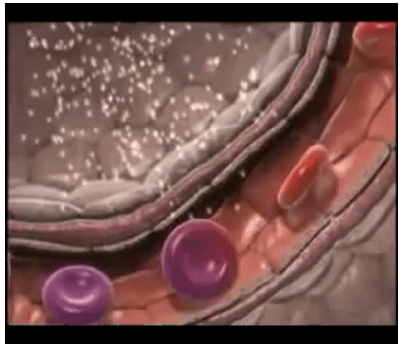
Production of Human Bioengineered Lung

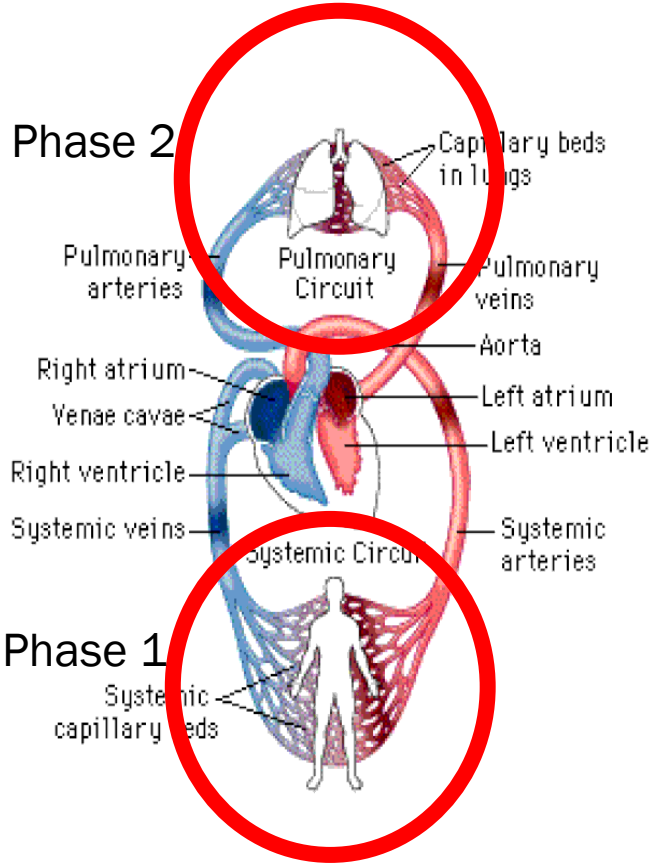
Savel
La France

Joaquin
Cortiella M

Gas Exchange in the Lung

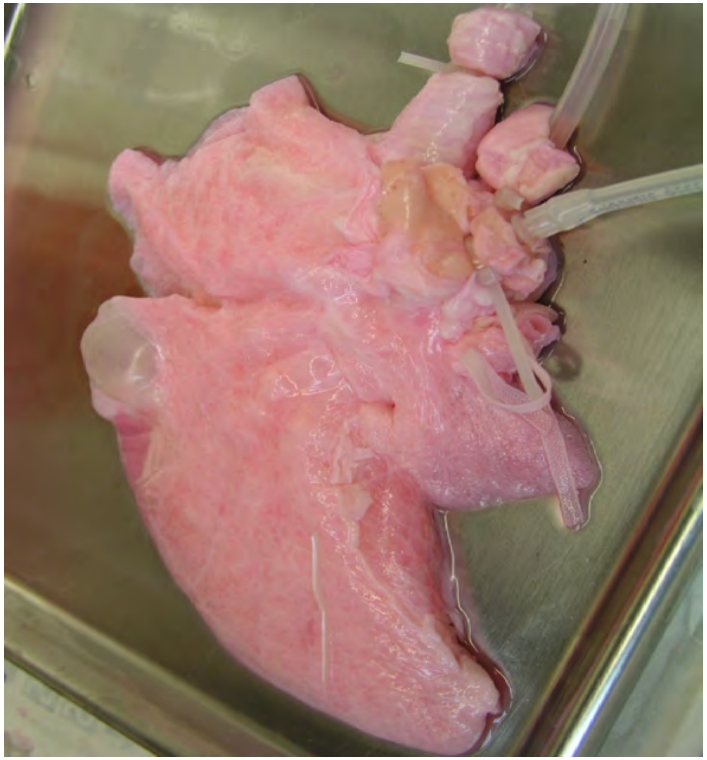






Preclinical Phase 1

HOUSTON Methodist LEADING MEDICINE

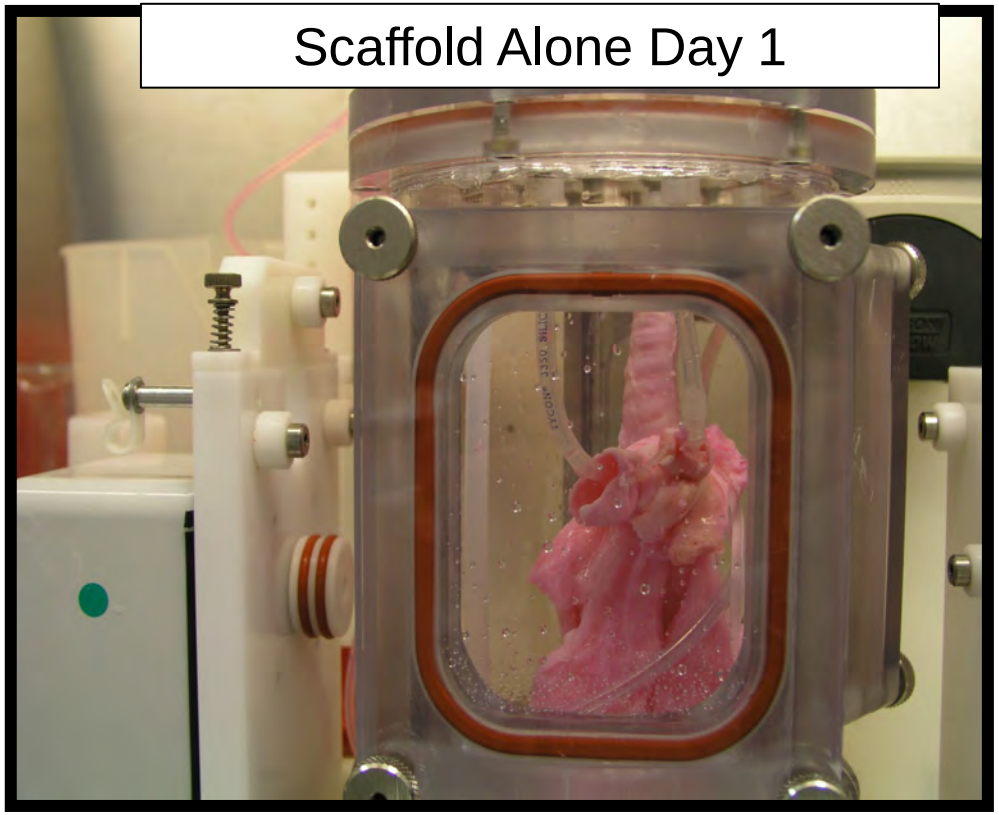


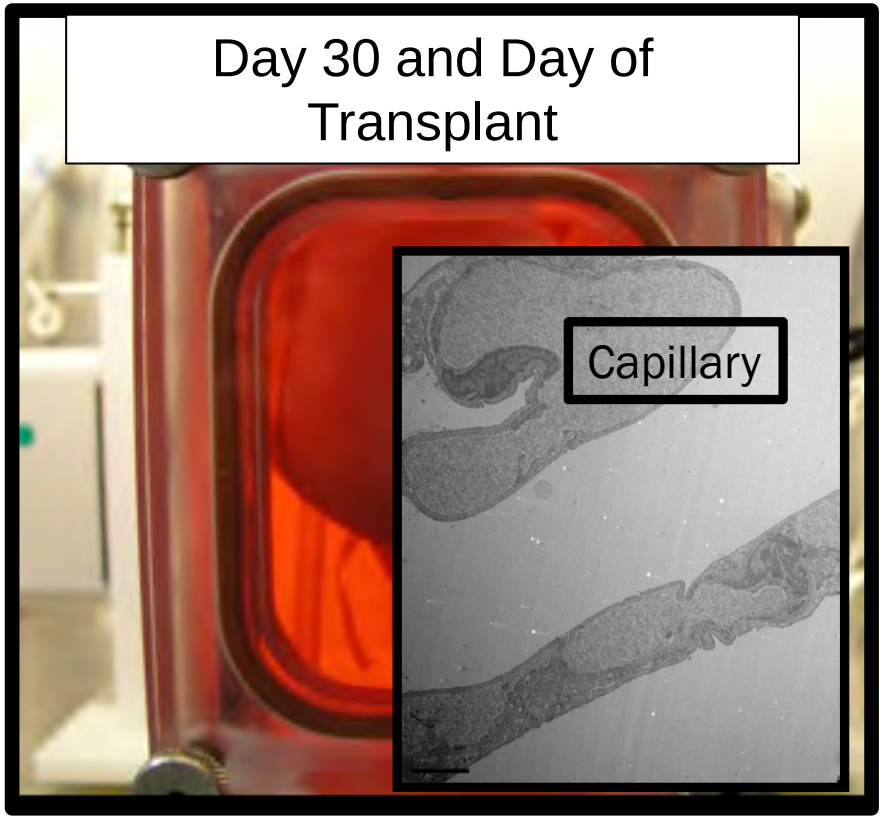
Pre-Clinical Transplant Phase 1

1. The left lung was removed from a pig (pneumonectomy)
2. Cells were isolated (trachea, bronchial, distal lung, vascular)
3. We used the pig's cells grown on a different smaller scaffold to make a bioengineered lung
4. The bioengineered left lung was transplanted after 30 days

Preclinical Study Phase I

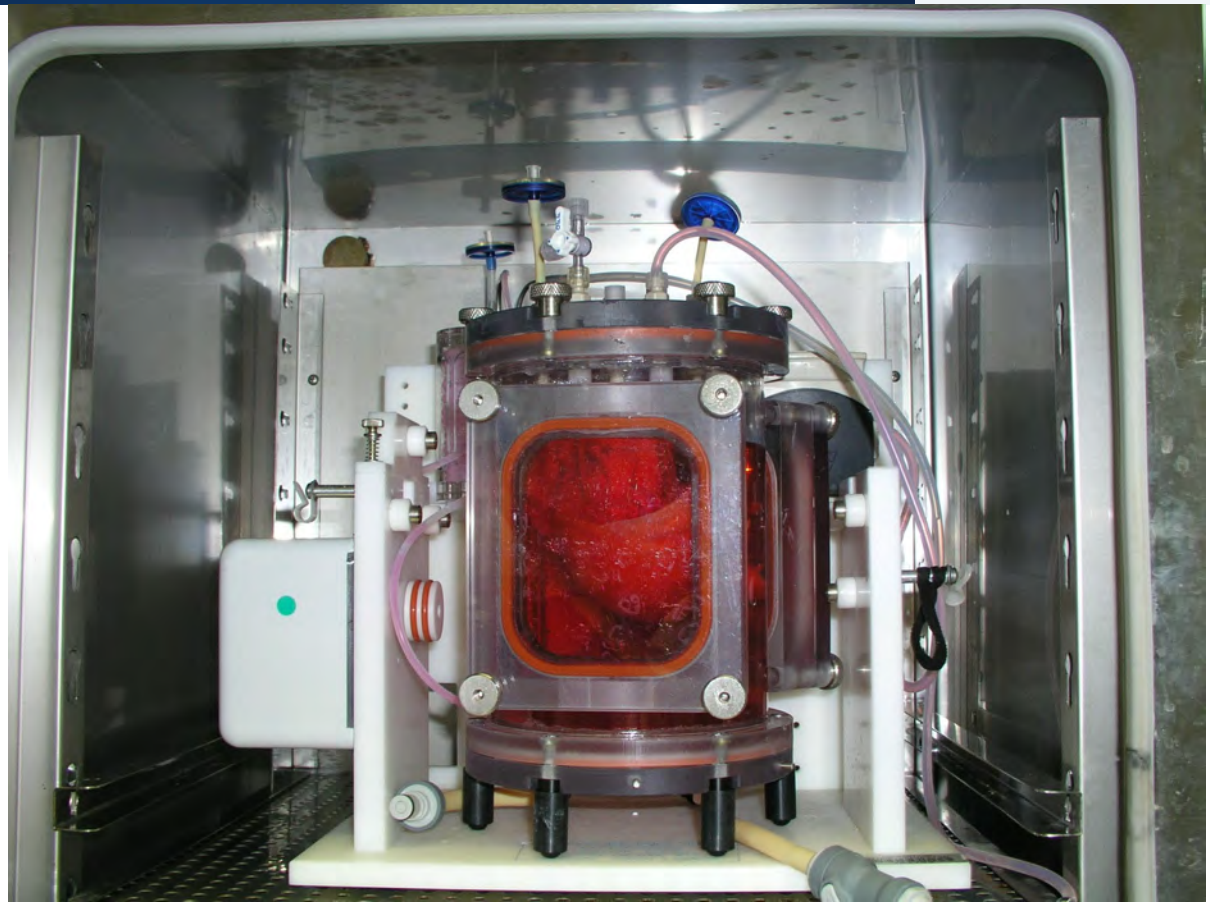
HOUSTON Methodist LEADING MEDICINE





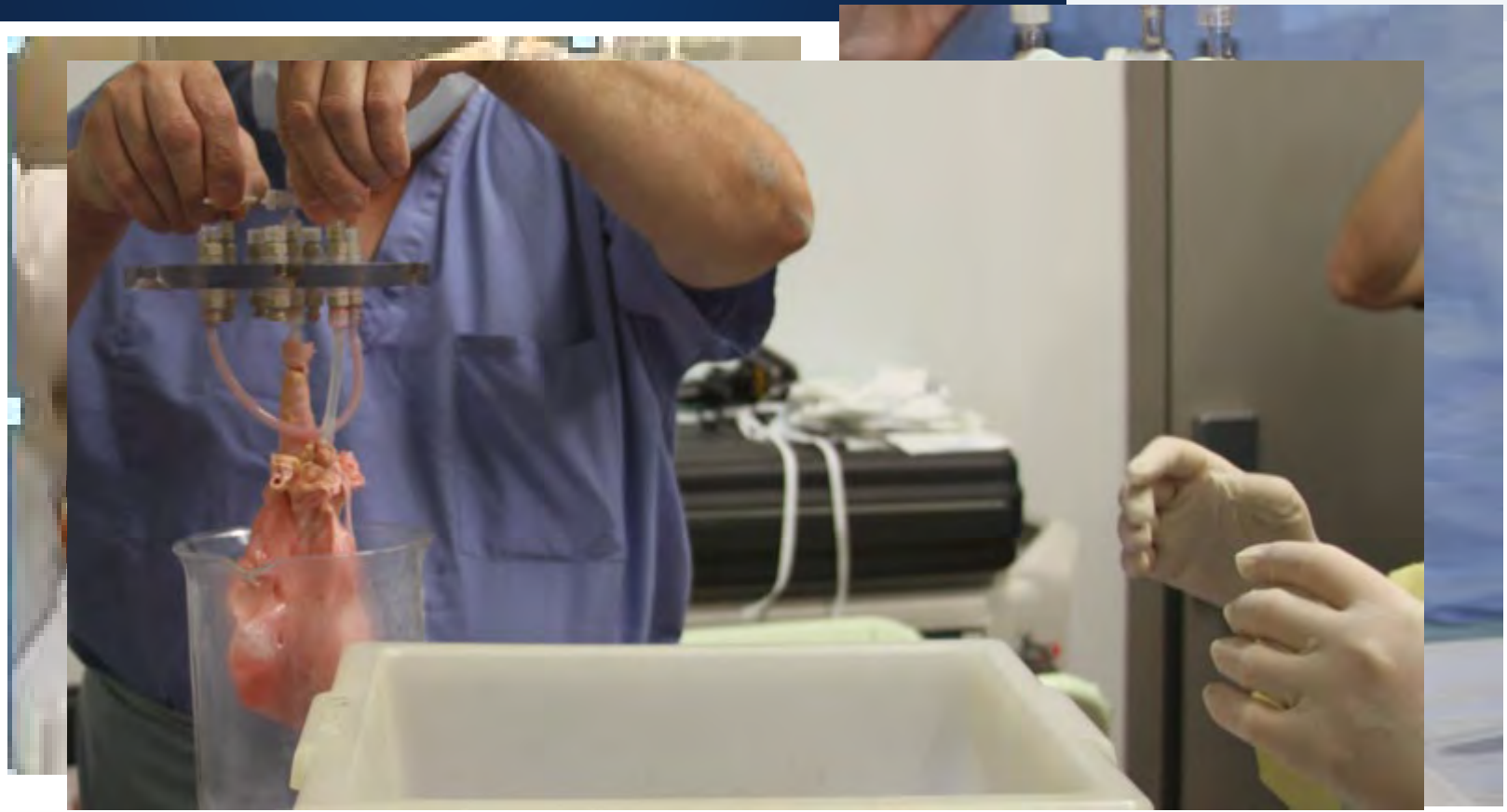
Bioengineered Lung in Incubator

HOUSTON Methodist LEADING MEDICINE



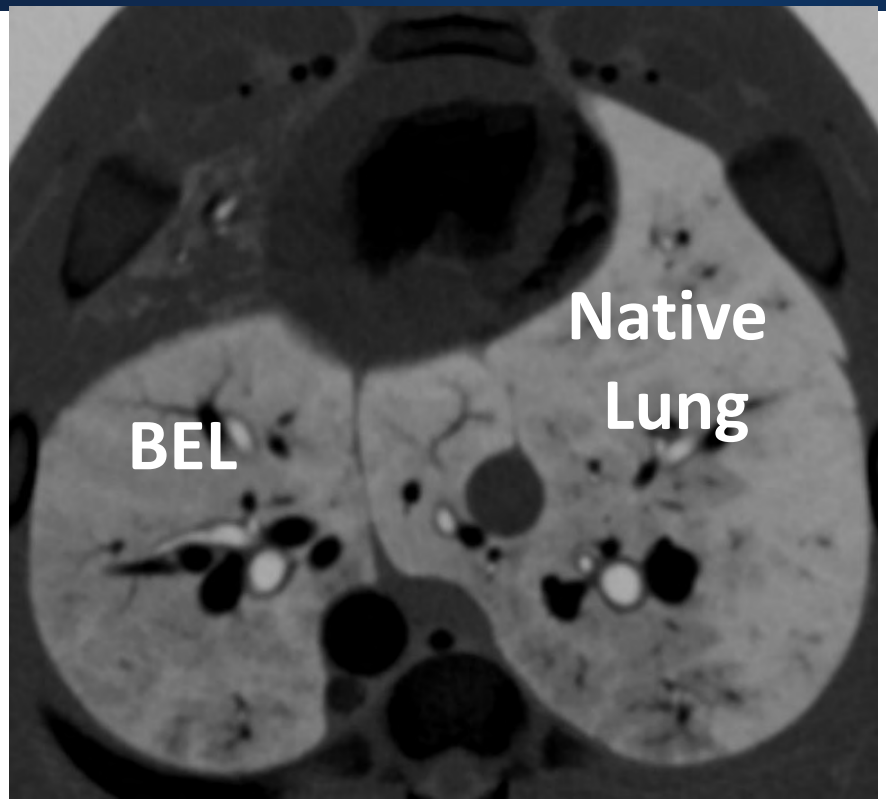
Lung Ready for Transplantation

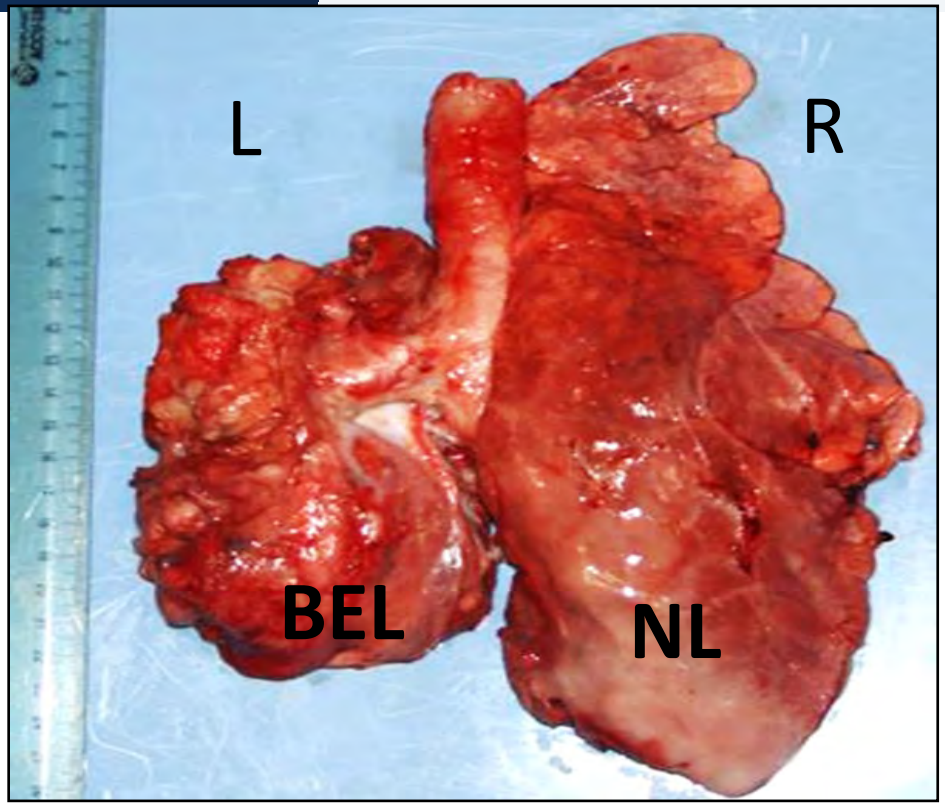
HOUSTON Methodist LEADING MEDICINE



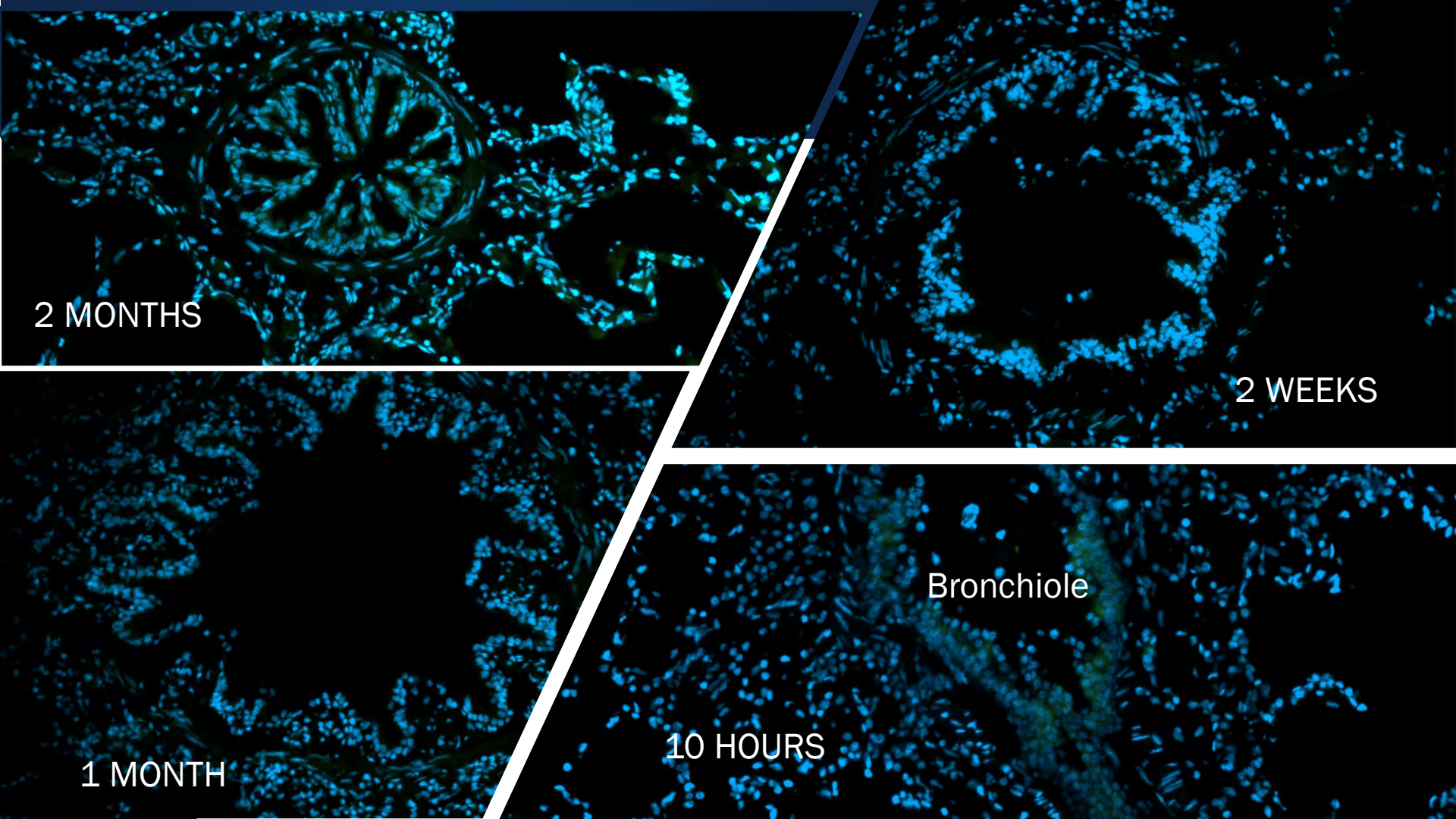
Preclinical Pilot Transplant
2 Months after Transplantation

HOUSTON Methodist LEADING MEDICINE



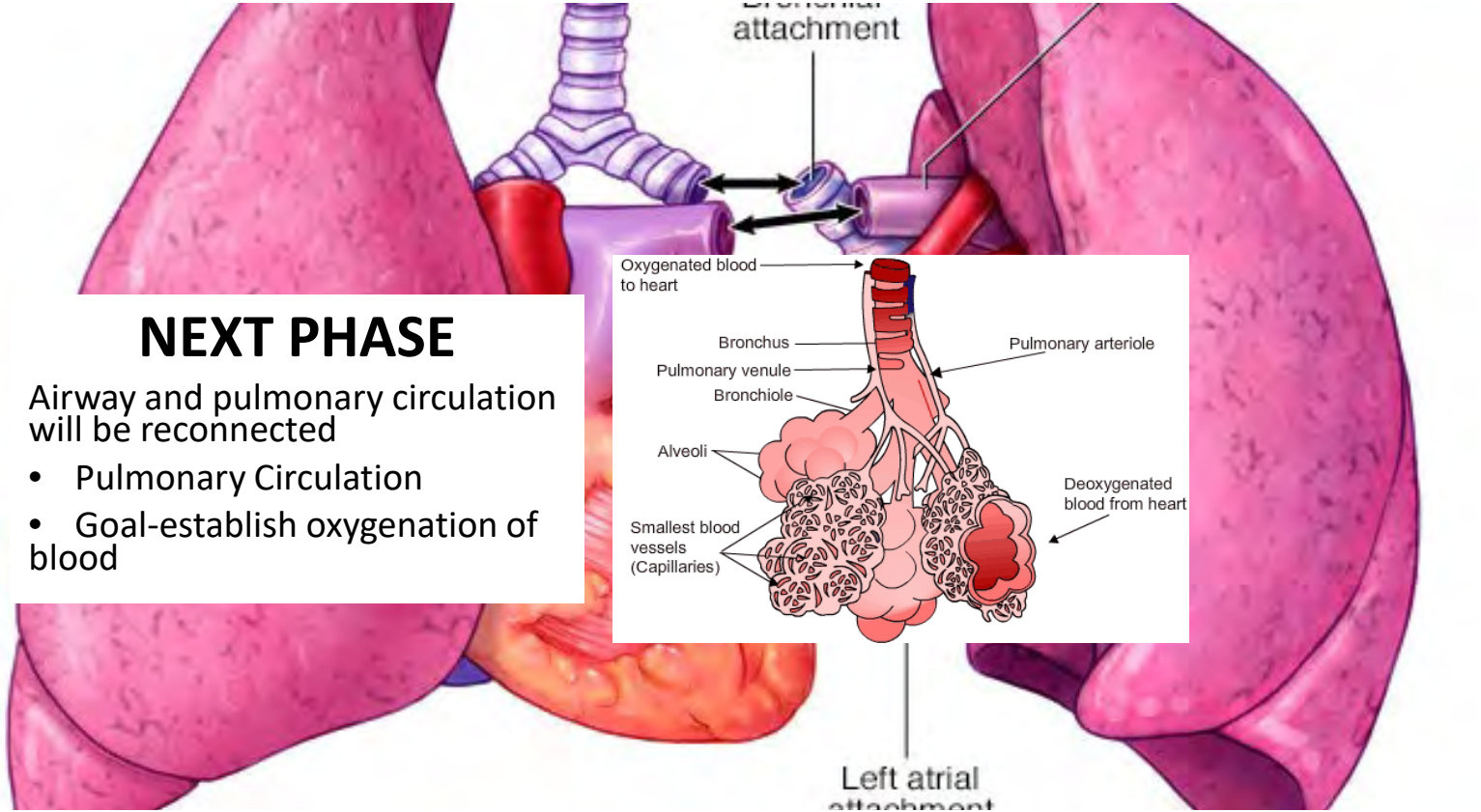


Nichols JE, S. LaFrancesca, JA Niles, SP Vega, LB Argueta, L. Frank, DC Christiani, R Pyles, B Hynes, R Zhang, A Miller, J Sakamoto, J Jessica Rhudy, G Hendricks, F Begarani, X Liu, G Vargas, R Pal, I Patrikeev, L Woodson, A Wacher, M Grimaldo, D Weaver, R Mlcak, J Cortiella Science Translational Medicine. vol 10. 2018


2 MONTHS
2 WEEKS
1 MONTH
Bronchiole
10 HOURS

Phase 2 of Engineered Lung Project

HOUSTON Methodist LEADING MEDICINE

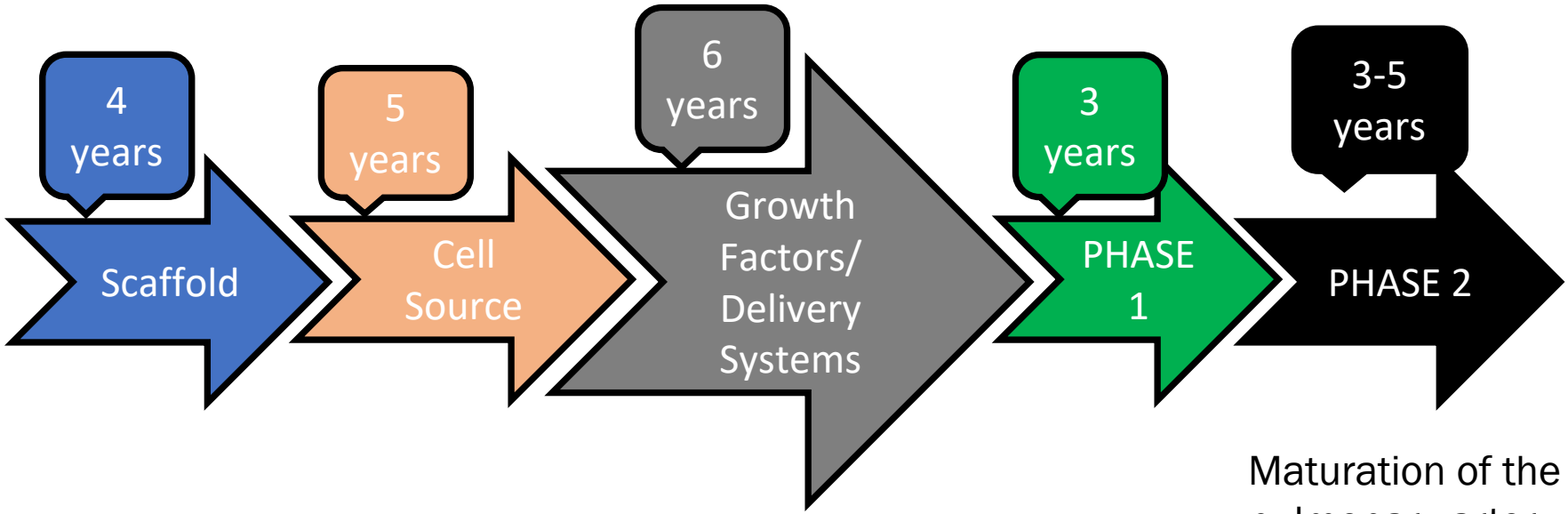


NEXT PHASE

Airway and pulmonary circulation will be reconnected

- Pulmonary Circulation
- Goal-establish oxygenation of blood

Timeline for Project



Maturation of the pulmonary artery

The Engineered Lung Team

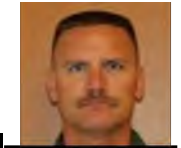
HOUSTON Methodist LEADING MEDICINE

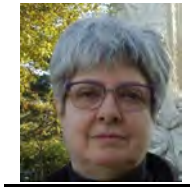
UTMB, Texas


Joaquin Cortiella MD


Gracie Vargas PhD


Adam Wacher MD


Curtis Klages DVM


Jean Niles MA

Harvard

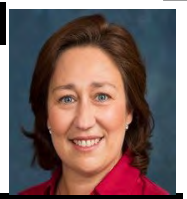

Dave Christiani MD

U Penn

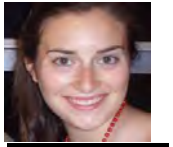

Blanca Himes PhD

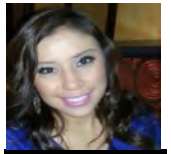

Rick Pyles


Rahul Pal PhD


Luba Frank MD


Andrea Bretttler MS


Andrea Cantu PhD


Stephanie Vega PhD


Lissenya Argueta PhD


Saverio La Francesca MD


Jason Sakamoto PhD


Michael Riddle MD


Lee Woodson MD PhD

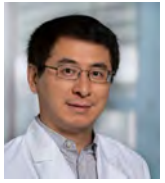

Ron MIcak PhD


Sean Winston MD


Kevin Cyr


Maria Grimaldo


Daniil Weaver


Xuewu Liu, PhD


Ghanashyam Acharya PhD

HM Update

Marc L. Boom

May 17, 2023

HOUSTON Methodist
LEADING MEDICINE

Leapfrog Hospital Safety Grade Trend

	Past Scores																					
	Spring 2012	Fall 2012	Spring 2013	Fall 2013	Spring 2014	Fall 2014	Spring 2015	Fall 2015	Spring 2016	Fall 2016	Spring 2017	Fall 2017	Spring 2018	Fall 2018	Spring 2019	Fall 2019	Spring 2020	Fall 2020	Spring 2021	Fall 2021	Spring 2022	Fall 2022	Spring 2023
HMH	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
HMB	B	A	A	A	A	A	A	A	A	A	B	B	A	A	A	A	A	A	A	A	A	A	A
HMCL	B	B	A	A	C	C	C	C	C	C	B	A	B	A	A	A	A	A	A	A	A	A	A
HMSL	B	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
HMTW	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	A	A	A	A	A	A	A	A	A
HMWB	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
HMW	NS	NS	A	B	B	A	A	A	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A

HOUSTON Methodist LEADING MEDICINE

Newsweek recognized Houston Methodist Hospital as one of the World's Best Hospitals in 2023

THE WORLD'S BEST HOSPITALS 2023

WORLD'S BEST HOSPITALS 2023

Newsweek

POWERED BY statista

HOUSTON Methodist LEADING MEDICINE

Houston Methodist Named #40 on Fortune's List of America's Most Innovative Companies

HOUSTON Methodist LEADING MEDICINE

Arianne Dowdell and Ryane Jackson named on Becker's list of "Black Healthcare Leaders to Know in 2023"

BECKER'S HEALTHCARE

HOUSTON Methodist LEADING MEDICINE

Houston Methodist Baytown Hospital Milestone: 75th Anniversary

The Baytown Sun

Vol. 103, No. 48 | 281-422-8302 | THURSDAY, APRIL 20, 2023 | www.baytownsun.com | $1.50

Houston Methodist Baytown Hospital celebrates 75th

HOUSTON Methodist LEADING MEDICINE

Houston Methodist Sugar Land Hospital Milestone: 25th Anniversary

HOUSTON Methodist LEADING MEDICINE

Doctors' Day 2023

2023 John W. Overstreet, M.D. Award Honorees:

Dr. Richard Harper
and
Dr. Susan Miller

HOUSTON Methodist
LEADING MEDICINE

The Education Institute Held a Special Ring Ceremony for a TAMU Student

HOUSTON Methodist LEADING MEDICINE

TEXAS A&M UNIVERSITY SCHOOL OF ENGINEERING MEDICINE
HOME OF ENMED INVITES YOU TO THE

INAUGURAL PHYSICIANEERS GRADUATION

CLASS OF 2023

Celebrate the landmark graduation of the world's first class of Physicianeers!

May 20, 2023
11 a.m. - 1 p.m.
The Westin Hotel

ENMED ENGINEERING MEDICINE

HOUSTON Methodist LEADING MEDICINE

TEXAS A&M SCHOOL OF ENGINEERING MEDICINE/ENMED HOSTS

NOBEL LAUREATES AND INVENTOR OF THE INTERNET COLLOQUY

Carolyn Bertozzi, PhD
Stanford University, Nobel 2022

Martin Chalfie, PhD
Columbia University, Nobel 2008

Phillip Sharp, PhD
MIT, Nobel 1993

Vinton Cerf, PhD
Co-Inventor of the Internet, Google VP
(Live via Zoom)

Peter Agre, MD
Johns Hopkins University, Nobel 2003
(Live via Zoom)

Susan Hockfield, PhD
President Emerita of MIT,
Moderator

May 19, 2023 | 2:15 - 4:30 p.m.

The Westin Hotel | Fifth Floor Ballroom | 1709 Dryden Rd. | Houston, TX 77030

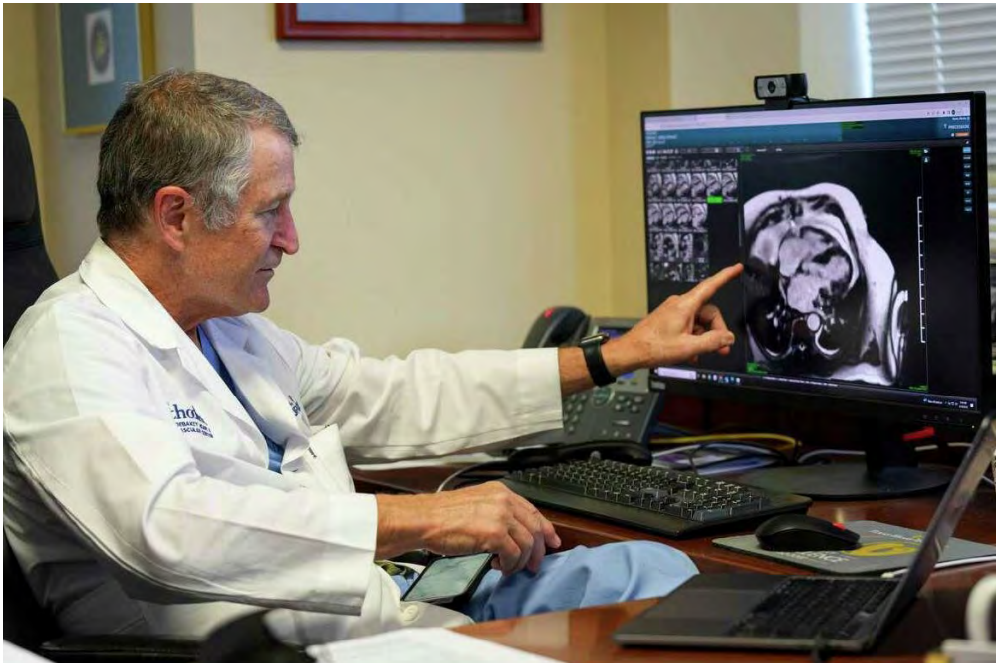
JOIN US FOR THIS UNPRECEDENTED EVENT

ENMED ENGINEERING MEDICINE

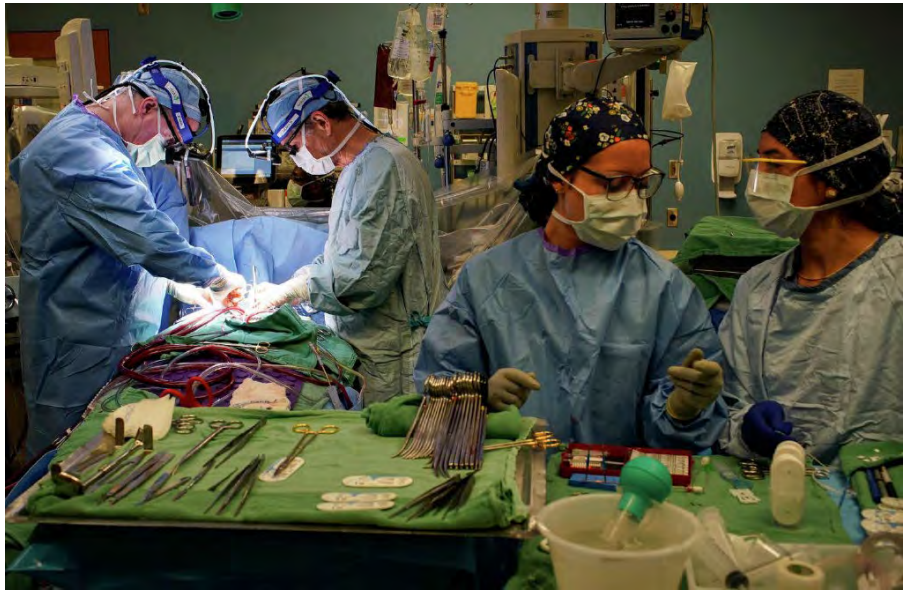
HOUSTON Methodist LEADING MEDICINE

Salute to Jim Nantz

Dr. Michael Reardon Featured in Houston Chronicle Article On Cardiac Tumor Program



HOUSTON CHRONICLE



HOUSTON Methodist
LEADING MEDICINE

Houston Methodist team travels to Ukraine to treat many hurt in war

By Evan MacDonald
STAFF WRITER

Houston Methodist surgeons and health care workers felt they had a good sense of what they'd see in Ukraine before they traveled there last month to treat soldiers and civilians injured in the war with Russia.

The team, part of a group of 13 health care workers from the U.S. and Canada, spent more than six months preparing to treat injuries from gunshots and high-velocity blasts. But it felt different once they arrived and met those patients in person, said Dr. Anthony Brissett, the director of facial plastic and reconstructive surgery at Houston Methodist.

"You can't help but have this affect you emotionally in some way," Brissett said. "A lot of these people are young men and

Ukraine continues on A11

Dr. Anthony Brissett, second from right, performs surgery in Ukraine, where he was part of a medical mission to treat soldiers and civilians.

Courtesy Houston Methodist

HOUSTON CHRONICLE

Photos courtesy Houston Methodist

Dr. Joshua Kain, center, of Houston Methodist, speaks to health care workers in Ukraine. Kain and Dr. Anthony Brissett, left in white, were part of a team treating gunshots and high-velocity blasts.

HOUSTON Methodist LEADING MEDICINE

Houston Methodist J.C. Walter Jr. Transplant Center has performed its 10,000th organ transplant. For 60 years, we have proudly served our community through lifesaving innovations in organ transplant, and we are honored to continue building on our legacy as a world leader.

1,226
HEART TRANSPLANTS

1,559
LUNG TRANSPLANTS

2,262
LIVER TRANSPLANTS

4,512
KIDNEY TRANSPLANTS

86
PANCREAS & ISLET TRANSPLANTS

355
MULTI-ORGAN TRANSPLANTS

THANK YOU FOR ATTENDING OUR **TOWN HALL CONVERSATION**

If you would like more information about lung transplantation or tissue engineering, please contact Tannya Flores at **tflores2@houstonmethodist.org**.

HOUSTON Methodist®
LEADING MEDICINE