FRONTIER BIO

Our Mission: End the Organ Shortage & Replace Animal Testing Through Engineered Human Tissue

frontierbio.com Hayward, CA

Highlights

1. $5.5M in Cumulative Sales: Validated demand from customers for tissue models built with human cells.
2. Transforming Medicine: Reducing animal studies and advancing implantable human tissue.
3. Market Opportunity: Multi-billion-dollar market for human tissue models and vascular grafts
4. $4.1M Raised to Date: Strong investor confidence with $1.6M committed in the current round.
5. Patent Families: Defensible IP covering core tissue

5 Patent Families: Defensible IP covering core tissue biofabrication and vascular graft technologies.

6 Elite Backing & Support: Funded by NSF SBIR and a Nobel Laureate, and advised by George Church.

7 Trusted by Industry Leaders: Clients include Mayo Clinic and Intuitive Surgical.

Featured Investor

Rob Ness
Syndicate Lead

Follow

Invested $72,482

Rob, Ness

"At Asymmetry, we invest in technologies that turn science fiction into fact. Frontier Bio is doing exactly that with their lab-grown human tissues.

It's rare to see a deeptech company achieve this level of capital efficiency. With a sales track record that speaks for itself, having secured contracts with Intuitive Surgical and Mayo Clinic, the team has proven they can deliver.

With the FDA now encouraging alternatives to animal testing, Frontier Bio's 'clinical trial in a dish' capabilities are perfectly timed.

- Asymmetry Ventures"

Team

Eric Bennett, MSc CEO

Eric is a serial entrepreneur & biomedical engineer. As past CTO at Aether, he designed advanced, low-cost 3D bioprinters. His deep-tech expertise spans DNA assembly, microfluidics, biofabrication, optogenetics, & brain-computer interfaces.

Dr. Sam Pashneh-Tala, PhD CTO

A recognized expert in tissue-engineered blood vessels, Sam authored the subject's seminal, ~1,000-citation review paper. He completed his PhD and fellowship in the field and previously ran an advanced medical device and tissue engineering consultancy.

Dr. George M. Church, PhD Advisor

Harvard Medical School genetics professor and synthetic biology pioneer. Member of the National Academy of Sciences and National Academy of Engineering. Co-founder of multiple biotech companies, including Editas Medicine and Colossal Biosciences.

Ravi Belani, MBA, MS Advisor

Founder & Managing Director of Alchemist Accelerator, backing unicorns like LaunchDarkly and Rigetti. Stanford lecturer on entrepreneurship. Previously led early investments in Twitch and PubMatic at DFJ. MBA, Harvard Business School.

Dr. Jamie Cate, PhD Advisor

Professor at UC Berkeley and Faculty Scientist at Lawrence Berkeley National Laboratory. Elected member of the American Academy of Arts and Sciences. Specializes in translating molecular mechanisms into therapeutics and sustainable biofuels applications.

Dr. Rami El Assal, DDS Advisor

Managing Partner at Boutique Venture Partners, clinician-scientist with postdoctoral training at both Harvard Medical School and Stanford, and author of "Towards Artificial Tissue Models: Past, Present, and Future of 3D Bioprinting."

Dr. Jaimie Shores, MD Advisor

Hand and peripheral nerve surgeon specializing in reconstructive microsurgery. Former Clinical Director of the Hand and Arm Transplant Program at Johns Hopkins; led the vascular team for the institution's first bilateral arm transplant.

Our Mission: To Engineer Human Tissues to End the Organ Shortage & Replace Animal Studies

Our mission is to eliminate the organ transplant waitlist and replace animal studies. While many biotech companies remain in the lab for years, Frontier Bio is generating revenue today. We have generated $5.5M in cumulative sales by starting with products and services that researchers need now while advancing toward implantable tissues for patients.

1. Demonstrated Commercial Traction

Our business is built on **human tissue models** for preclinical testing. These living tissues allow our partners to generate human-relevant data early in development, reducing their reliance on often-inaccurate animal models. We currently serve customers ranging from cell therapy innovators to government, helping them study disease and validate how novel therapies interact with human biology.

2. Advancing Toward the Clinic

We are applying our tissue engineering expertise to our first implantable product: a **living, tissue-engineered vascular graft.** Cardiovascular disease is the leading cause of death worldwide[1], creating a great need for replacement blood

vessels to use as vascular grafts. Unlike synthetic implants that can often fail, our grafts are designed to remodel into a natural, living blood vessel within the patient's body.

3. Long-Term Vision

Blood vessels are the essential infrastructure of life. By advancing lab-grown tissues for testing and vascular grafts for implantation, we aim to build the biological foundation that could support future regenerative medicine applications, including transplantable **transplantable organs.**

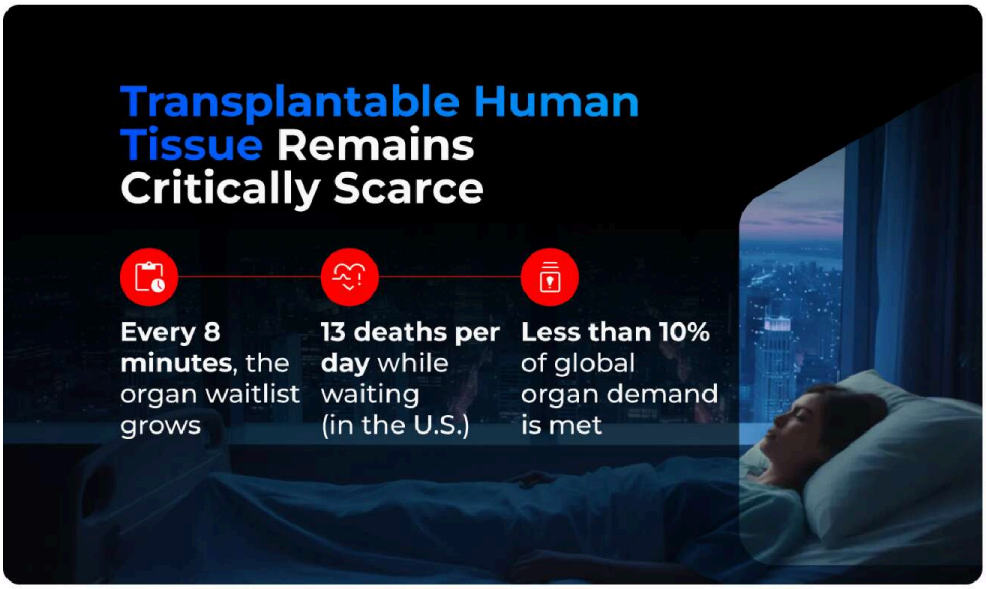
These statements contain forward-looking information based on current expectations and assumptions. Actual results may differ materially due to risks and uncertainties. No assurance can be given that projected outcomes will be achieved. Investing involves risk, including possible loss of principal.

The Problem

From the lab to the operating room, medicine faces ongoing shortages of functional human tissue for research, vascular repair, and organ transplantation.

Pharmaceutical companies still rely heavily on animal testing to evaluate new therapies. These models can be expensive and time-consuming, and translating findings from animal studies to human biology remains complex. About 90 percent of drugs that pass animal studies fail in human trials.[2] Regulatory agencies and research institutions are increasingly exploring human-based systems, but better tools are needed to make that transition practical.

In clinical settings, synthetic vascular grafts remain standard for various procedures. These grafts do not biologically integrate with the body and tend to fail in small-diameter vessel applications. Failure rates can reach 65% within two years, leading to additional surgeries, higher costs, and worse outcomes for patients. A potentially ideal solution is a “living scaffold” that transforms into native tissue over time.



(source)

The shortage of human tissue affects millions of patients. More than 100,000 people in the U.S. wait for organ transplants. Hundreds of thousands more need vascular grafts for surgery each year. Current solutions rely on synthetic materials that fail or on donor tissue, which is in limited supply. The shortage continues to widen as demand outpaces what’s available. New strategies are needed to create functional, living human tissue.

Our Solution

We leverage deep expertise in human tissue engineering to address two significant healthcare challenges.

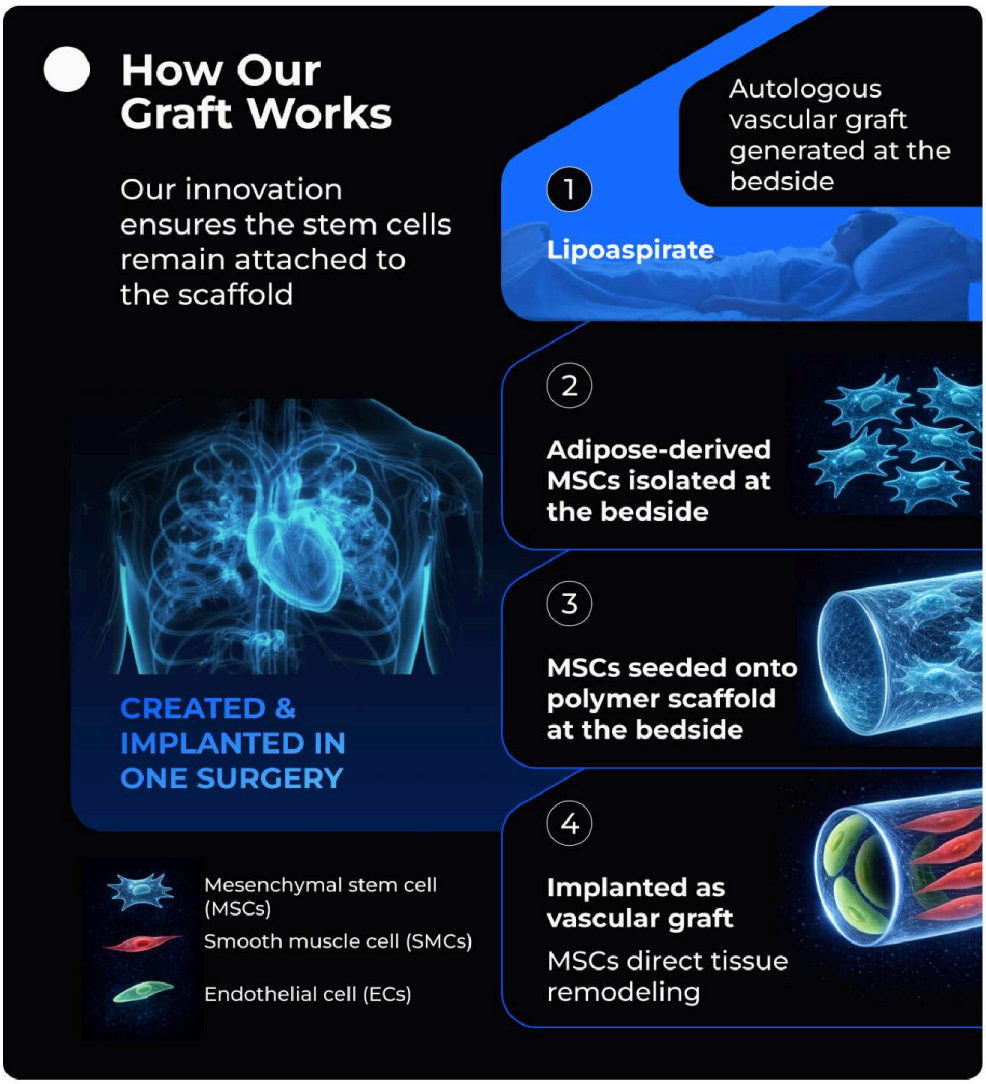
To improve the accuracy of preclinical testing, we create lab-grown human tissue models designed to serve as high-fidelity alternatives to animal studies.

- **High-Fidelity:** Our models are engineered to reproduce selected biological functions of the brain, lungs, and blood vessels, providing a human-relevant platform for evaluating safety and biological activity.
- **Commercial Application:** These systems are designed to support the evaluation of a range of therapeutic approaches, from pharmaceutical drugs to novel cell therapies. We are currently collaborating with partners to use these models to support the development of next-generation therapies.

We are developing a regenerative graft designed to use the patient's own stem cells to address the high failure rate of purely synthetic grafts.

- **Seeded at the Bedside, Grown in the Body:** By combining the patient's own cells with a bioresorbable scaffold at the bedside, we aim to mitigate the risk of immune rejection and the need for vein harvesting. The result is a graft that is engineered to transform into a natural blood vessel over time after implantation, designed to provide a long-term solution that overcomes the limitations of purely synthetic materials.

- **Target Applications:** We are focusing on critical procedures where current options fall short, including dialysis access (AV access), coronary artery bypass, peripheral artery bypass, and trauma repair.
- **Immediate & Regenerative:** The graft is engineered to conduct blood flow immediately upon implantation. With this design, over time, the biodegradable scaffold is absorbed and replaced by living tissue to create a durable vessel that integrates naturally designed to minimize the risk of long-term foreign body rejection.



The Path to Engineered Organs

Blood vessels are the foundation of every organ. Developing functional vascular tissue now lays the groundwork for full organ engineering. This core capability positions us to address transplantable tissues and organs such as pancreas, lung, kidney, liver, and heart.

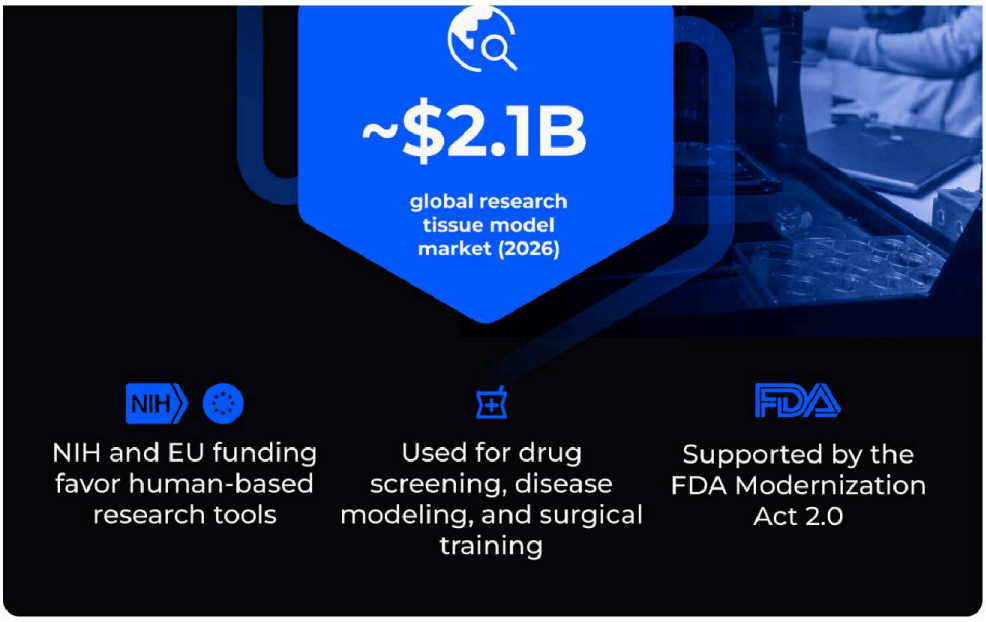
The same biological expertise that powers our human tissue models today forms the foundation for our mission to develop tissue-engineered blood vessels and eventually pioneer lab-grown organs.

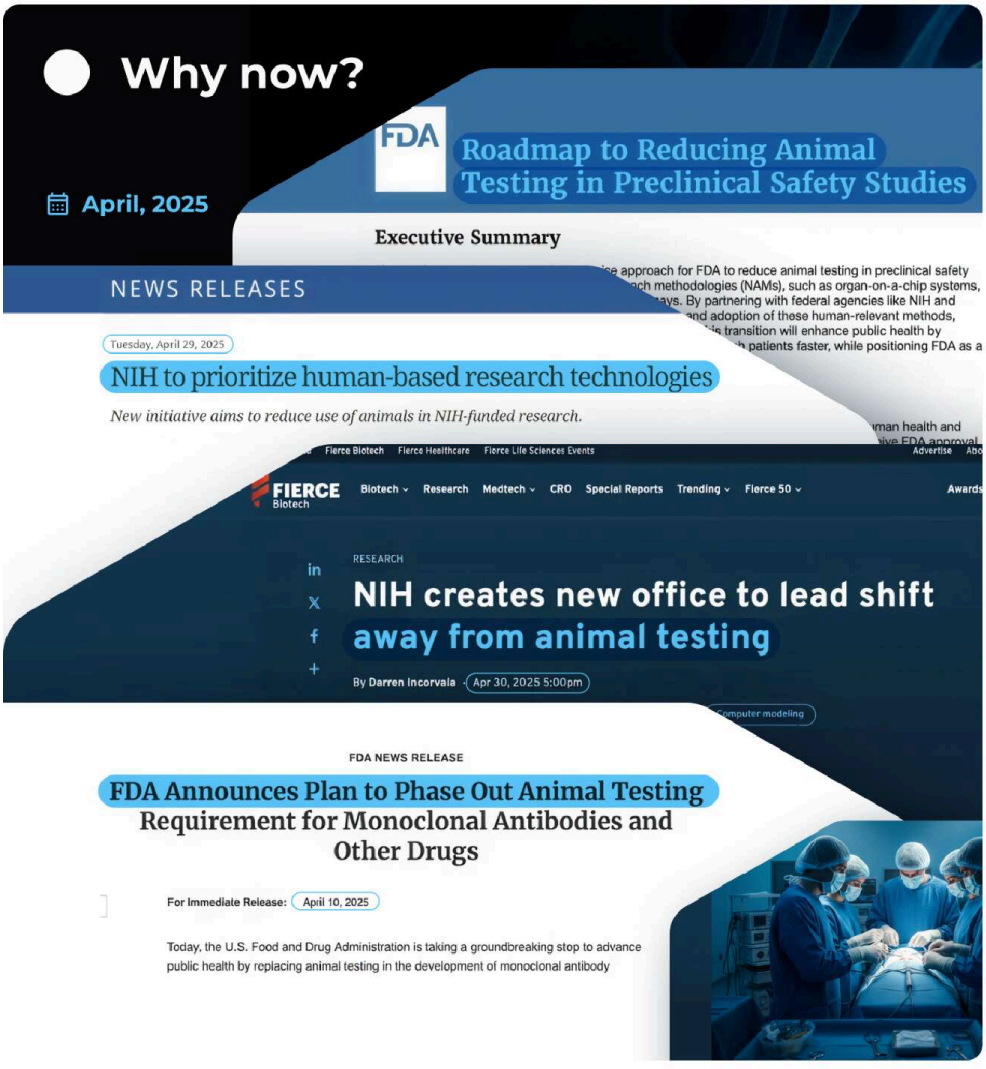
Market

Frontier Bio operates in two evolving sectors that are shifting away from synthetic and animal-based models toward human tissue engineering.

Human Tissue Models - An Animal Alternative

The global market for human tissue models is estimated at approximately $2.1 billion[3] and continues to grow as researchers explore alternative approaches to traditional animal studies. We believe our platform is well positioned to participate in this evolving market as regulatory agencies and research institutions evaluate and expand the use of human-based research tools.



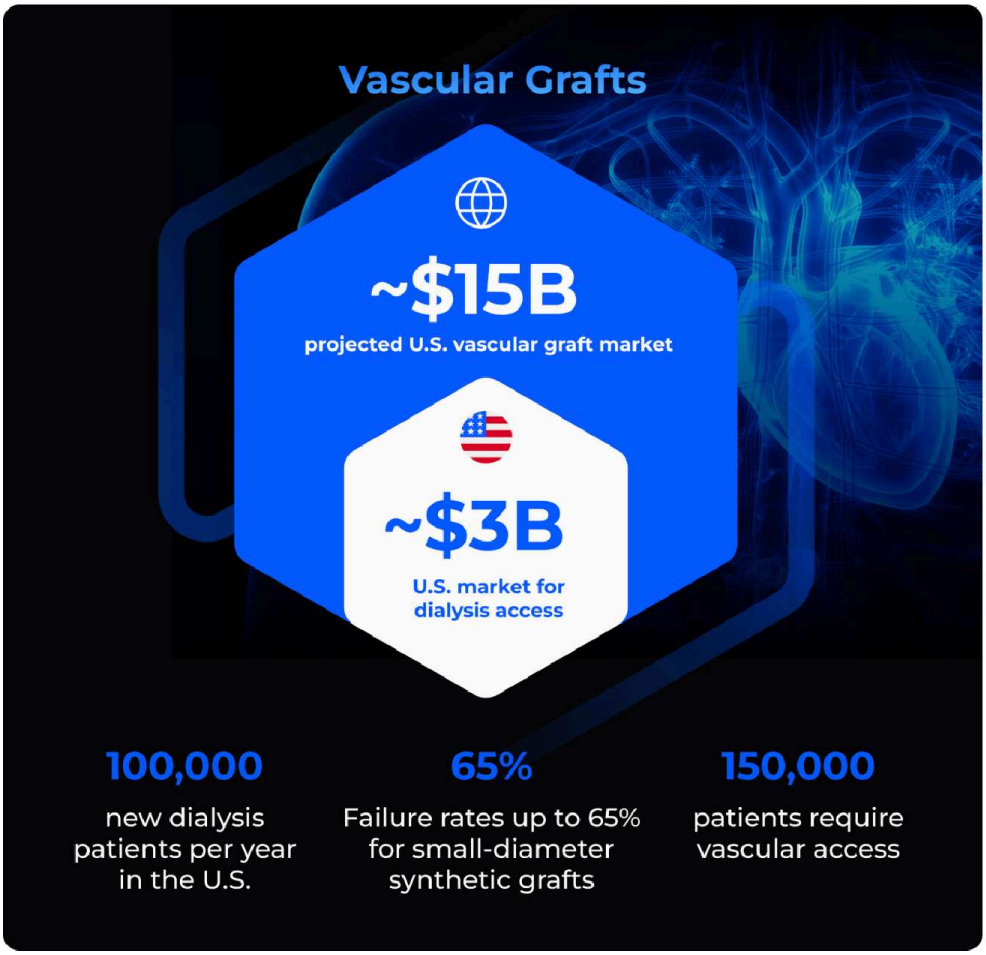


Vascular Grafts

The vascular graft market is massive but severely underserved. For small vessels, surgeons are currently forced to choose between two flawed options: synthetic grafts with

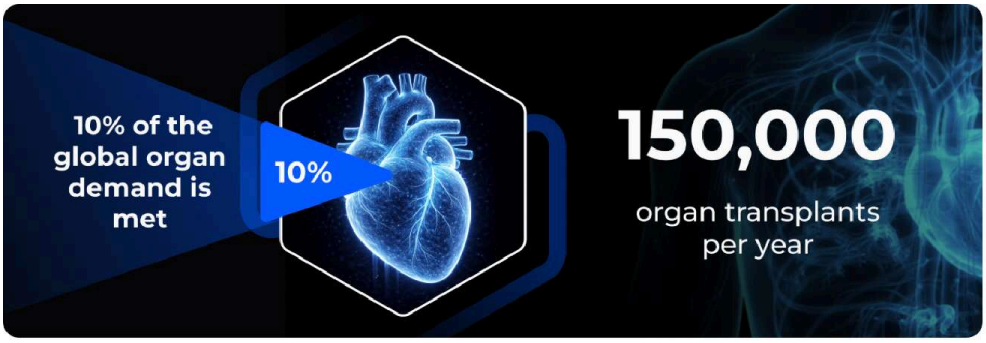
significant failure rates, or harvesting the patient's own vein, which prolongs surgery and causes donor-site injury.[4]

We are developing a solution to address these shortcomings. Our approach combines the patient's own stem cells with a bioresorbable scaffold, designed to transform into a living vessel inside the body.



5

Towards Lab-Grown Implantable Organs



According to the World Health Organization, only 10% of global organ demand is met. This scarcity, combined with lifetime care costs that can exceed $1M per patient, has created a $100B+ market opportunity.[6]

created a $100B+ market opportunity.

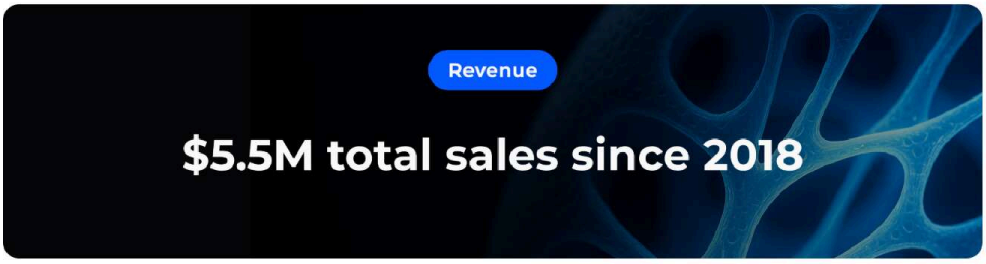
For example, the demand for lung transplants is incredibly high, yet they come at a substantial cost.

7

Traction

Revenue-First Biotech Model

Unlike many preclinical biotechs, we are already generating revenue. We use sales from our commercial tissue models to fund and support our clinical endeavors.

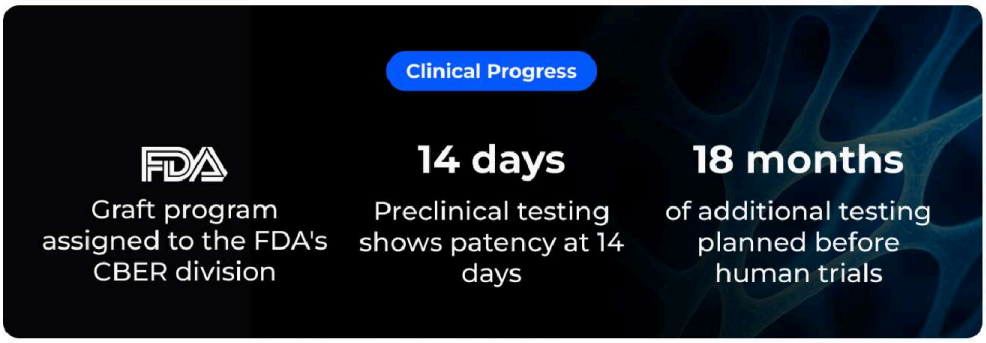


World-Class Partners & Customer Adoption

Top-tier institutions rely on our tissue models to test therapies and study disease.

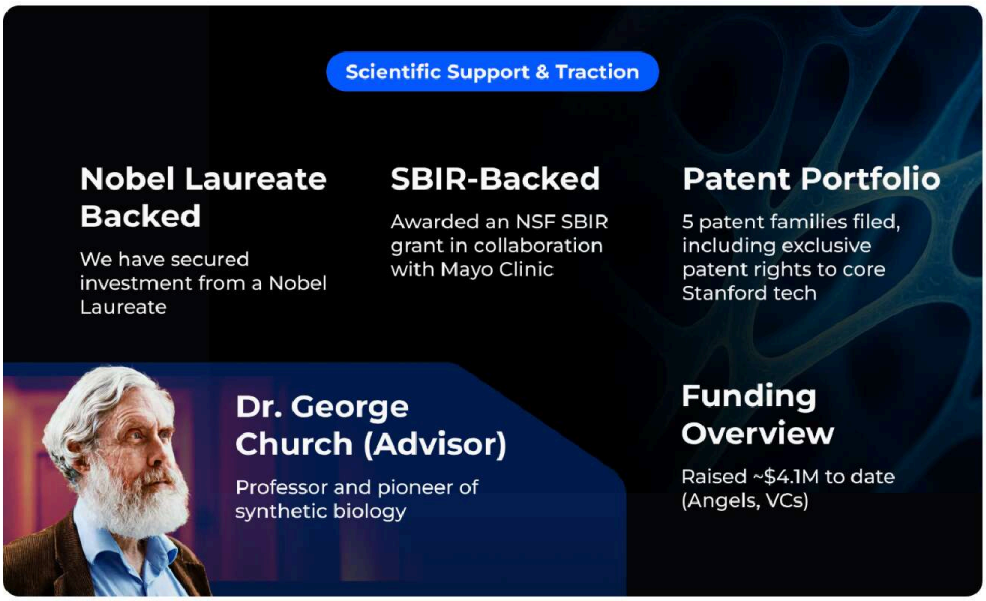
Clinical Progress: Road to the Clinic

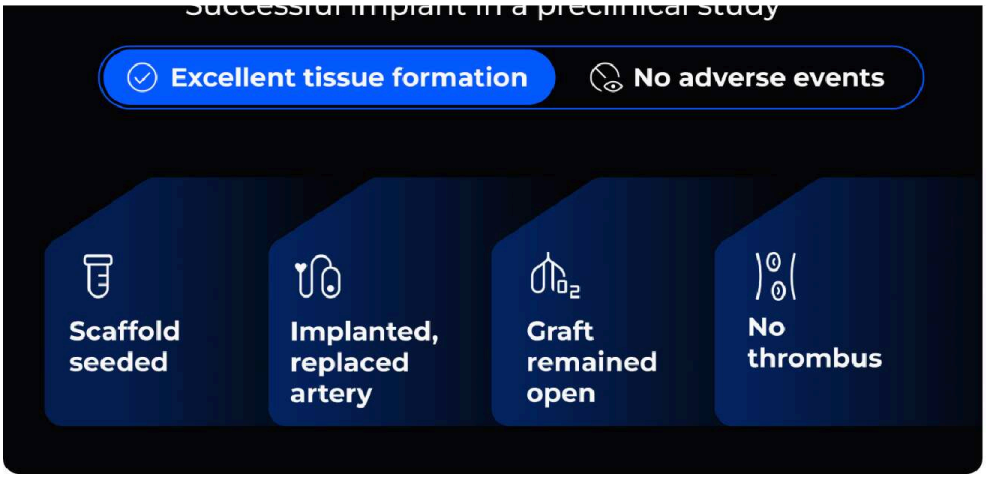
Our vascular graft program is advancing toward human trials. We have engaged the FDA early to help clarify our path to market.

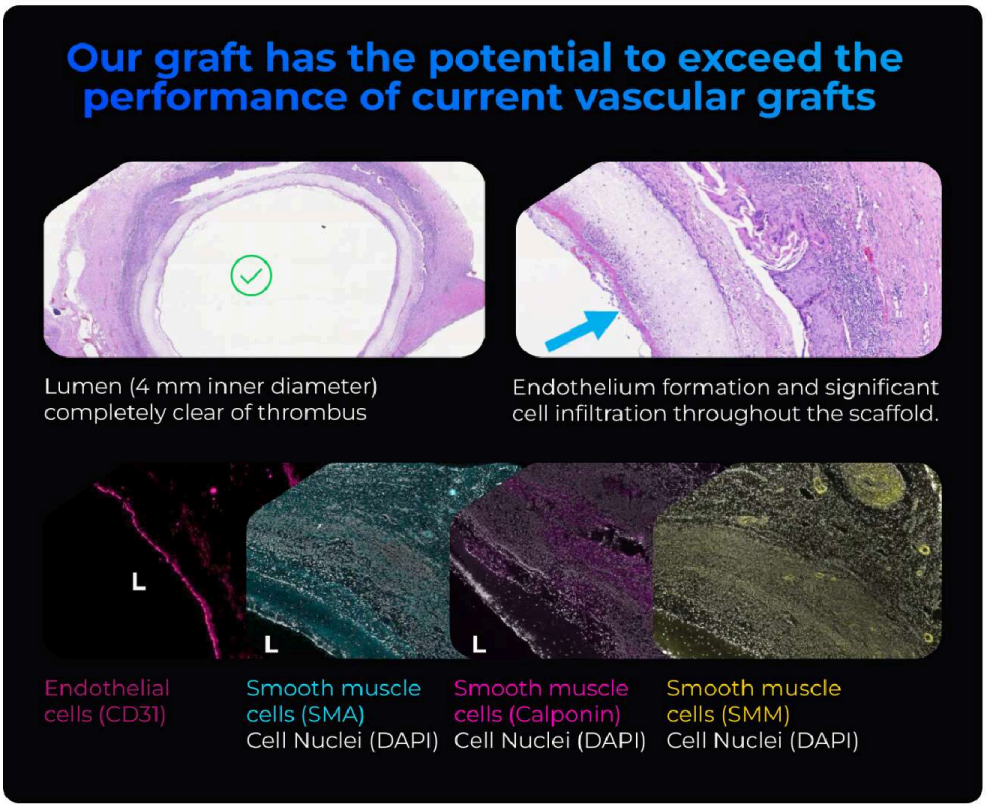


Elite Scientific Backing & Commercial Validation

We are built on elite scientific backing, a defensive IP moat, and disciplined capital execution.

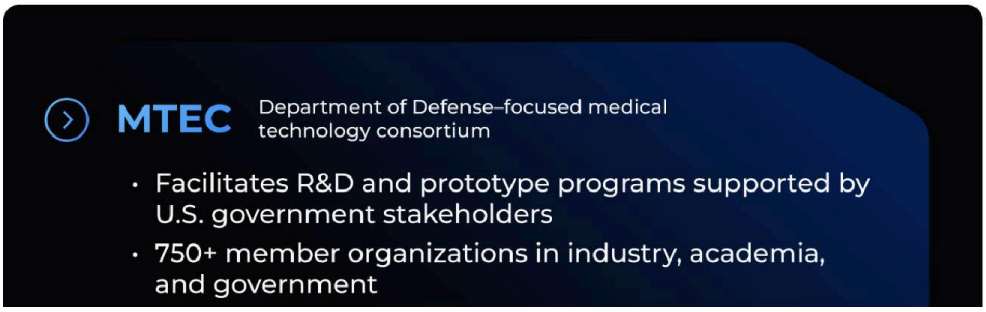


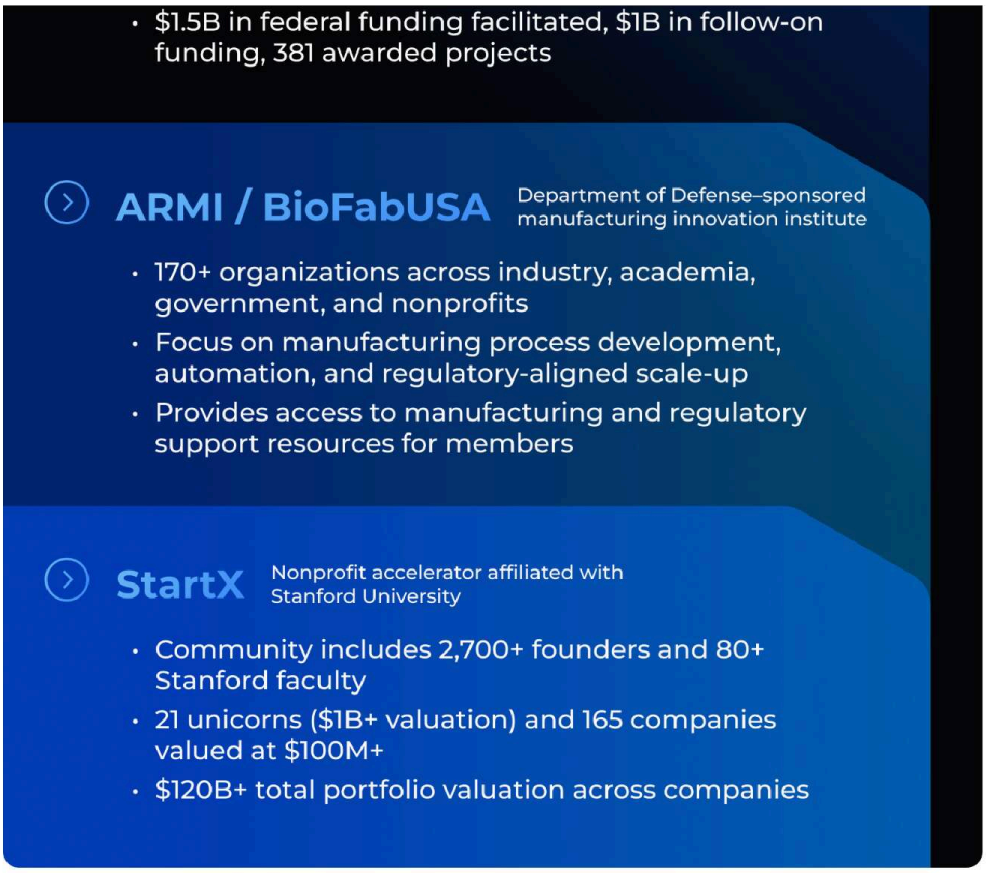




Strategic Consortia & Accelerator Participation

Frontier Bio participates in established defense, manufacturing, and innovation ecosystems that support collaboration, early commercialization efforts, and manufacturing readiness in regenerative medicine, including MTEC, ARMI, StartX, Alchemist Accelerator, Brinc, and the NSF SBIR Beat-the-Odds Bootcamp.





How We Make Money

Our business model leverages our deep expertise in tissue engineering and stem cells to drive near-term and long-term revenue streams. We generate revenue today through our existing capabilities while continuing to invest in future clinical development programs.

The Growth Engine: Human Tissue Sales & Services

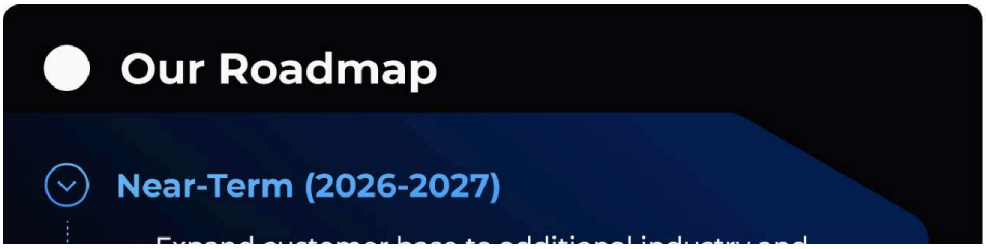
We generate revenue by providing high-fidelity human tissue models and tissue R&D services to commercial partners, academic institutions, and the government.

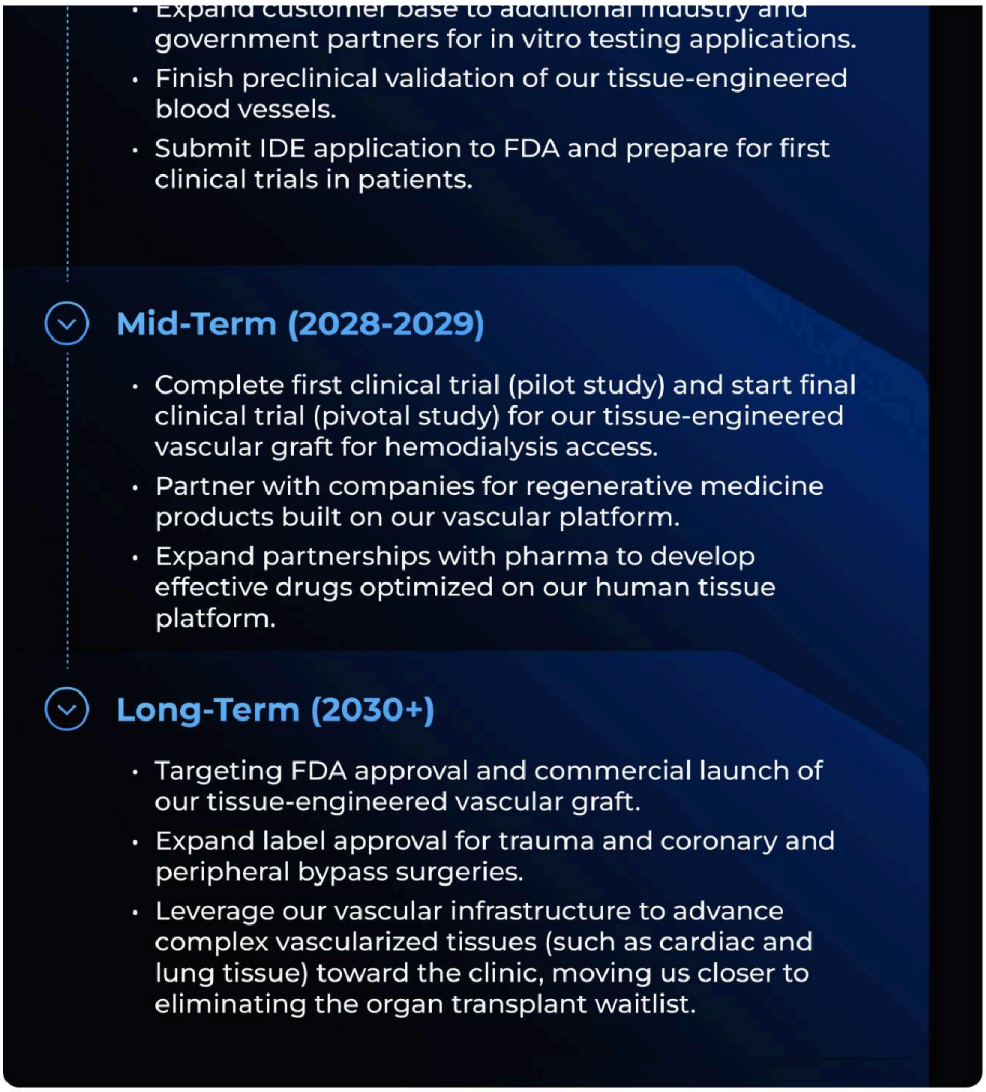
- **Customer Base:** We serve companies, universities, and government who are developing therapeutics, studying disease, and advancing medical science.
- **High-Value Contracts:** Our clients pay for tissues and bespoke R&D. We have secured sizable contracts for our various tissues ranging from $250k up to $1.1M.
- **Strategic Expansion:** Our sales strategy focuses on executing successful pilot projects, with the goal of transitioning those early engagements into broader, long-term research partnerships.

Beachhead Clinical Market: Vascular Grafts (in development)

Our clinical vertical will focus on the sale of our tissue-engineered vascular graft.

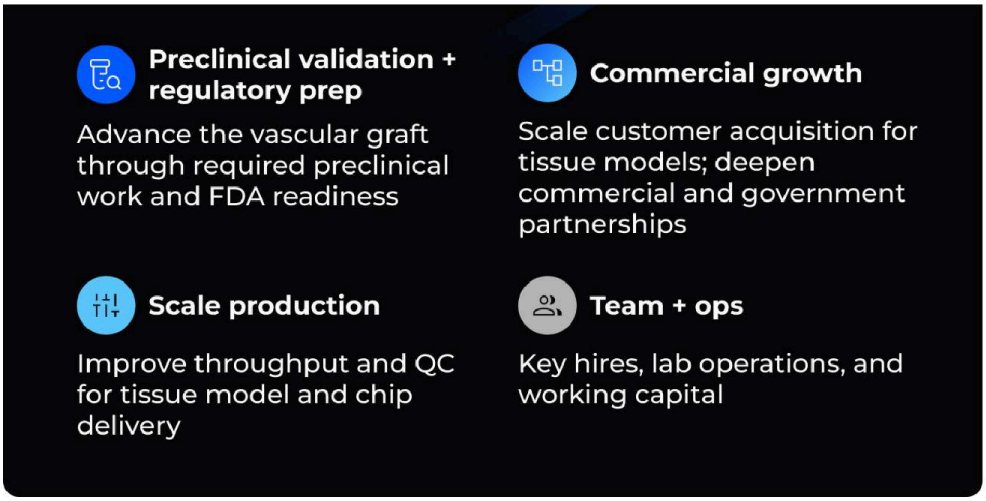
- **Model:** Direct sales to hospitals and surgical centers for use in operating rooms.
- **Beachhead Application:** Vascular access for dialysis. This is a critical clinical need with established reimbursement pathways and a defined regulatory framework.
- **Expansion:** While advancing dialysis grafts, we aim to generate validation data for other applications such as trauma, coronary artery bypass, and peripheral artery disease (PAD) bypass to address a significantly larger total market.





Use of Funds

We are raising on Wefunder to advance preclinical testing of our vascular grafts, scale customer acquisition for our tissue models, and expand commercial and government partnerships.



*Allocation may change depending on regulatory or operational needs.

The statements above reflect the personal views and opinions of the individuals quoted and are based on their experience with Frontier Bio. These statements do not constitute an endorsement of the Company or its securities offering. No compensation was provided for these testimonials. Past performance and investor opinions are not indicative of future results.

Help Us Build a Future Without the Organ Waitlist & Reduce Animal Testing

Deep technology can take years to move from the lab to real-world application. We are already generating revenue in the market.

Our tissue models are currently generating revenue and represent a small step towards the long term goal of drastically reducing the industry's reliance on animal testing. We are now advancing our development of implantable tissue technologies towards future clinical use.

We have the traction, the team, and the technology. Now we need you.

Help us develop technologies to save patients, spare animals, and engineer the future of human tissue.

This is a Regulation Crowdfunding offering. Investing in early-stage biotech carries risk, including total loss of capital. FDA approval is not guaranteed. Please review all offering materials and risk factors before investing.

1. World Health Organization. (2025, July 31). Cardiovascular diseases (CVDs). WHO. https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)
2. doi: 10.1016/j.jacbts.2019.10.008, doi: 10.1039/c8lc00330k, doi: 10.1038/nrd4539
3. Ghosh, S. (2026, January 15). In-vitro human models market size and share forecast outlook 2026 to 2036. Future Market Insights. Retrieved February 22, 2026, from https://www.futuremarketinsights.com/reports/in-vitro-human-models-market
4. Pashneh-Tala S, MacNeil S, Claeyssens F. The Tissue-Engineered Vascular Graft-Past, Present, and Future. Tissue Eng Part B Rev. 2016 Feb;22(1):68-100. doi: 10.1089/ten.teb.2015.0100. Epub 2015 Oct 8. PMID: 26447530; PMCID: PMC4753638. [973 citations via Google Scholar, retrieved February 2026]
5. Allon M, Zhang Y, Thamer M, Crews DC, Lee T. Trends in vascular access among patients initiating hemodialysis in the United States. JAMA Netw Open. 2023;6(8):e2326458.

   Al-Balas A, Lee T, Young CJ, Allon M. Choice of a second vascular access in hemodialysis patients whose initial arteriovenous fistula failed to mature. J Vasc Surg. 2018;68:1858-64.e1. doi:10.1016/j.jvs.2018.03.419.

   Dahlerus C, Kim S, Chen S, Segal JH. Arteriovenous fistula use in the United States and dialysis facility-level comorbidity burden. Am J Kidney Dis. 2020;75:879-86. doi:10.1053/j.ajkd.2019.08.023.

   United States Renal Data System. Vascular access [Internet]. 2024 USRDS Annual Data Report. Bethesda (MD): National Institute of Diabetes and Digestive and Kidney Diseases; 2024 [cited 2025 Jul 4]. Available from: https://usrds-adr.niddk.nih.gov/2024/end-stage-

renal disease/4-vascular-access

https://doi.org/10.1089/ten.teb.2015.010

6. Yadav U. Global regenerative medicine market size, industry analysis and outlook (2025-2033) [Internet]. DataM Intelligence; 2026 Feb 3 [cited 2026 Feb 22]. Available from: https://www.datamintelligence.com/research-report/regenerative-medicine-market

7. Thabut G, Mal H. Outcomes after lung transplantation. J Thorac Dis. 2017 Aug;9(8):2684-2691. doi: 10.21037/jtd.2017.07.85. PMID: 28932576; PMCID: PMC5594127.

Ortner N, Holzer H. 2025 U.S. organ and tissue transplants: Estimated costs and utilization, emerging issues, and solutions. Milliman. 2025 Feb 13 [cited 2026 Feb 22]. Available from: https://www.milliman.com/en/insight/2025-us-organ-and-tissue-transplants-costs-utilization