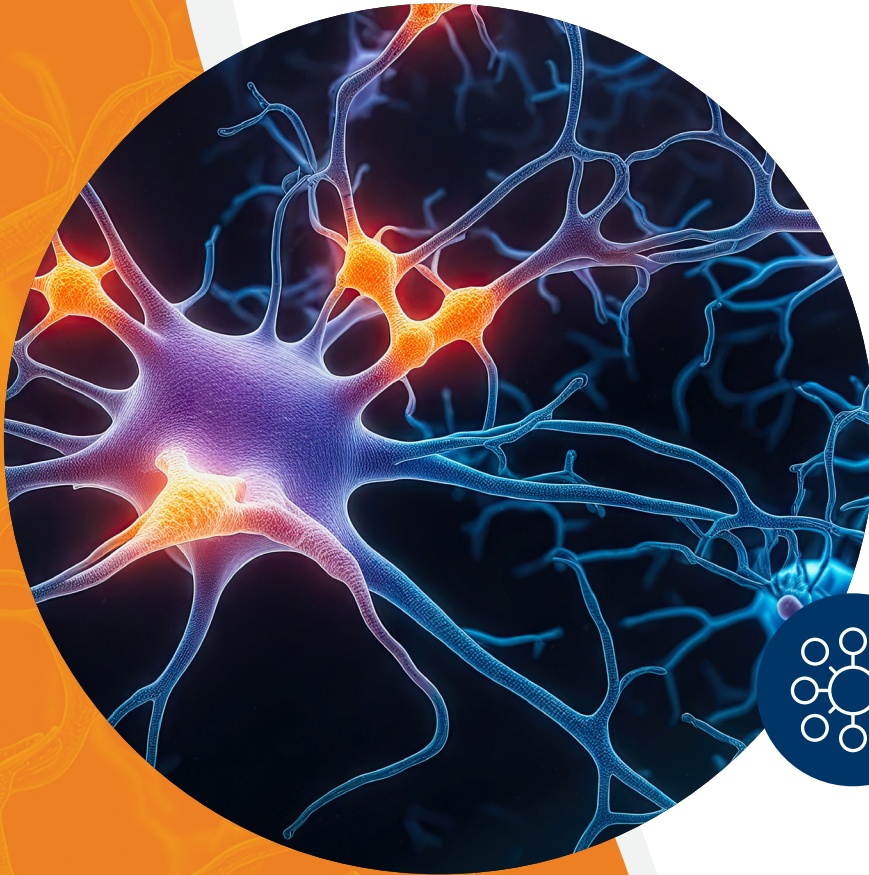


# Human Biospecimens for Research



## Who We Are

Human-Relevant *In Vitro* Research Solutions

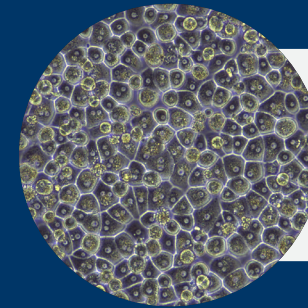
Our Promise | Our Declaration | Our Commitment



**Organ Transplantation**



**Tissue Transplantation**



**LifeSciences**



**Community**



Biospecimens for Research



Primary Cells & Models



In Vitro Assay Services



Dental



Cardiovascular



Wound Management & Surgical Reconstruction



Orthopedics & Craniomaxillofacial, Spine, Sports Medicine, Trauma/CMF



Clinical Services/Organ Recovery



Hospital Services



Community Education & Outreach



Donor Family Services



International Outreach



# What Sets Us Apart

## The Largest Network for Recovery Partnerships

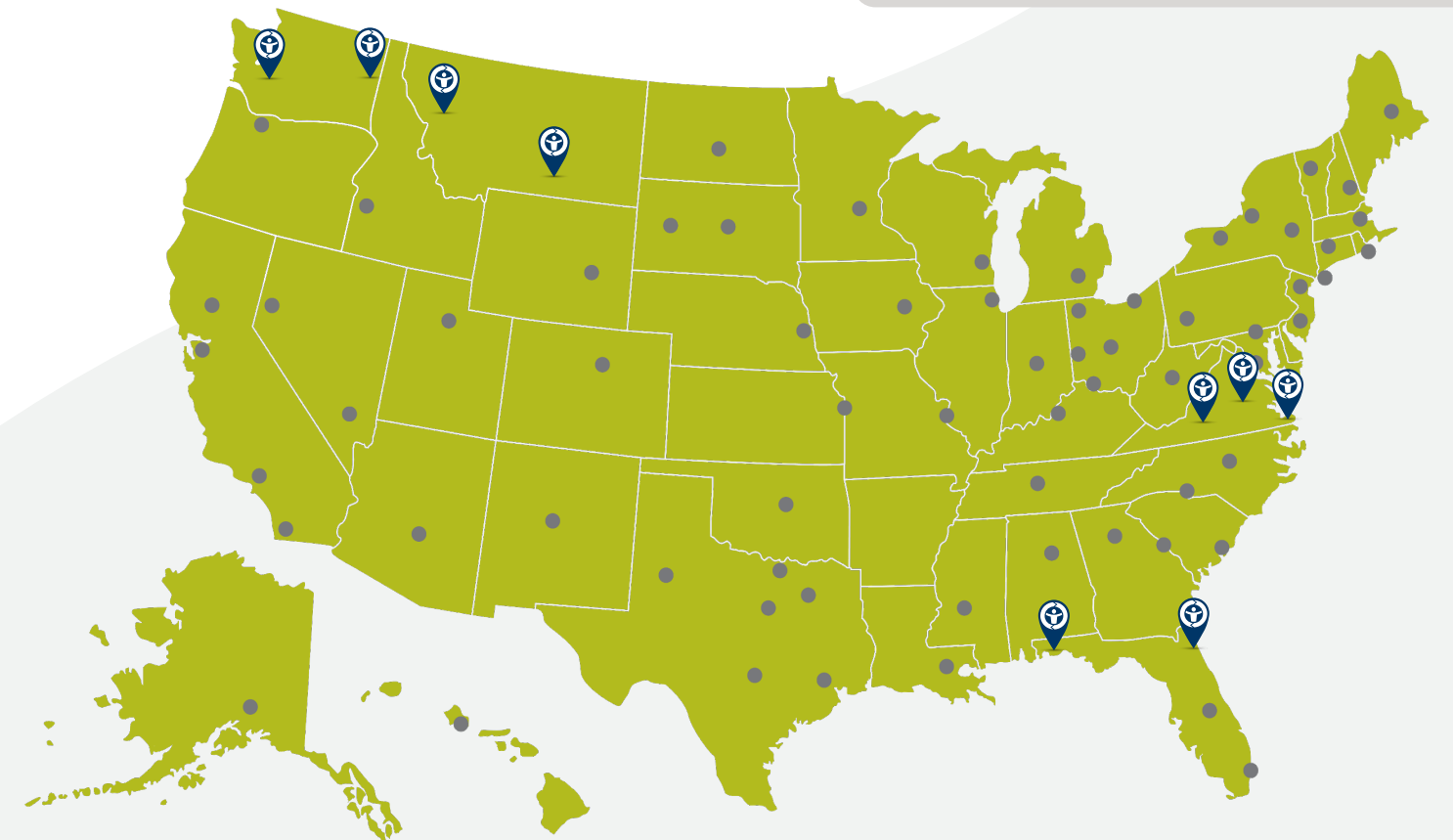
Working with nearly all Organ Procurement Organizations in the U.S. and with access to over 9,000 donors, LifeNet Health has more partners, more donors, and more access than any other tissue program in the world. LifeNet Health LifeSciences is the direct tissue source and is therefore able to offer a variety of tissue types and preservation formats. Researchers work directly with our screening and procurement teams, and we provide direct customer service support to ensure quick, reliable assistance whenever you need it.

### Why Leading Researchers Choose Us Over the Rest

- Over 90 years of combined experience with research project management
- 24/7 recovery and logistics support
- International shipping
- Research biospecimens provider since 1984
- Offer full authorization and research disclosure
- Give access to de-identified medical records

### Donor Network

- LifeNet Health facility
- Partner organ procurement organization



# A Focus on the Future

Established in 2012, the LifeNet Health Institute of Regenerative Medicine (IRM) is a division of LifeNet Health and serves as a global center of excellence for research and development. The IRM relies on the gift of human research biospecimens to support the development of innovative cell therapies and advanced tissue engineering.

- World class scientists focused on enhancing biological matrices, signaling, and cellular therapies to enhance patient outcomes
- 75+ new products and technologies in our R&D pipeline — including personalized medicine and drug discovery programs
- 190+ patents issued around the world



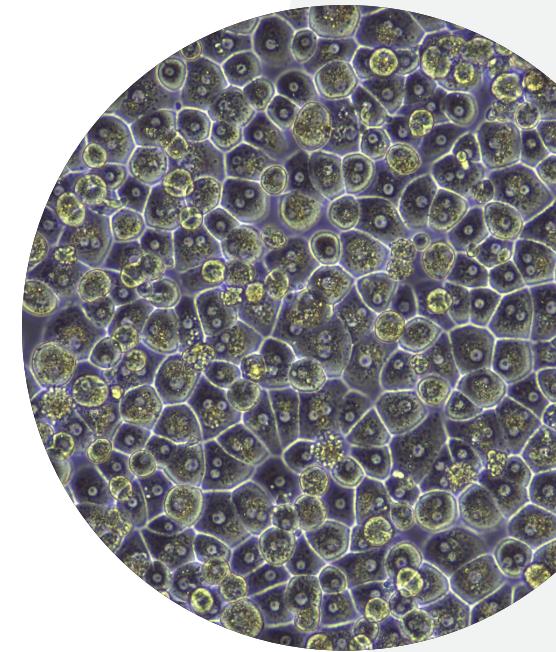
# Benefits of our Biospecimens

Our rapid collection processes ensure low ischemia times, preserving biospecimen integrity for high-quality analysis. We recover biospecimens from both normal/control (healthy) donors and donors with medical conditions and provide medical and social history data from donors with well-documented medical histories, including age, sex, BMI, ethnicity, cause of death, and social history.

Our diverse offerings, including over 120 different tissue configurations, empower researchers to study specific tissue functions and diseases with precision.

## 24/7 Recovery and Logistics

- Ability to handle short delivery times for specific tissues
- Courier systems in place to facilitate biospecimen delivery
- Regional recovery sites when necessary
- International shipping through our distribution hub in Indianapolis



# Best Practices in Biospecimen Procurement

- **Standardized, reproducible, surgical recovery practices**
  - We work with researchers to establish detailed specifications
  - Tissues are recovered in an operating room environment
- **Low interval from death to preservation**
- **Highly skilled anatomists**
  - Transplant coordinator certification
  - Certified tissue bank specialists
- **State of the art training**
- **Transplant program certifications/FDA**
  - AOPO
  - AATB



# Biospecimens for Research



## Neurological tissue

Brain  
Pituitary gland  
Dorsal root ganglia (DRG)  
Peripheral nerves  
Cerebrospinal fluid (CSF)



## Hepatic tissue

Liver



## Cardiothoracic tissue

Esophagus  
Gastroesophageal junction  
Heart  
Lung  
Pericardium  
Vein  
Coronary artery  
Aorta  
Trachea  
Thymus  
Lymph node



## Abdominal tissue

Adipose, subcutaneous, & visceral  
Colon  
Kidney  
Stomach  
Spleen  
Intestine  
Bladder  
Gall bladder  
Ureter  
Prostate



## Musculoskeletal & integumentary tissue

Skeletal muscle  
Skin: full thickness  
Bone  
Adipose tissue  
Tendons  
Bone marrow  
Cartilage



## Endocrine tissue

Hypothalamus  
Thyroid gland  
Adrenal glands  
Pancreas  
Breast/mammary tissue  
Thymus  
Reproductive tissues

# Preservation Methods

- **We assist with establishing tissue request specifications**
  - Our expert staff works with you to define your tissue requests
- **Whole tissue or tissue samples available**
  - Specific to your application
  - Recovered according to established standards
- **Variety of preservation formats**
  - Fresh, Frozen, Formalin, or FFPE
- **Temporary in-house storage available**
- **LifeNet Health can accommodate specific researcher requirements and works with the researcher to provide the specific preservation methods necessary for project success**

# Applications of Biospecimens for Research

Human biospecimens for research are suitable for multiple applications, including:

- Cell isolation
- 2D and 3D cell culture
- Genomics
- Proteomics
- Organotypic culture models – Co-cultures, 3D models
- Drug discovery and development
- Disease progression research
- Biomarker discovery
- Normal and high through put cell assays
- Exploration studies
- Non-diseased control tissue

Brain and other  
biorepository build up

Gene expression

Cell isolation/precision-cut tissues

Biomarker identification

Immunohistochemistry

# Genotype-Tissue Expression Project (GTEx)

In 2010, the National Institutes of Health established this Common Fund Project in order to create a data resource to investigate genetic variation and gene expression across multiple human tissues from the same individuals. LifeNet Health LifeSciences was one of eight biospecimen providers chosen to participate in these groundbreaking studies.

## LifeNet Health Contribution

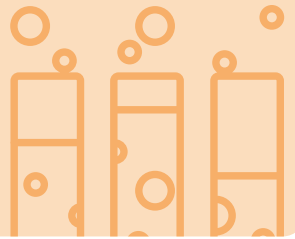
- Collection of more than 25 human tissue types
- Low postmortem time intervals
  - Organ donor: 1:22 to 6:51
  - Tissue donor: 7:01 to 24:00
- Developed advanced recovery and preservation systems for delivery of the highest quality biospecimen samples

## 5-Year Project August 2010 to 2015

54 tissue types

1,000 donors

17,000+ samples



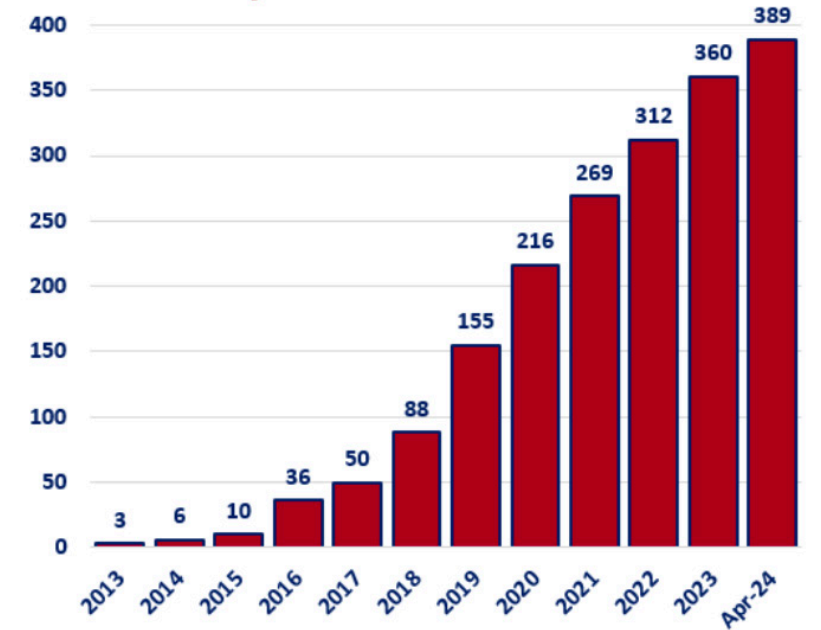
# Brain Tissue Repository Program

LifeNet Health LifeSciences collaborated with the Center for Neuroscience and Regenerative Medicine (CNRM), a joint research program of the Uniformed Services University and the National Institutes of Health, to support the Brain Tissue Repository (BTR) program. The BTR program was developed to better understand military traumatic brain injury (TBI).

## LifeNet Health Supports the Center for Neuroscience and Regenerative Medicine by:

- Screening for, authorizing, and recovering brains from US military service men and women suspected of having TBI
- Authorizing and recovering over 90 brains since 2015

DoD/USU Brain Tissue Repository Specimen Collection



# Military Traumatic Brain Injury

The DoD/USU Brain Tissue Repository was established by the U.S. Department of Defense to collect, preserve, and study brain donations obtained from deceased patients aged 18-60 with any history of U.S. military service. These brain tissues are used to support research aimed at a better understanding of the long-term effects of military career on brain health. This is the largest Department of Defense-funded CTE scientific research project at Uniformed Services University of the Health Sciences (USUHS). Mild TBI and PTSD are considered the signature injuries of modern warfare and invisible wounds of war.

## LifeNet Health Contribution

The Henry Jackson Foundation awarded LifeNet Health a 5-year contract for the identification and procurement of brains from military veterans

**Ongoing recovery of brain donations from veterans who may suffer from Chronic Traumatic Encephalopathy (CTE)**



# Customer Service Support



**Assigned project fulfillment leader**



**Monitoring and communication of procurement progress**



**Feedback to recovery teams**



**Notification upon donor matches**



**Pertinent medical information follow-up**



**Screening if requested**



**Infectious disease testing**

# How the Process Works

## Application to Fulfillment

1

### Researcher Engagement

- Inquiry
- Donor profile & tissue recovery
- Project feasibility

Tissue type

Time to Activation

2

### Protocol Build

- Tissue protocol design
- Preservation
- Recovery SOPs & logistical needs

Disease screening

3

### Project Launch

- Recovery locations
- Staff training
- Equipment & supplies
- Active protocol

Preservation method

4

### Donor match

- Screen candidate donors
- Review active protocols
- Authorize research donation

Receipt of tissues

5

### Recovery

- Professional staff
- Standardized recoveries
- Documentation

6

### Delivery

- Researcher notification
- Track shipment
- Delivered to researcher

# Key Deliverables

- Project activation in three weeks from project specification finalization
- Distinct project leader
- High-level of communication with researcher
- Screening criteria adjustments, as needed
- Strict adherence to project specifications within protocol guidelines
- Timely notification of biospecimen recoveries and delivery
- Analytical review of screening criteria and suggested adjustments to ensure fulfillment

# Notes

## How can we help?

Talk with one of our experts for help with general inquiries, protocol details, or becoming a new client.

[LNHLifesciences.org/information](https://LNHLifesciences.org/information)  
[lifesciences@lifenethealth.org](mailto:lifesciences@lifenethealth.org)



[LifeNetHealth.org](https://LifeNetHealth.org)

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