BCRF ILC Legacy Project
Lobular Breast Cancer Biobank

Jagmohan Hooda, PhD, MBA
UPMC Hillman Cancer Centre, Pittsburgh, PA
Honoring Leigh Pate
The woman who made the biorepository possible

- Leigh understood the lack of well-defined models for ILC research.
- Donation to BCRF - to establish a living Biorepository of ILC
- Overseen by UPMC Hillman Cancer Center and MSKCC
Nothing to Disclose
The Team Making Leigh Pate's Vision a Reality

Collaboration between UPMC Hillman Cancer Center and MSKCC

Steffi Oesterreich, PhD
UPMC Hillman Cancer Center

Adrian Lee, PhD
UPMC Hillman Cancer Center

Jagmohan Hooda, PhD, MBA
UPMC Hillman Cancer Center

Daniel Brown, PhD
UPMC Hillman Cancer Center

Rohit Bhargava, MD
Magee-Womens Hospital of UPMC

Priscilla F. McAuliffe, MD, PhD
Breast Surgical Oncology, UPMC

Jorge Reis-Filho, MD, PhD
MSKCC

Britta Weigelt, PhD
MSKCC
Leigh Pate's Legacy - Aims
Overcoming challenges in ILC research with Living Biorepository

To collect ILC specimen together with clinicopathological data

To develop 3D patient derived organoids (PDOs) from ILC specimens

To perform bulk genomics on the ILC tumor specimen and the PDOs

Single-cell sequencing on the ILC tumor specimen and the PDOs

Creating a living collection of organoids to augment our knowledge of invasive lobular breast cancer and to enable more accurate diagnosis and treatments.
Building a Biorepository for ILC Research: Leigh Pate's Enduring Impact

Generation of characterized organoid models

- PDO
- IPM
- Bulk Sequencing
- single-Cell Sequencing
- WGS
- ATACseq
- RNAseq

ILC tissue sample from patient

FFPE

BCRF ILC Legacy Biorepository and Data Portal

Clinical Data

Digital Pathology
From Tissue Sample to LIOs: The Journey of an Organoid

LIO: Legacy ILC Organoids

- Patient tissue sample
- Establishment at IPM
- Transported to Lee-Oesterreich Lab
- Bright field microscopy for morphology
- Immunofluorescence: E-Cadh, p120
- Genomic sequencing: Bulk seq and single-cell seq
- Bulking: Biobank
- Phenotypic characterization: ER response, Growth
- Available for researchers

Legacy Biorepository
Example Data and Advancement
Organoids show high similarity to originating tumor

Case:
- **Primary:** ER+/PR-/Her2-

Metastasis
- **Left Pelvis (BoML)**
- **Right Tibia (BoMR)**

ER-; Mixed

Adjuvant letrozole

Organoid development workflow

**ILC bone metastasis**

Organoid culture

Feeding Medium

Hydrogel Dome

Individual Organoids

Organoid culture

ILC bone metastasis

Organoid development workflow

**scRNAseq:** Bone metastasis (BoM) and associated PDOs
LIO Organoids: A promising model for ILC research

- LIO organoids maintain their stability over multiple passages, ensuring consistent research results.
- Single-cell RNA sequencing (scRNAseq) data confirms their genetic stability across various passages.
One Year of Progress

21 PDO attempted
Development from 21 patient tissue samples attempted

8 PDOs established
Rest are under development
Some unsuccessful

16 IF: E-Cadh, p120
2 rounds of IF on 8 and 3 rounds IF on 2 PDOs

3 LIOs WES and RNAseq.
2 undergoing scRNAseq, scATACseq and WGS
2 PDOs: long term passage scRNAseq

2 Digital pathology
Remaining organoid blocks under preparation for digital pathology
Final Thoughts

**Organoids:** Powerful models unlocking ILC's secrets

**Leigh Pate's donation:** Paving the way for a living biorepository

**Committed to Leigh's legacy:** Progressing ILC research together

Leigh Pate's Legacy: Advancing ILC Research with Organoids
Thank you