



Exploring a Mesh-Cancer Link: Establishing the ACHQC Biorepository

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Disclosures

- Abdominal Core Health Quality Collaborative – salary support
- Bard-Davol, Advanced Medical Solutions – research support
- Abbvie-Allergan – consulting
- EndoEvolve – equity

Does Mesh Cause Cancer?



Yes



Possibly



No

We've All Seen This At Some Point...

-
- 74m with symptomatic bilateral inguinal hernias
History of melanoma resection
 - Underwent uneventful laparoscopic bilateral inguinal hernia repair in 2021 with polypropylene mesh

One Year Later...



Plausible Mechanism

Mesh



Chronic Inflammation
Neovascularity

Cancer



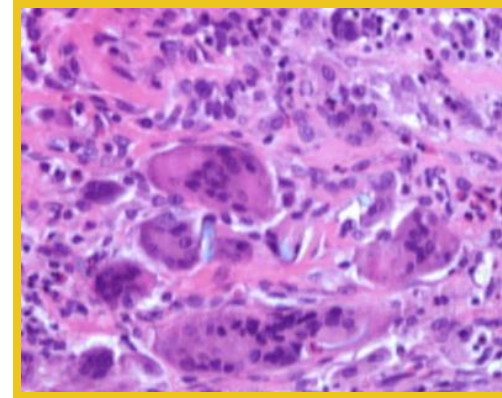
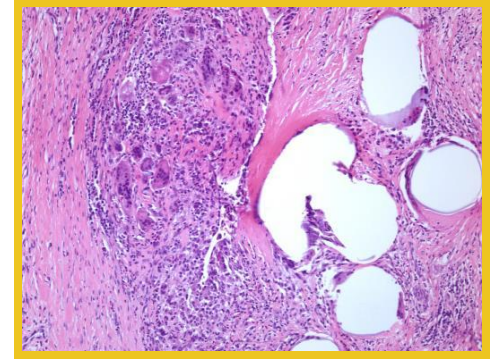
Chronic Inflammation
Neovascularity

Mesh

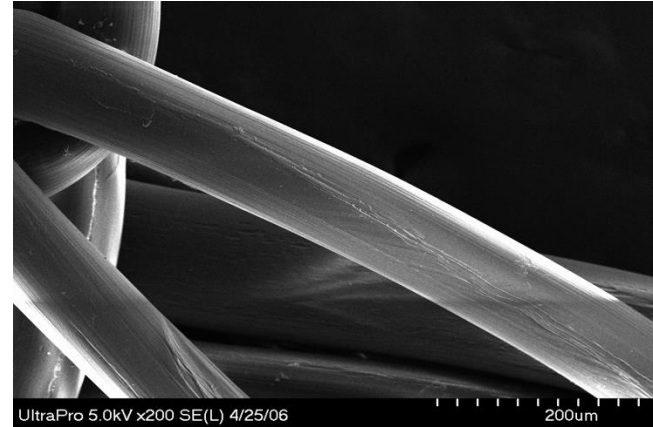
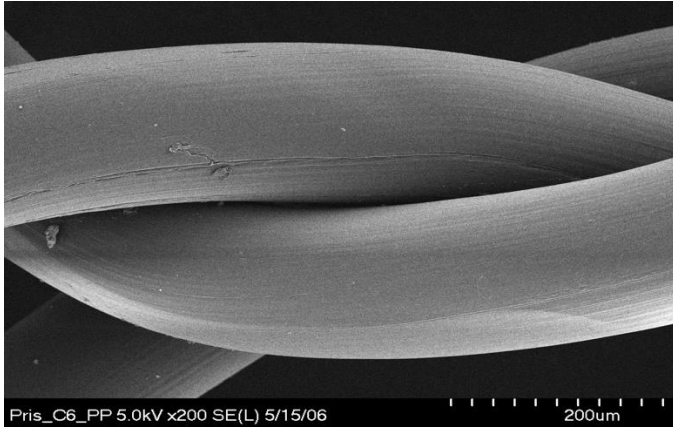
Chronic Inflammation

Neovascularity

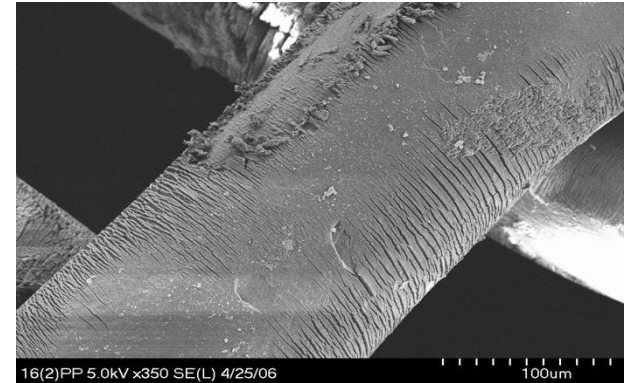
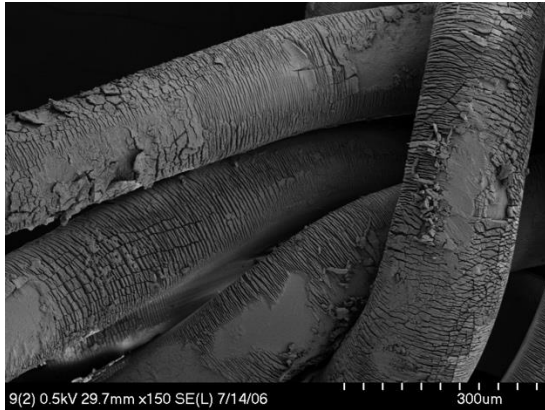
- Not inert
- Foreign body reaction: constant exposure to oxidants from phagocytic cells
- Bioresorbable?



Polypropylene – At Implantation

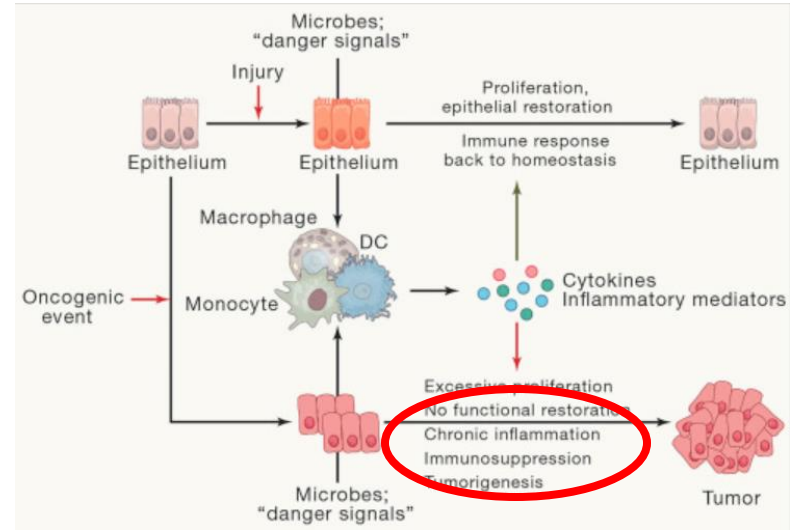


Polypropylene – Long Term



Cancer

Chronic Inflammation
Neovascularity



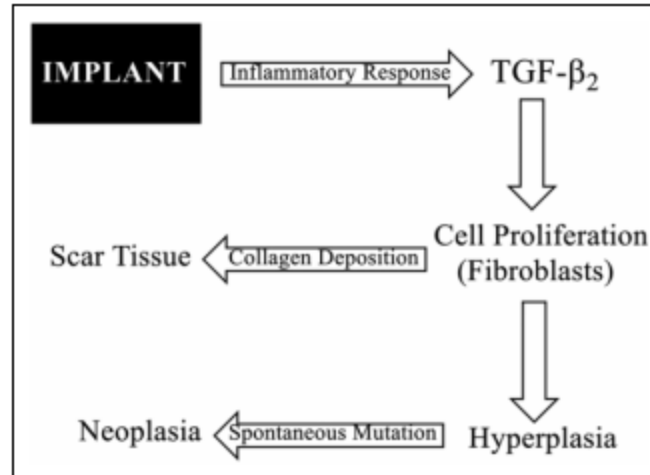
Greten et al, *Immunity* 2015

Evidence?

-
- Kulacoglu and Kockerling (*Front Surg*, 2019)
 - Systematic review ‘hernia and cancer’
 - Two articles
 - ‘No direct causal relationship’
 - Common biomarkers
 - Needs further investigation

Evidence?

- Shaw (*Human and Exp Toxicology*, 2021)
- Evaluation of gynecologic meshes, plausible mechanism



Evidence?

800.223.2273

100 Years of Cleveland Clinic MyChart



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BREAST IMPLANT-ASSOCIATED ANAPLASTIC LARGE CELL LYMPHOMA (BIA-ALCL)

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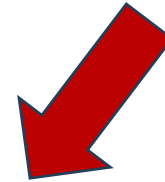
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Breast Implant-Associated Anaplastic Large Cell Lymphoma (BIA-ALCL)

There is enough out there
that this needs more attention
(esp with more long-term
bioresorbable meshes being used)

Clinical Information

Tissue Information



**Linked
Biorepository**

We Had Lots of Help!





Tatiana Cuellar-Gaviria, PhD



Kristin Stanford, PhD



Savannah Renshaw,
MPH, MPA



Ben Poulouse,
MD, MPH



Daniel Gallego-
Perez, PhD

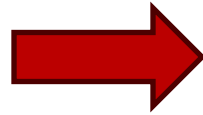


Rolf Halden,
PhD



- Central hypothesis: Implantation and degradation of mesh leads to detrimental inflammatory responses, a known precursor for cancer.
- SA1: Obtain samples of human tissue having been in contact with surgical mesh for a known period of time and control tissue obtained from the same patient.
- SA2: Compare the cellular health of mesh-exposed and control tissue to identify biomarkers informative of adverse cellular impacts from exposure.

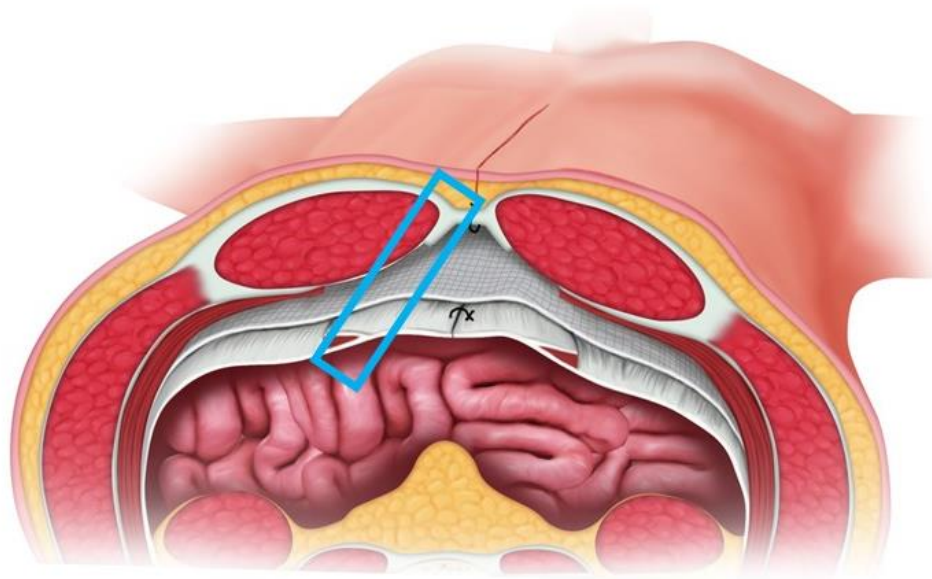
We Obtained Seed Funding!



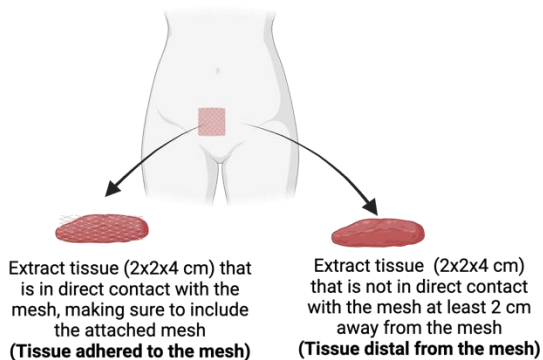
\$150,000/yr
Renewable x 5 years

20 samples

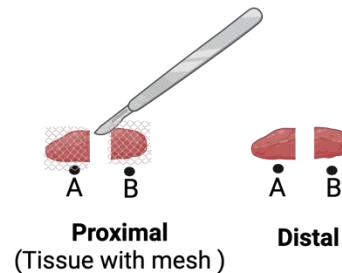




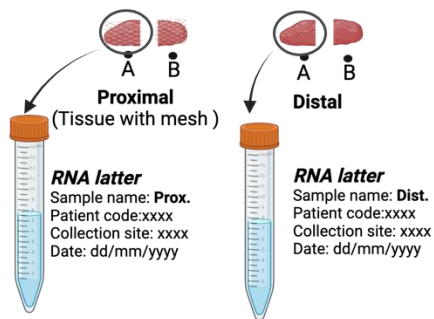
1. Sample collection



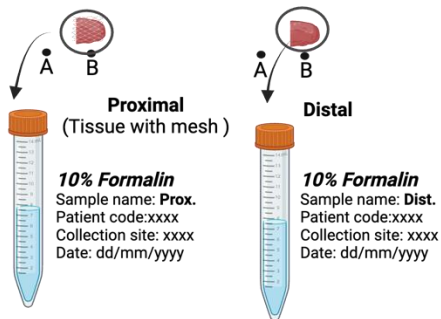
2. Using a scalpel, cut each tissue sample in half (A and B)



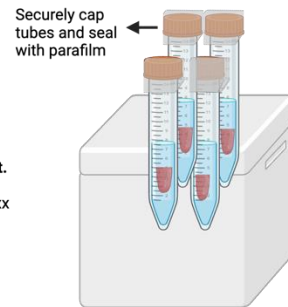
3. Transfer parts "A" to a pre-labeled 15 mL tube containing 10 mL of RNA lysis reagent (provided)



4. Transfer parts "B" to a pre-labeled 15 mL tube containing 10 mL of 10% Formalin (provided)



5. Seal tubes cap with parafilm (provided) and ship overnight in styrofoam box at room temperature



- Expected outcomes

- Identify patterns of gene expression for tissue samples in contact with mesh, comparing them to control tissue samples
- Evaluate differentially expressed genes based on RNA analysis
- Store samples for future investigation

The Exact Patient Who Would Benefit

-
- 54f with known neuroendocrine tumor requiring hepatic resection and left adnexal mass resection. The patient had a symptomatic recurrent incisional hernia and request had been made for AWR at the time of her Oncologic resection
 - Healthy woman, exercises, 4-5 times per week, BMI 30
 - Read about meshes, did not want permanent synthetic mesh

The Exact Patient Who Would Benefit



The Exact Patient Who Would Benefit

-
- Underwent left hepatectomy, left ovarian cystectomy
 - Hernia repair
 - Barbed suture for fascial closure (resorbable)
 - Moderate subcutaneous flaps raised
 - Onlay mesh using P4HB
 - Discharged POD#3
 - Seen at 1 year follow up with surveillance CT

The Exact Patient Who Would Benefit



The Exact Patient Who Would Benefit

-
- What's the right type of mesh to use for this cancer patient?
 - What space should the mesh be placed?

Does Mesh Cause Cancer?



Yes



Possibly



No

We owe it to our patients to find out!



THE OHIO STATE UNIVERSITY

WEXNER MEDICAL CENTER

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Center for Abdominal Core Health