Evaluating Abdominal Wall Health at the Mesh-Tissue Interface in Ventral Hernia Repair

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Disclosures

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- Bard-Davol, Advanced Medical Solutions – research support

You Would Think…

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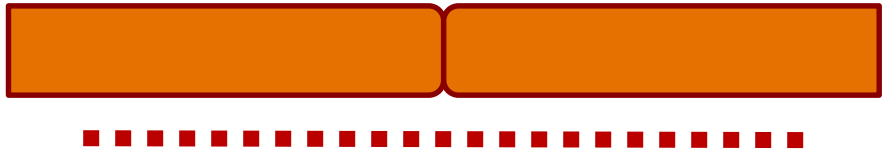
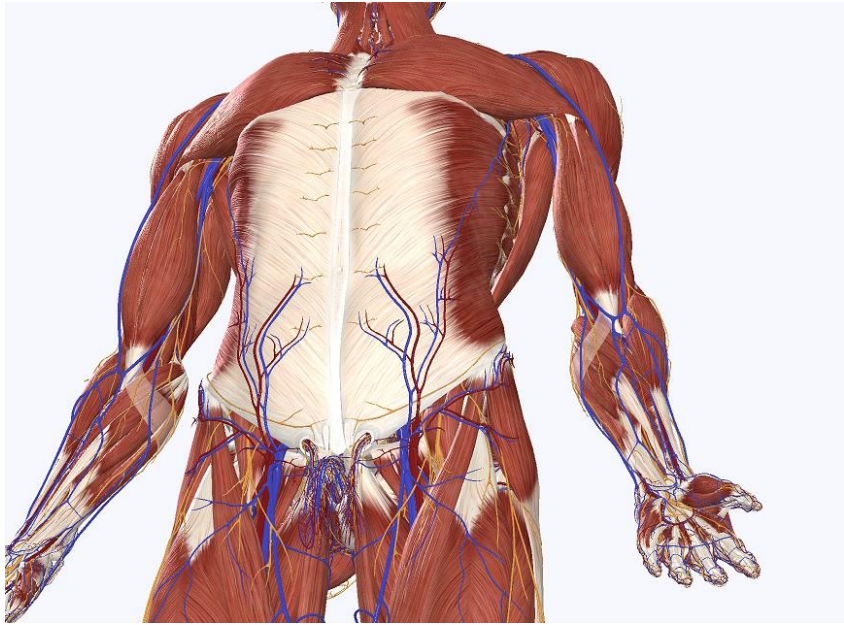


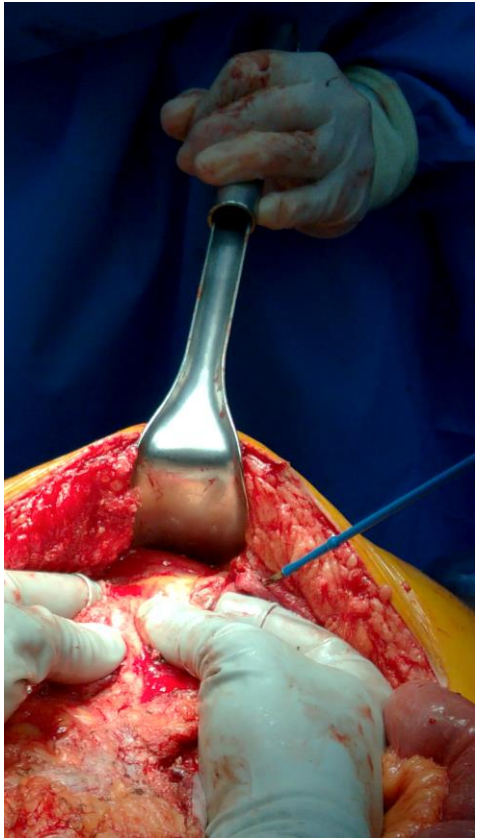
It Get’s Complicated




$2 billion industry

Ventral Hernia Repair – Unintended Consequences

- The vast majority of patients do well
- Some do not –why?



How Often Does This Happen?

- 611,000 ventral hernia repairs done per year in U.S. (Schlosser et al, *Hernia* 2022)
- 5.6% mesh related complications **requiring excision** at 5 years in healthy Danish people (Kokotovic et al, *JAMA* 2017)
- Over 20 years (assume we are like healthy Danes, and 80% repairs use mesh):

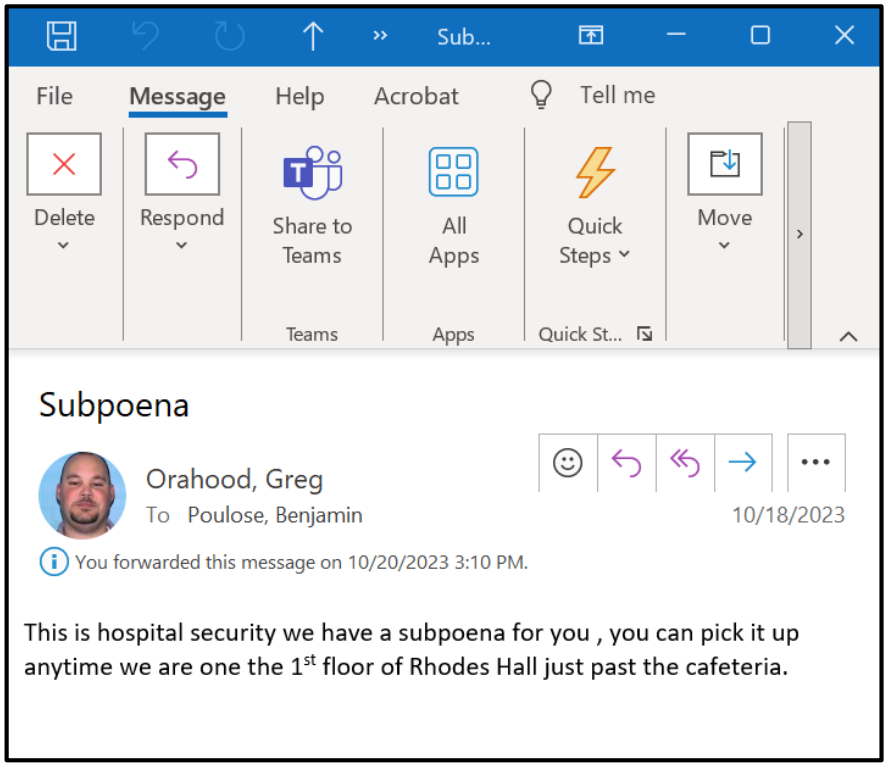
  -At least **550,000** people with mesh related complications needing surgical intervention


ALEXANDRA

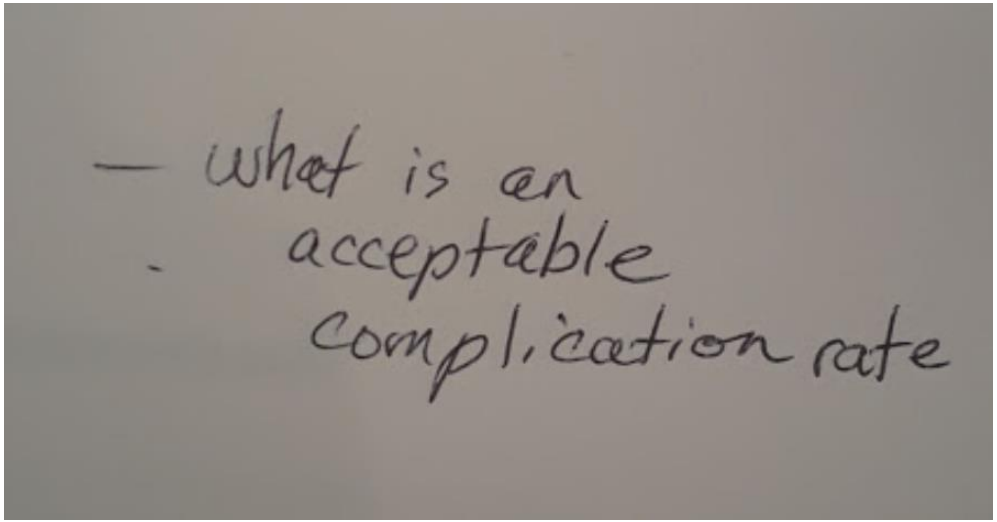
The Mess about Mesh

- Thousands of individual lawsuits across the country
- Multiple MDLs (Multi-District Litigation) actions

Take your PPIs!!



The Real Problem



…This is a basic science problem

Overall Question

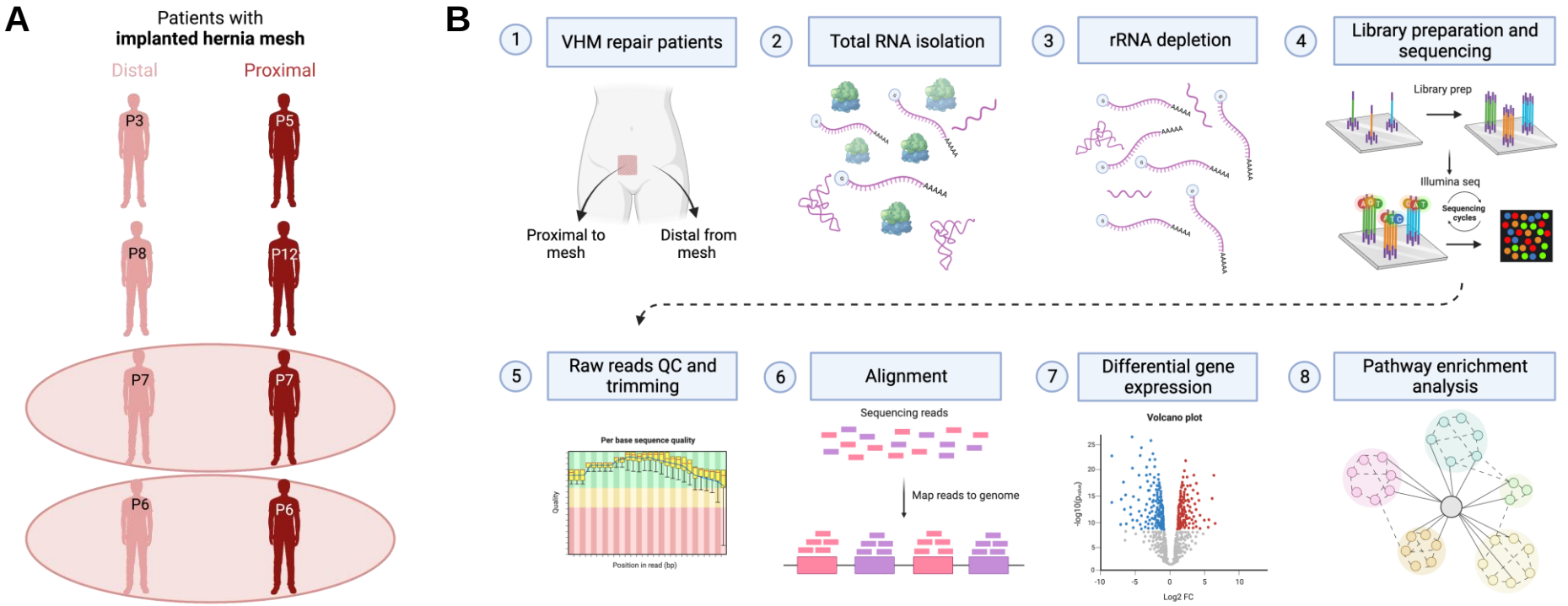
What Happens Right Here Over Time?

Study aim: Evaluate the changes in gene expression of tissue samples proximal or distal from the mesh/tissue interface of patients undergoing recurrent **Ventral Hernia Repair** (VHR)

Experimental design

- **Samples of 1.0 cm^2 from the abdominal wall at the mesh/tissue interface of the previous repair site**:
  - 4 tissue samples at mesh-tissue interface (Proximal)
  - 4 tissue samples distal to the mesh (Distal)

Methodology – Changes at the whole transcriptome level (RNA-seq)

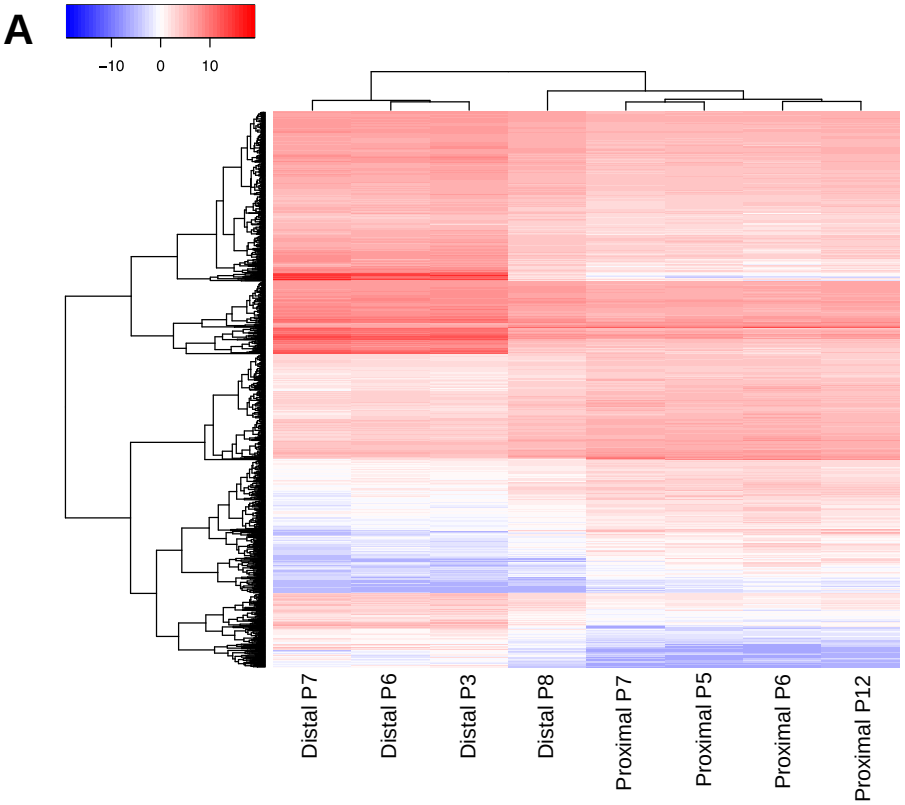


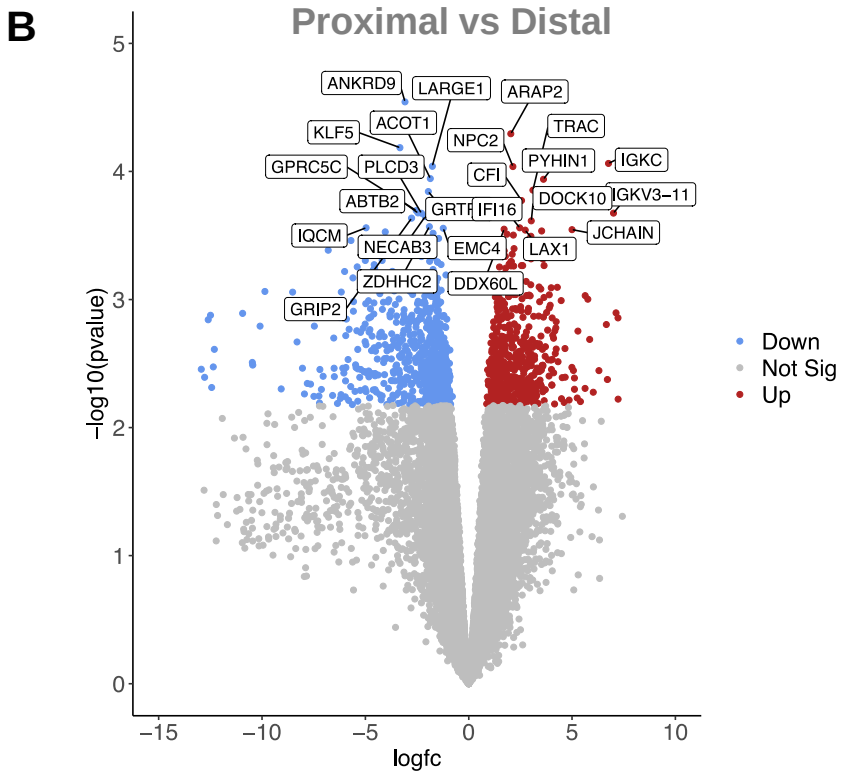
Results

- Samples collected prospectively from 8 patients undergoing recurrent VHR
- Average age 63 years old
- Average time from previous repair 10 years
- All intraperitoneal mesh placement (polyester, polypropylene)

Results

Differential Gene Expression (DGE)

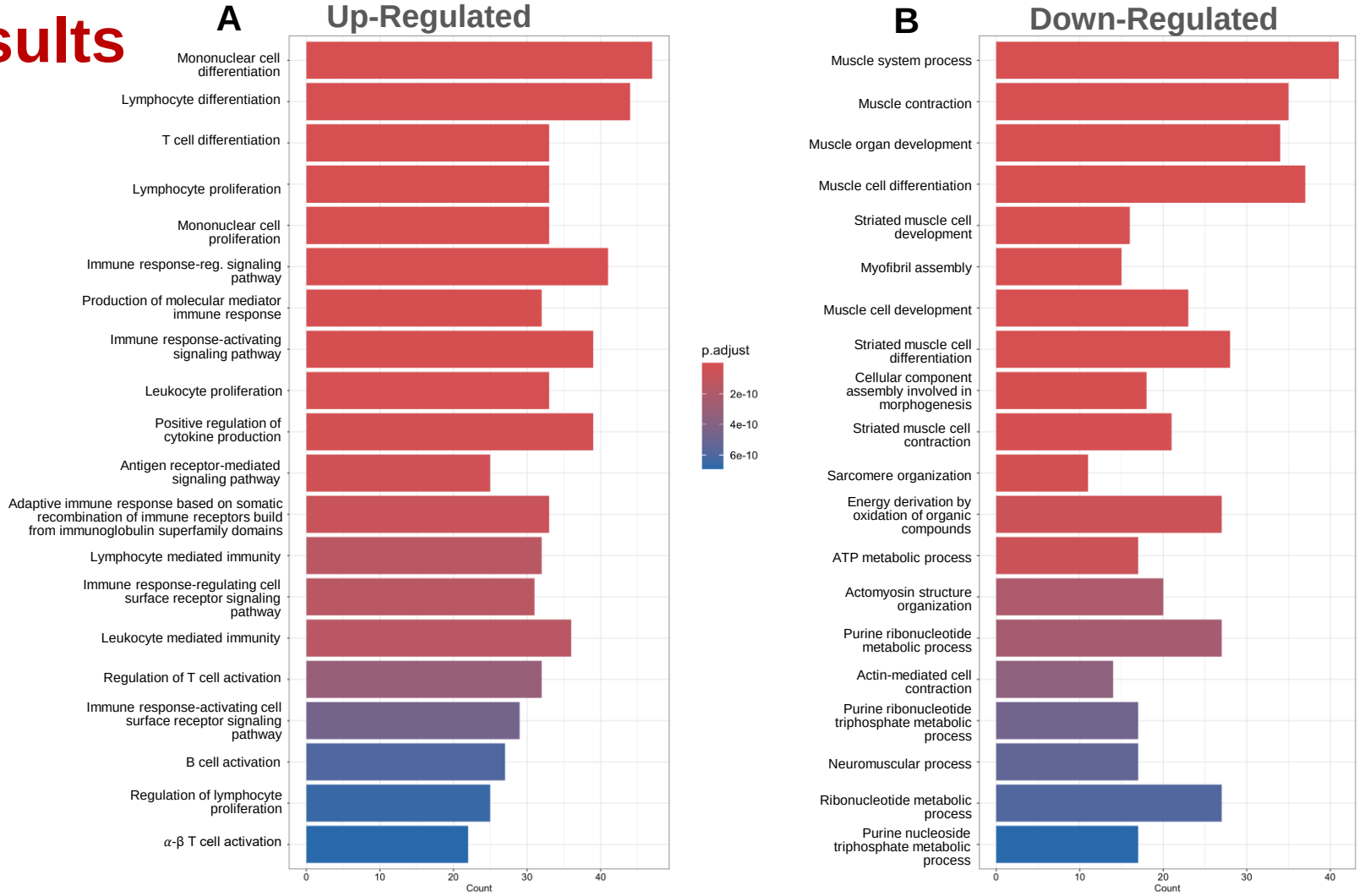




Fold-change > 2 and FDR < 0.1

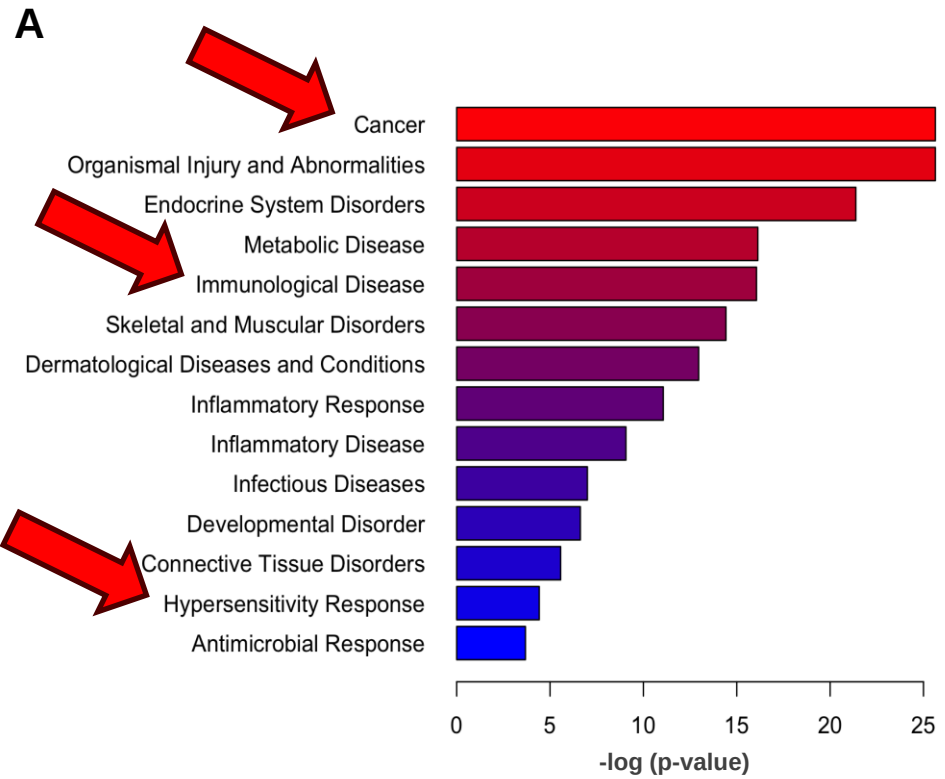
Results

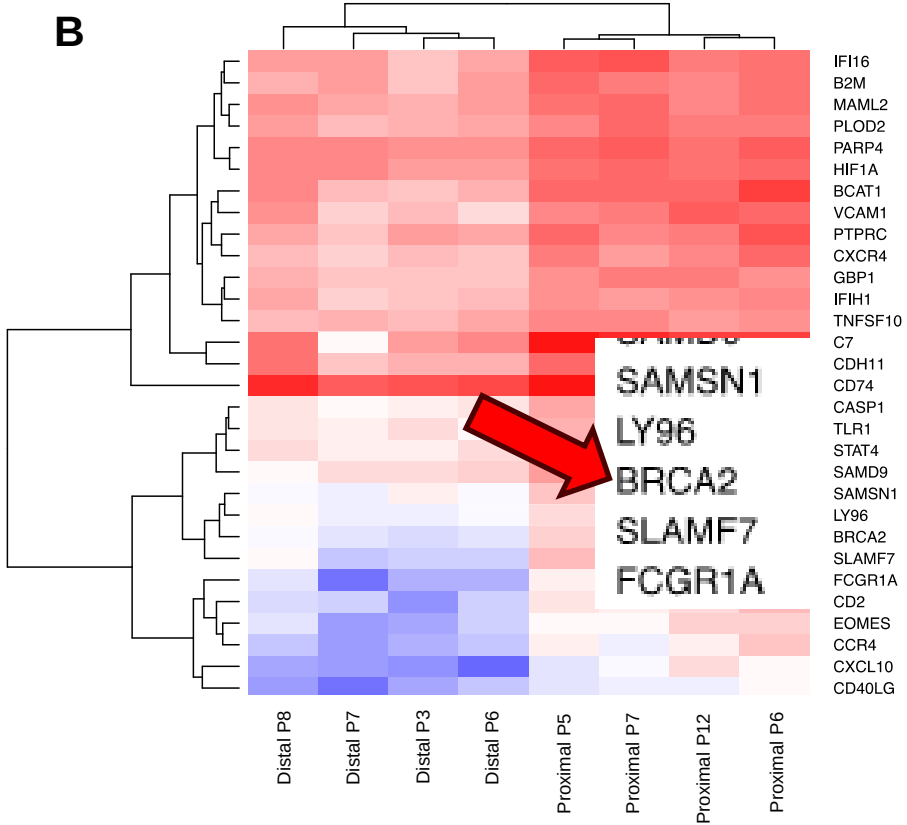
GO Enrichment: Proximal vs Distal



Results

Main Pathological Pathways Affected by Mesh





Summary

- Marked and chronic **difference in gene expression** at the mesh/tissue interface
- Increased translation of genes related **cell proliferation** and **immune reaction** associated with **inflammation**
- **Oncogenes** upregulated

Does this Happen?

Does this Happen?

Conclusion

- Preliminary data indicate that permanent prosthetic meshes create local changes in gene expression that can affect multiple regulatory pathways potentially impacting **cancer** and **immune regulation**, among other systems

Acknowledgements

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Nanomedicine Lab

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