**MOTIVATION**

Polymers are used in many biomedical devices and fail in many ways, but we found that historically material choice was not focused on, instead polymers were chosen because of previous use.

**GOAL**

Examine material choice in devices by evaluating novel polymers in the context of specific applications.

**OUR PROJECT**

We completed six tests on Novel Polymer A and Novel Polymer B to assess their applicability in biomedical devices for pelvic floor repair and other applications.

**PROCESS**

1. Identify therapeutic areas
2. Research failure modes for each area
3. Determine material requirements
4. Test polymer properties to assess material requirements

- Heart Valve Repair
- Hernia Repair
- Pelvic Floor Repair
- Ventricular Septal Defects
- Sleep Apnea
- Hydrocephalus And Shunts
- Drug-incorporating Sutures

**TESTS**

**Baseline Characterization**
Assess basic mechanical, thermal and chemical properties before other tests are carried out.

**Cytotoxicity**
Assess whether there is a toxic affect of the polymers on cells by growing cells in direct contact with or below agar and the polymer.

**Fatigue**
Determine cycles to breakage to gain insight into long-term durability of the material.

**Cell Adhesion**
Address how cells adhere to polymers by growing cells on polymers and counting adhered cells to gain insight into tissue ingrowth.

**Acid Degradation**
Assess material degradation in an acid environment, especially important for application in the stomach.

**Microbial Behavior**
Assess bacterial adherence by culturing polymers with bacteria and counting adhered bacteria to better understand the likelihood of infection.

**Relevant tests, tests carried out are bold.**