**INTRODUCTION**

**Tissue Engineering**
- Need materials that are biocompatible and can integrate with native tissues

**Structure-Function Relationships**
- Native and regenerated tissue must have similar mechanical properties
- Adjusting the mechanical properties of a scaffold is a crucial aspect of tissue engineering and regeneration

**Hydrogels**
- Hydrogel scaffolds are used in cartilage tissue engineering
  - Significant water content mimics native tissue properties

**Photolithography**
- Proteins and cells can be patterned using soft lithography
- Important for:
  - Fundamental cell biology
  - Biosensors
  - Tissue engineering

**Jell-O: Gelatin**
- **Collagen** is produced by hydrolysis of collagen
  - **Collagen**: Water-insoluble protein found in bone, connective tissues, and skin
  - **Gelatin**: Water-soluble protein

**Materials**
- Jell-O mix
- Ice
- Aluminum foil
- Water
- Petri dish
- Plastic cups
- Seeds
- Stirring rod
- Graduated cylinder

**METHODS**

1. **Structure-function relationships**:
   - Make Jell-O at three concentrations: 4x, 2x, and 1x
   - Observe differences in mechanical stiffness among gels

2. **Cell-seeded scaffolds**:
   - Insert seeds or beans into gels from Step 1

3. **Defect repair**:
   - Using aluminum foil, make a model bone with a defect
   - Pour Jell-O mixture into defect and allow gel to set
   - Observe integration of gel with model defect

4. **Patterning**:
   - Using aluminum foil, make a stamp
   - Pour Jell-O mixture into petri dish, place stamp on Jell-O, and allow gel to set before removing stamp

**STUDENT ASSESSMENT**

- Students were tested on biomaterials properties and tissue engineering concepts before and after participating in education module
- Significant improvement in assessment scores after participation

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