

# Improved Design for Fine-Needle Aspiration (FNA) of Breast Cancer Lesions

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Midsemester Presentation

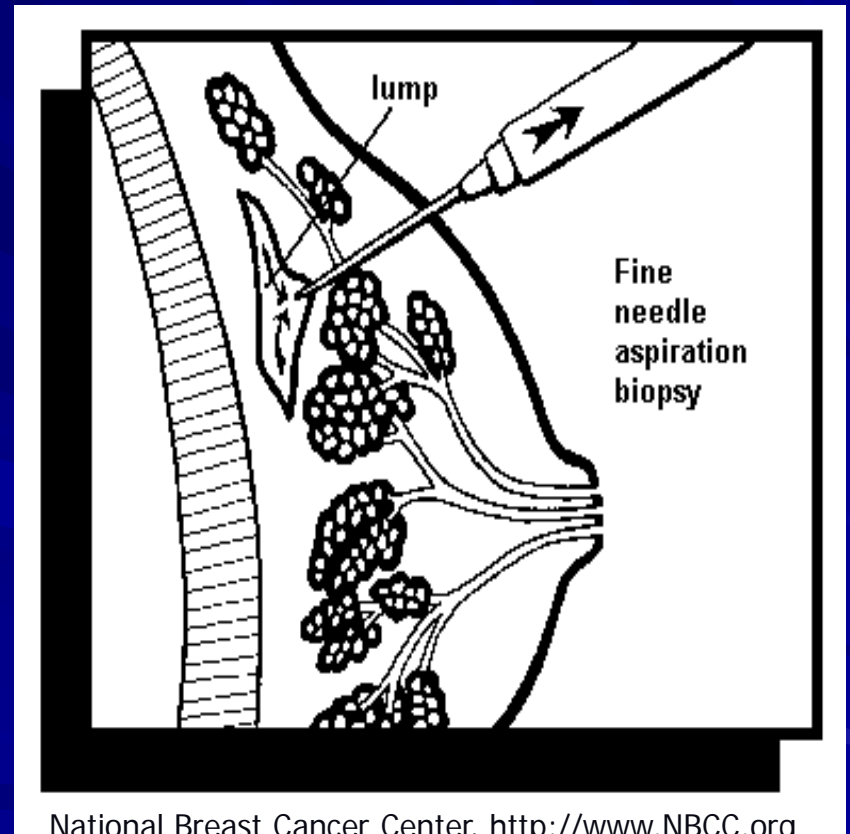
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# Problem Statement

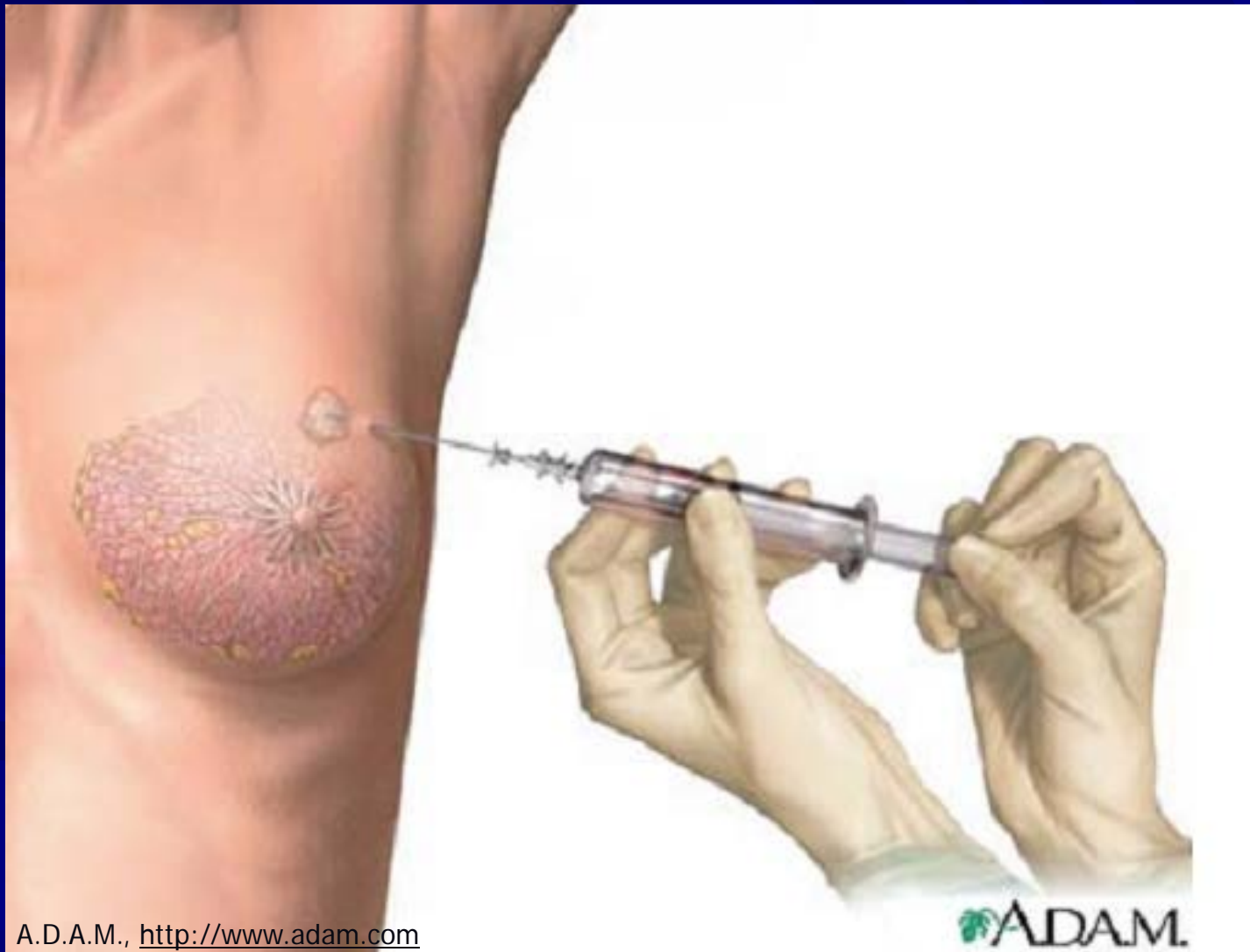
**GOAL:** To modify the needle used during a Fine Needle Aspiration (FNA) procedure. The modification should not drastically change the FNA procedure and still increase the amount of tissue removed for cytological testing. It should also minimize the time (by collecting an adequate sample size on the first attempt) and discomfort caused to the patient during the procedure.

# What is FNA?

- Technique used to extract cells; no incision needed
- Several insertions are usually required to ensure an adequate sample size
- Samples are sent to pathologist to be analyzed



# Fine Needle Aspiration (FNA)



# Product Design Specifications

- Removes adequate number of cells for diagnosis.
- Should not cause more discomfort than current FNA procedure.
- Constrained to standard 20-25-gauge needle, client prefers 23-gauge.

# Current Prototype

- Pre-manufactured drill bit
- 6" length
- Fits in 23 gauge needle
- Bead on shaft of drill bit to allow for ease of turning during cell collection



# Tissues Tested

- Fixed cat tissues (Last semester)
  - Mammary
  - Lymph
  - Fat
- Fresh tissue
  - Mouse mammary tumor (cystic)



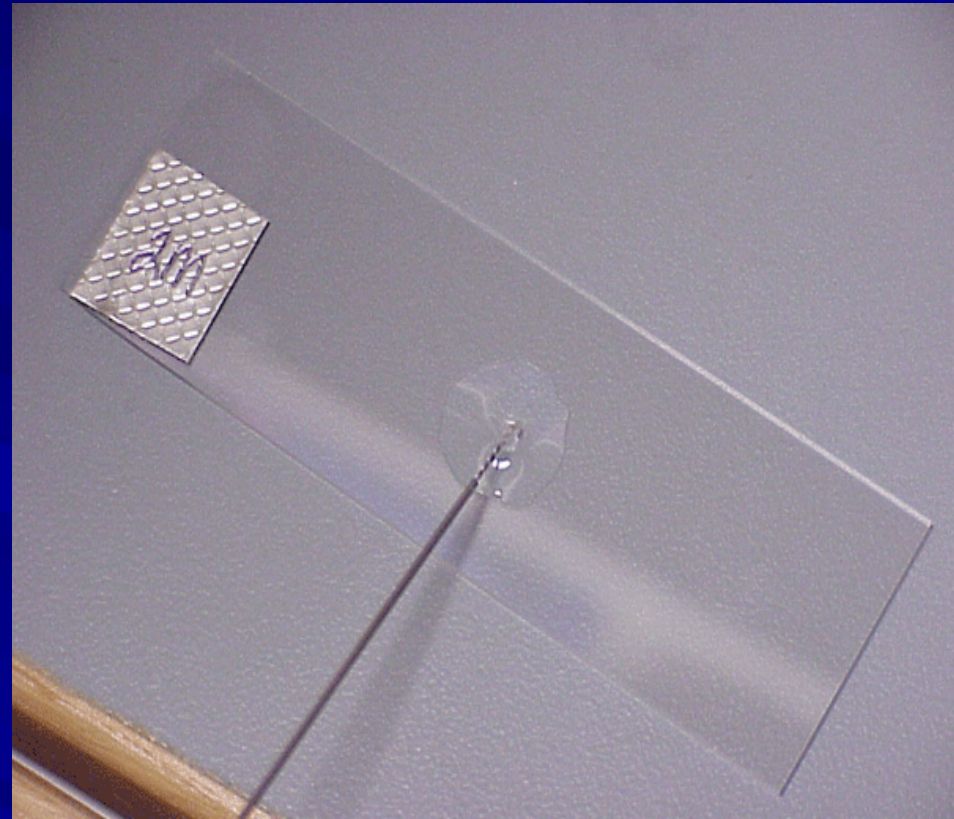
# Testing Procedures (Fresh Tissue)

- Old technique
  - No insert used
  - Performed one trial on the mouse tumor
- New technique
  - Drill bit insert used
  - Performed one trial on the mouse tumor
- Observed in saline bath under microscope
- Prepared slides and sent to lab for evaluation



# Sample Quantification

- Old technique
  - Resulted in a small amount of tissue
- New technique
  - Roughly five times as much tissue collected using drill bit



# Slide Preparation

## ■ Two methods

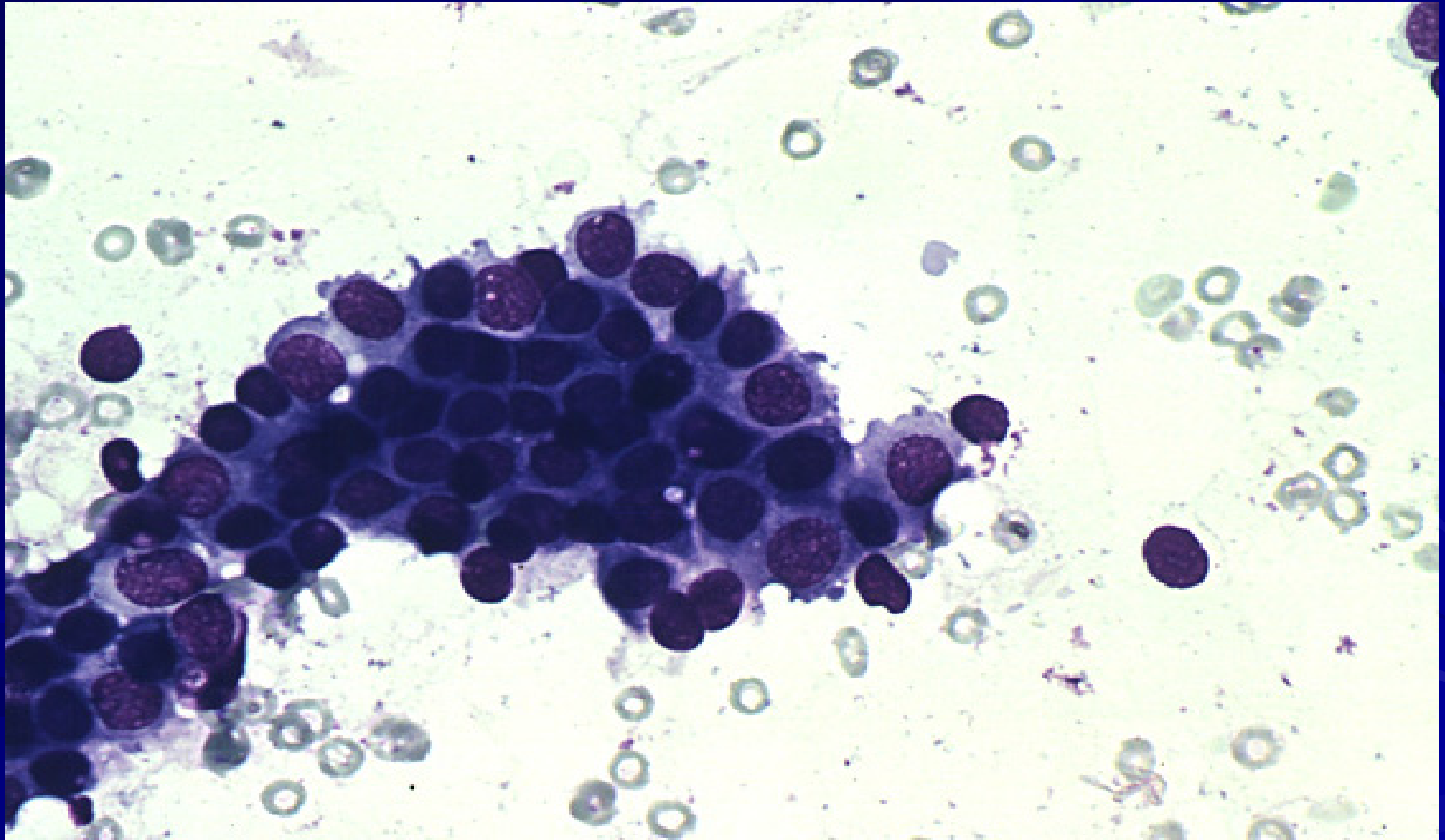
### 1. Air-dry method

- Place sample on slide and smear using a second slide
- Results in two identical slides
- Stain with Methanol Blue type stain

### 2. ThinPrep method

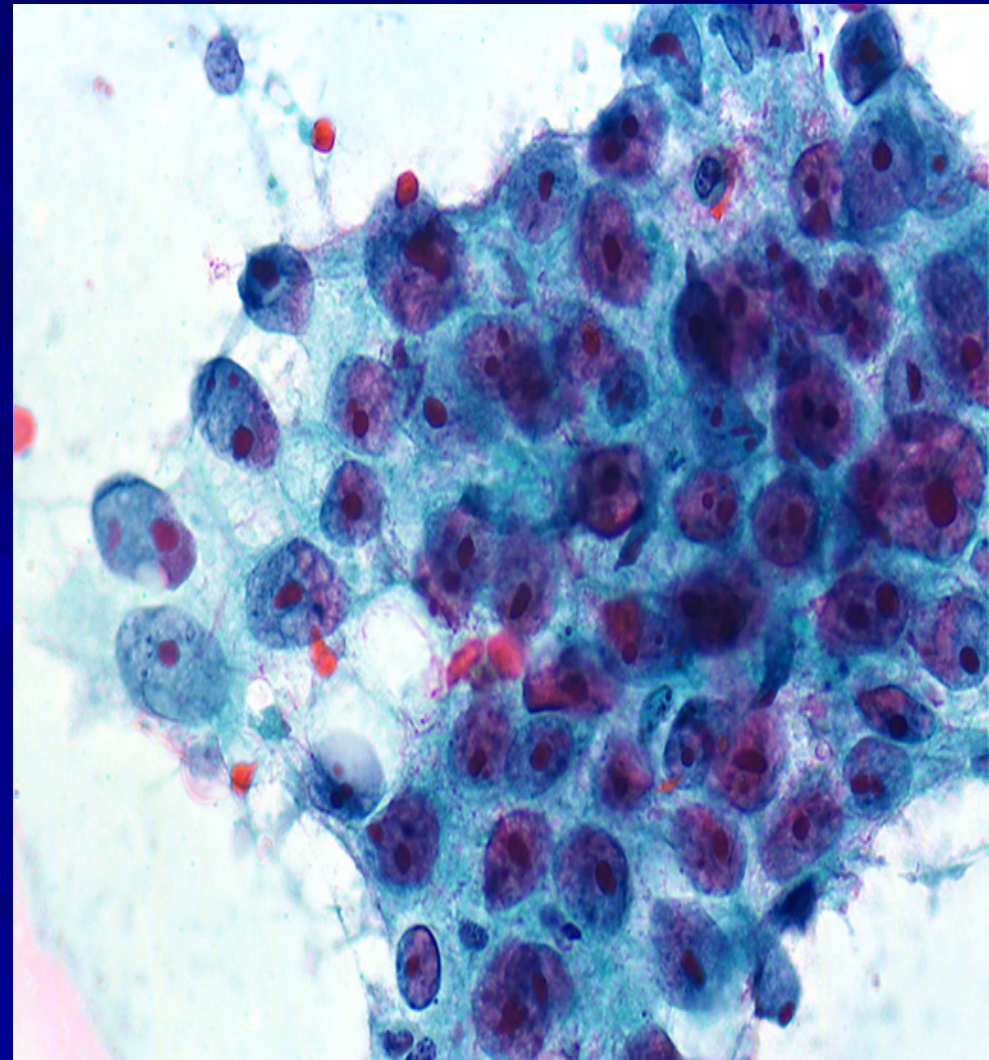
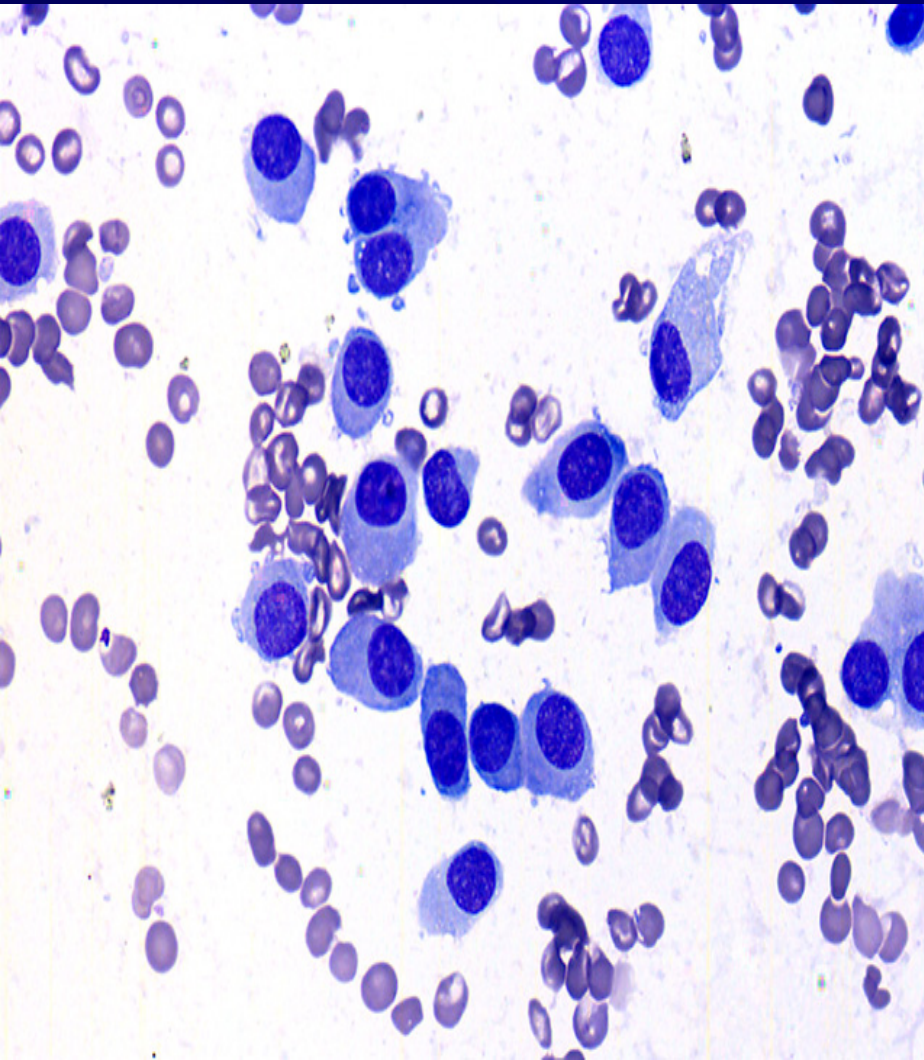
- Place sample in vile of ThinPrep solution
- Slide prepared using ThinPrep machine in lab
- \$8.00/vile

# Sample Slides



Benign FNA Cell Sample

# Sample Slides



Malignant FNA Cell Samples

# Future Work

- Test on more freshly sacrificed mouse tumors
- Have slides evaluated by pathologist
- *In vivo* testing of mouse tumors- *will require protocol amendment*
- Further prototype development
- Develop protocol for quantifying testing
- Continued research on independent cytopathological evaluation