INTRODUCTION

Beatrice Knudsen, MD., PhD.
Fred Hutchinson Cancer Research Center
Seattle, WA
Objectives of the Breakout Session

Examine problems with collected and banked tissues and how to overcome them

- How preanalysis conditions affect tissue quality
- Efforts towards understanding, recording and standardizing conditions that affect measurements in tissues
- Discussion of the most important improvements that are needed for the collection and banking of high-quality tissues
Lifecycle of a Biospecimen
Sources of Variability

Pre-acquisition
- Patient
- Medical/Surgical Procedures
- Acquisition

Uncontrollable variables

Post-acquisition
- Handling/Processing
- Sample preparation
- Analysis
- Reporting of results

Controllable variables

Consistent Reporting

Adapted from Dr. Moore
Post-surgical Causes of Variability

- Acquisition
- Handling/Processing
- Storage
- Distribution
- Analysis

Degradation of Bioanalytes

Transit time
- Fixative
- Fixation time
- Processing

- Temperature
- Humidity
- Atmosphere

- Handling
- Sample preparation

Inter-SPORE Biomarker Project
- IPBS Study
- ENDPOINT MEASURE:
  IMMUNOHISTOCHEMISTRY
  FOR PROTEIN DETECTION
IPBS Study: Variability in Tissue Processing

Data from 7 academic centers on tissue processing time (from ethanol into paraffin blocks)

Range: 40 to 310 minutes
What is the effect on immunoreactivity?

Data assembled by A De Marzo, G Netto, L True
IPBS Study: Variability in Immunohistochemistry

Significant difference in mean staining intensity between sites: MDA=2.7, UMICH=2.8, UCSF=4.0, p=0.0002
(mean=3.3, median=3.0)

% of Tumors with AMACR Staining 3-4
IPBS Study Conclusions

- Significant variability in processing schedules
- Good correlation among sites for some markers of normal prostate glands (e.g. p27)
- Significant variation for tumor markers (AMACR and Ki-67)
  - Due to tumor heterogeneity?
- Interaction between processing and biomarker measurements?
Tissue Analysis for Personalized Medicine

• The measurements encompass multiple endpoints to identify the best treatment and predict responses to treatment. Measures include assays using DNA, RNA, Protein, Lipid, Carbohydrates….

• The bioanalytes differ in stability during tissue collection, processing and analysis
Goals of Discussion

• Where is the biggest need for critical data that will improve the quality of banked tissues?

• What are the obstacles to generate and implement protocols of high quality tissue collection?