BANKING HUMAN BIOMATERIALS FOR RESEARCH

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Observations on research tissue banking today…

• Specimen acquisition has moved from large tissue blocks to small, specially processed, well-characterized specimens

• Preservation of gross anatomy has been replaced by preservation of cellular structures and processes

• Associated clinical information has as much value as the specimen itself
What need will the bank fill?

• **Mission-oriented**
  - Local demand for research tissue
  - Adjunct to other clinical services or specialty designation
  - Disease-specific
  - Share with other like programs

• **Revenue generating service-line**
  - Full-service
  - Contracts for drug development
Tissue sourcing can be simple or complex – but will always be driven by the end-user.
Research tissue banking - surgical

- Acquisition for use someday
- Limited or broad disease states – specific vs. all tumors
- One-size fits all processing and storage – standing order for samples from a want-list
- Surgical discards collected and frozen after grossing
- Embellishments
  - longitudinal specimen collection following therapy
  - patient information
  - patient and family serum
Research tissue banking - advantages

• Cases easily identified
• Minimal disruption to Pathology
• Standard protocol for processing
• Uniform storage requirements
• Existing networks for tissue sharing, i.e. simplified distribution
• Associated clinical information readily available
• Lowest acquisition cost
Research tissue banking - limitations

- Guess at most likely future use
- Future use dictates recovery and preservation
- Focus on volume
- Researchers take it or leave it
- Missed opportunities for tissue recovery
- Limited quantity of tissue available
Research tissue banking - reality

- May not meet the needs of most of your researchers
  - Wrong disease
  - Wrong tissue
  - Wrong amount
  - Wrong preservation

Who is your customer?
If your researchers are local…

What is your commitment to serving them?

Try to reserve some capacity for your other internal customers

- **Surgical path** tissue won’t stress the system – it requires a mechanism for surveillance
  - Fold into larger biorepository function
  - Keep preservation to standard techniques – fixed/frozen
Perioperative tissue recovery is potentially much more complicated

- Specimen dissection
- Immediate preservation - RNA preservation, snap freezing
- Surg Path needs to allow collection of diseased tissue
- Research coordinators may need to be available for secondary processing
- Expensive
• **Post-mortem** tissue recovery
  
  • Value of tissue driven by protocol – 12, 18, 24 hrs post- OK?
  
  • Preservation generally limited to standard fixation
  
  • Advantage in tissue recovery and preparation
    - Specific structures can be isolated/dissected
    - Greater variety of tissue sites can be accessed
    - Normal tissue can be recovered
  
  • Low tissue acquisition cost
A word about protocols...

Nature of the protocol dictates potential sources

- **Known diseased tissue** - targeted sourcing requires surveillance
  - Surgical discards
  - Autopsy
  - Archived specimens
  - Opportunities for tissue sharing
• **Opportunistic tissue recovery** - you may never see that disease and/or tissue again
  - Two or three default procurement/preservation protocols
  - Minimum tissue recovery - blood, nodes, liver, brain, etc.

• **Normal** - controls
  - Matched to demographics
  - Non-transplantable organs or tissues
  - Biomaterials recovered from organ donor cases
Nature of the protocol dictates recovery procedures

- Whole organ/tissue vs. specific structure
- Non-diseased tissue from a variety of sites
- Timing - 3 minutes, 3 hours, 12 hours
- Quantity - 1 cm³, 100 gm, as much as possible
- Preparation - diced, sectioned

More is not always better
Nature of the protocol dictates preservation

- Fresh
- Frozen - flash LN$_2$, dry ice, ULT
- Refrigerate
- Fix - formalin or other preservative
- RNA preservation media
- On-site processing
Expanded opportunities for tissue acquisition and distribution

• Networking for surgical tissues
• Custom sourcing
  - Proactive - linkage with other repositories
  - Patient advocacy groups
  - Specialized processing
• Rare/orphan diseases - meaningful contribution
• New products - micro-arrays
  - Same disease/site, many patients
  - Same patient, various sites
Finally, a word about “9 to 5” tissue acquisition

- Tissue recovery must occur when both the donor and site are ready - not on demand
- Tissue recovery is a hassle; your source doesn’t need the aggravation - you don’t pay enough
- Researchers who only accept material from Mon - Thurs, 9 - 3 (when their tech is available) deserve to go hungry
- Do you really expect your recovery site to do it for free? Pharma’s willing to pay - can you compete?
Consistency in tissue recovery, processing, storage and retrieval are hallmarks of a successful biomaterials bank.

But, the best data repository wins!