The Biospecimen Research Network: Program Update and Symposium Overview

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2009 BRN Symposium
March 16, 2009
Translational Research Promises to Advance Molecular Medicine for Cancer Patients

PERSONALIZED CANCER CARE

Biospecimen Distribution

Biospecimen Collection

Biospecimen Processing and Banking

Molecular Data

Diagnosis / Therapy
On the Road to Molecular Medicine...

...there are some significant obstacles to progress

- Lack of standardization of biospecimen collection, processing and storage
  - Needed in order to provide robust testing of patient samples
  - Important to Clinical Work and R&D

- Lack of knowledge about how different methods of biospecimen collection, processing and storage alter the biological picture presented by the specimen
  - A significant confounding factor in research
  - Why we’re here today!
What do we know about the biology of the Biospecimen?

Cancer Patient → Mini-Me Biospecimen → Disease Biology → Real Biospecimen → Unique Biology!

Biological Stress!

Translational Research

Personalized Medicine

Researcher → M.D. → Cured Patient

Object of Investigation
Multiple pre-analytical variables can affect the molecular integrity of the biospecimen

Variables (examples):
- Antibiotics
- Other drugs
- Type of anesthesia
- Duration of anesthesia
- Arterial clamp time

Variables (examples):
- Time at room temperature
- Temperature of room
- Type of fixative
- Time in fixative
- Rate of freezing
- Size of aliquots
Pre- and Post- Acquisition Variables Impact Clinical and Research Outcomes

• Effects on Clinical Outcomes
  • Potential for incorrect diagnosis
    • Morphological/immunostaining artifact
    • Skewed clinical chemistry results
  • Potential for incorrect treatment
    • Therapy linked to a diagnostic test on a biospecimen (e.g., HER2 in breast cancer)

• Effects on Research Outcomes
  • Irreproducible results
    • Variations in gene expression data
    • Variations in post-translational modification data
  • Misinterpretation of artifacts as biomarkers
Lack of Standardization

Human biospecimens are collected, processed and stored:

- In many different institutions
- With many different SOPs guiding the biospecimen workflow
- Sometimes without detailed SOPs that are strictly adhered to

This can result in significant biological variation in biospecimens - that has nothing to do with disease!
Developing and implementing state-of-the-science processes that ensure the molecular integrity and clinical relevance of human biospecimens used in cancer research and clinical medicine.
OBBR’s Systematic, Comprehensive Approach to Improving Biospecimen Quality

- Help the US move toward standardized procedures for biospecimen collection, processing and storage: *The NCI Best Practices for Biospecimen Resources*
  - Appropriate patient informed consent
  - Encouraging the use of appropriate, standardized protocols and QA/QC procedures
  - Biospecimen data – patient clinical data, diagnostic data, biospecimen handling data (*maybe half the value of the specimen*)

- For more see: [http://biospecimens.cancer.gov](http://biospecimens.cancer.gov)
OBBR’s Systematic, Comprehensive Approach to Improving Biospecimen Quality

• Work with NCI, NIH, other national and international groups on targeted programs in biobanking
  • The Cancer Genome Atlas
  • Clinical Proteomics Technologies Assessment for Cancer
  • National Community Cancer Centers Program
  • Interagency Oncology Task Force
  • NCI-FDA-AACR Biomarkers Collaborative
• In the planning stages – a National Cancer Biobank, the HUB.
• Sponsor, collaborate, and promote research on biospecimen science:

_The Biospecimen Research Network_
The Biospecimen Research Network: Supporting Collaborative Research

- **Provide a forum for research results on how biospecimen variables affect molecular analysis:**
  - The Biospecimen Research Database: Make existing and emerging biospecimen research data more accessible
  - Annual symposium: “Advancing Cancer Research through Biospecimen Science” *March 16-19, 2009, MD*
    [http://brnsymposium.com](http://brnsymposium.com)

- **Generate new research data:**
  - NCI Biospecimen Research Laboratory
  - New Extramural Research Programs
  - IMAT Program – “Innovative and Applied Emerging Technologies in Biospecimen Science” (RFA)

- **Collaborate with other programs, e.g.:**
  - Clinical Proteomics Technologies Assessment for Cancer (CPTAC)
  - The Cancer Genome Atlas (TCGA)
The Biospecimen Research Database
- Database held 22 papers last year, 150 today (75 journals)
- Presentation tomorrow

BRN symposium
- Now an annual event
- 350 on site plus 100 webcast registrants
- New! Workshops

NCI Biospecimen Research Laboratory
- Ischemia presentation today by Hien Dang
- New data on plasma metabolomics - Wednesday
- Other work described in poster session tonight

IMAT Program – “Innovative and Applied Emerging Technologies in Biospecimen Science” (RFA)
- Presentation today by Richard Aragon
BRN Progress Report

Experimental Design Workshop, June 2008
- Terry Speed presentation today
Extramural research program, "Biospecimen Research for Molecular Medicine"

- **Program aims:**

  1. Develop innovative approaches to the control, monitoring and assessment of biospecimen quality.

     *RFP issued 10/08, award decisions have been made – presentations Tuesday*

  2. Systematically define the impact of key pre-analytical variables in human biospecimens of specific type on downstream molecular data generated from specific molecular analysis platforms.

     *Series of RFPs in preparation*
• **NIH Challenge Grant Topics related to Biospecimens**
  • See poster outside for topics
  • Application due date April 27, 2009
Building the BRN

- Where we started – an idea

- Where we were last year – launching
Building the BRN

- Where we are now - !
Who are we?
Hello webcast viewers!

Today at Lunch: Meet the Experts!
  • Sign up – see program book – network – learn
  • Handouts at registration desk

Poster Session and Reception Tonight!
  • 45 posters

Wednesday Workshops!
  • Mark Lim

Let’s have a great meeting! Thanks for coming!
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