

OBBR

Office of Biorepositories
and Biospecimen Research

The Biospecimen Research Network: Program Update and Symposium Overview

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2009 BRN Symposium
March 16, 2009

NATIONAL
CANCER
INSTITUTE

Translational Research Promises to Advance Molecular Medicine for Cancer Patients

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Molecular Data

Diagnosis / Therapy

Translational Research

PERSONALIZED CANCER CARE

Biospecimen Distribution

Biospecimen Collection

Biospecimen Processing and Banking

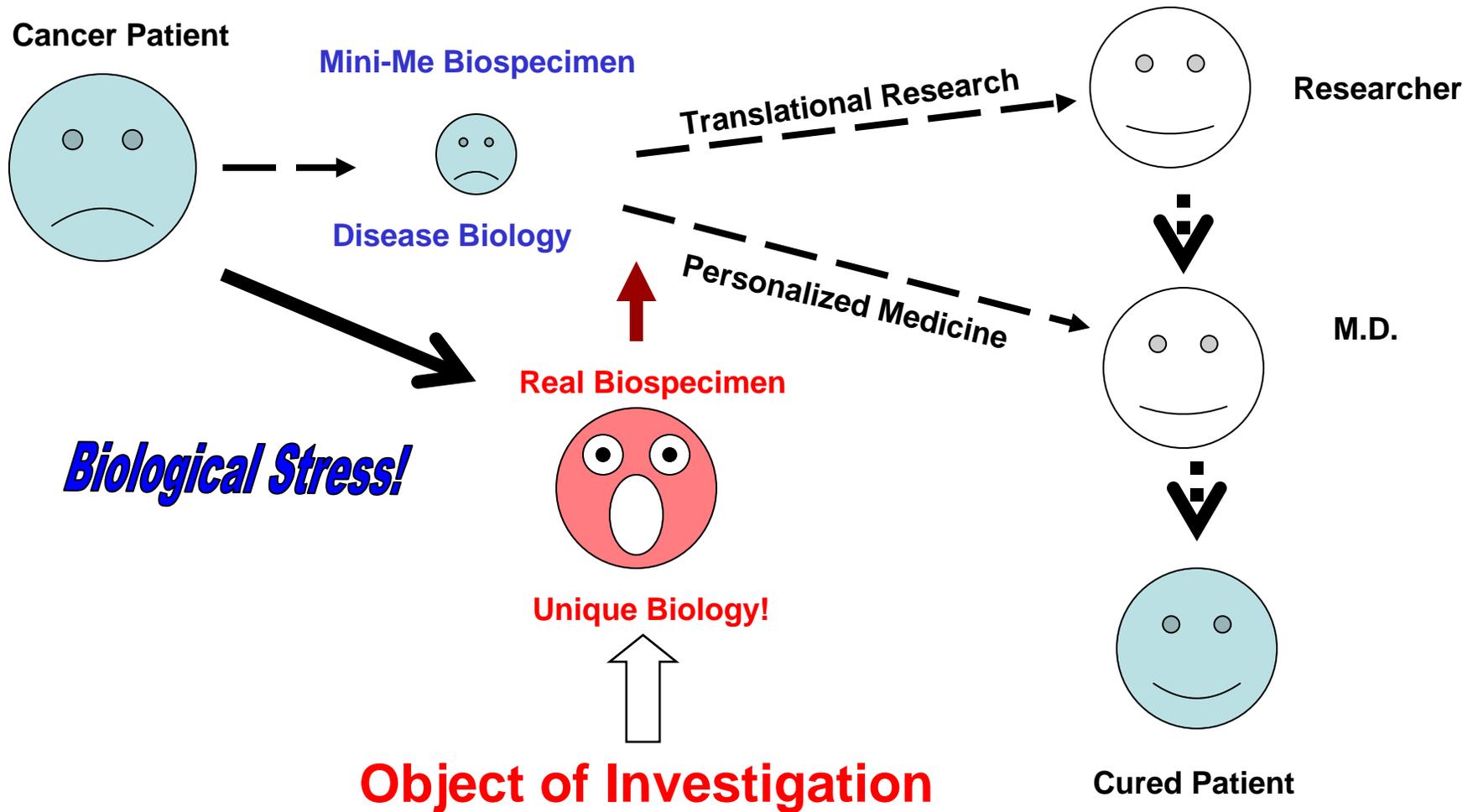


...there are some significant obstacles to progress

- **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?

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

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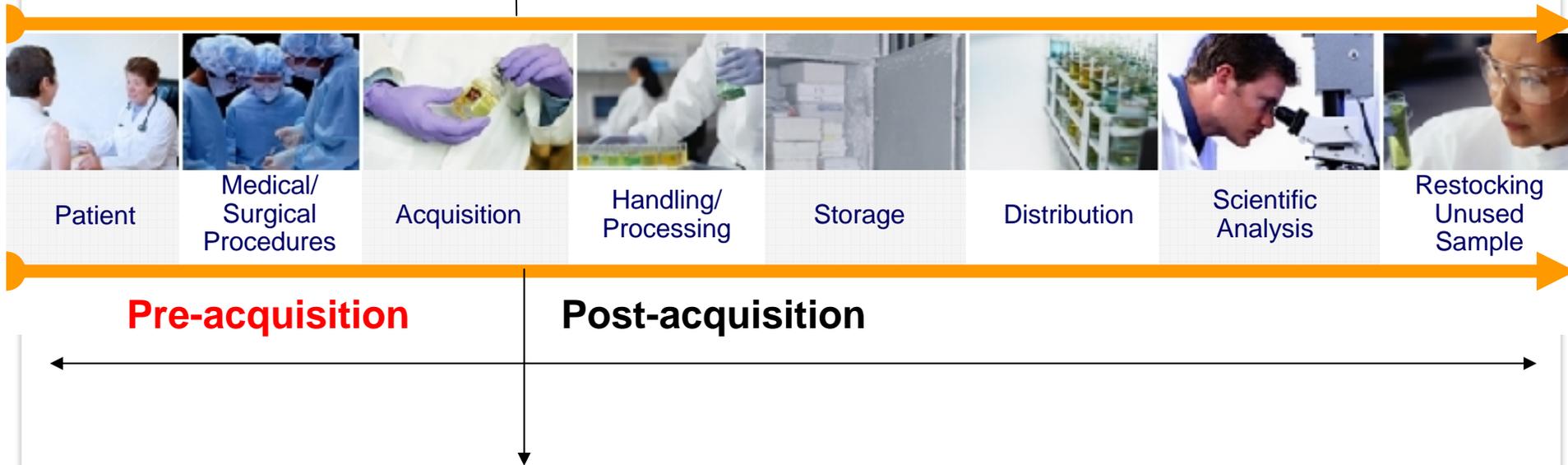
Variables (examples):

- **Antibiotics**
- **Other drugs**
- **Type of anesthesia**
- **Duration of anesthesia**
- **Arterial clamp time**

Time 0

Variables (examples):

- **Time at room temperature**
- **Temperature of room**
- **Type of fixative**
- **Time in fixative**
- **Rate of freezing**
- **Size of aliquots**



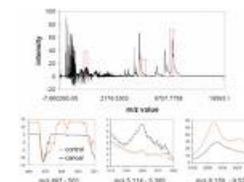
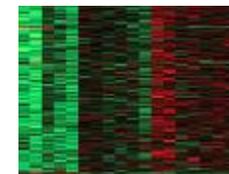
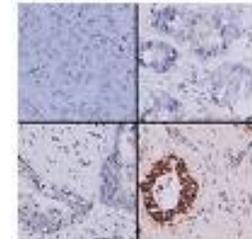
Pre- and Post- Acquisition Variables Impact Clinical and Research Outcomes

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- **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**



HER-2 as assessed by IHC



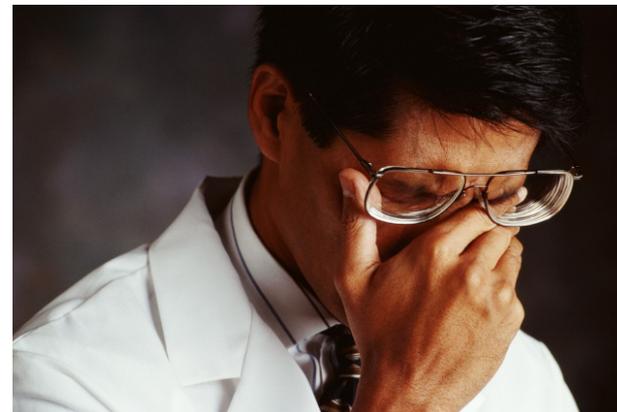
Lack of Standardization

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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!





NCI's OBBR: Building Better Biospecimen Resources

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**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

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- 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>



OBBR's Systematic, Comprehensive Approach to Improving Biospecimen Quality

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- 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**.



OBBR's Systematic, Comprehensive Approach to Improving Biospecimen Quality

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- Sponsor, collaborate, and promote research on biospecimen science:

The Biospecimen Research Network



The Biospecimen Research Network: Supporting Collaborative Research

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- **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>
- **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)



BRN Progress Report

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- **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

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Experimental Design Workshop, June 2008
- Terry Speed presentation today





BRN Progress Report

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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



BRN Progress Report

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- **NIH Challenge Grant Topics related to Biospecimens**
 - See poster outside for topics
 - Application due date April 27, 2009
 - <http://grants.nih.gov/grants/guide/rfa-files/RFA-OD-09-003.html>

Building the BRN

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- Where we started – an idea



- Where we were last year – launching





Building the BRN

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- **Where we are now - !**





Who are we?

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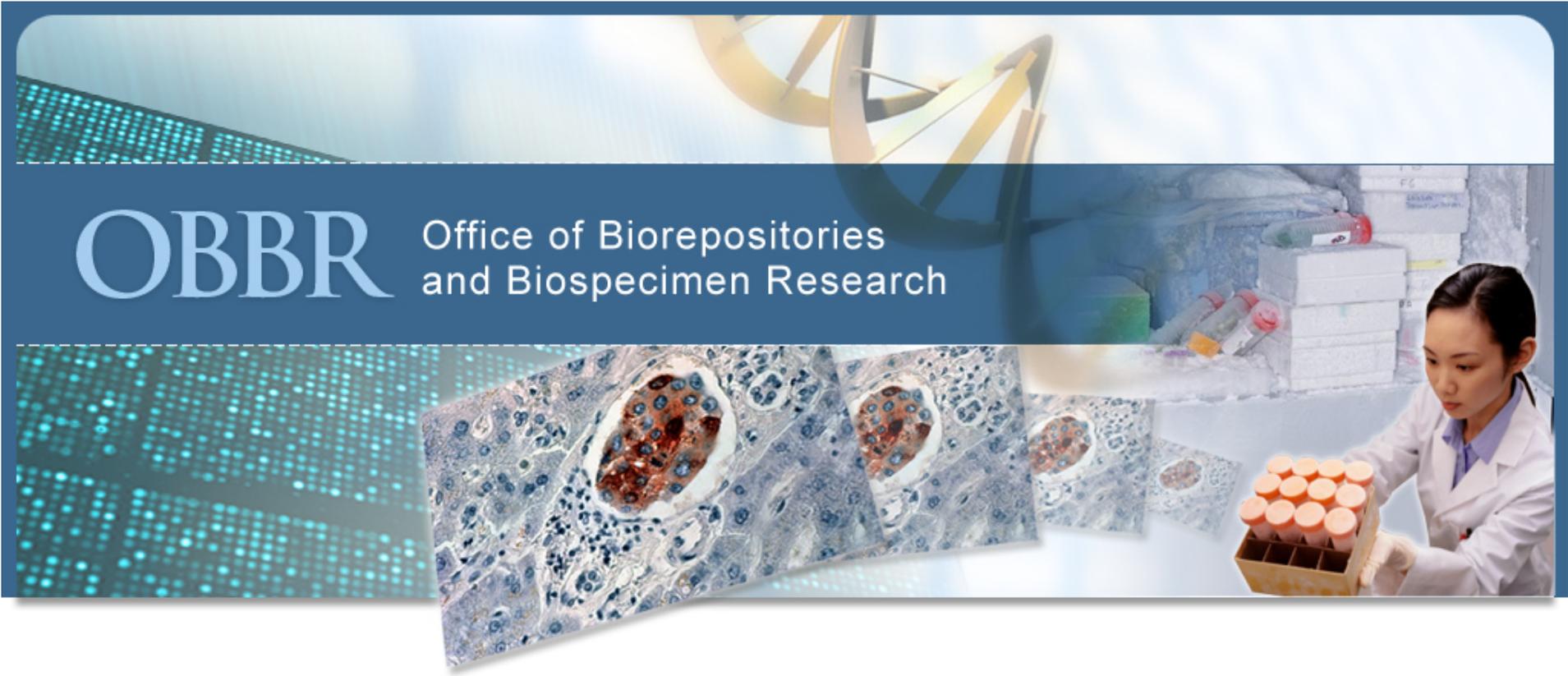




2009 BRN Symposium

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- 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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