Biobanking, Biorepositories & Biomaterials – Sample Storage, Tacking and Management at CCHMC

Michael Barnes, PhD
Director, Cincinnati BioBank Core Facility
michael.barnes@cchmc.org
www.cincinnatichildrens.org/biorepository

Research IT Clinic/Open House
Tuesday, April 6, 2010
11-12:30
S1.203

Cincinnati Children's
change the outcome

Overview

- Introduction
- Biobanking
- Cincinnati BioBank Core Facility
- Biomaterial Tracking and Management (BTM)

Michael Barnes; History

- PhD, Department of Molecular Genetics, Biochemistry and Microbiology; University of Cincinnati

- 2002 hired by Dr. David Glass for microarray gene expression analysis (Rheumatology and beyond)
- PRTR (Dr. Susan Thompson, PI)
  - Development of protocols (project/samples) and experiments
  - Design of sample tracking systems (BR, P01)
  - Migration of legacy data (Excel, Paradox, Access, etc)
  - Database queries

Michael Barnes; Current

- Hired December, 2008 Director, Cincinnati BioBank Core Facility (Pathology)

- Member
  - ISBER, Biospecimen Science Working group
  - P3G (Public Population Project in Genomics)
- Presentations
  - CHI's The Science of BioBanking/Gene Expression combination-conference
  - NIH/NCI OBBR BRN symposium "Hot Topic in Biospecimen Science"

- Activities of BioBank personnel
- Development off-site, long-term storage facility (GRI)
- IRB submission/s
- Protocol development
- Grant preparation

Overview

- Introduction
- Biobanking
- Cincinnati BioBank Core Facility
- Biomaterial Tracking and Management (BTM)

BioBanking goes mainstream

March 2009

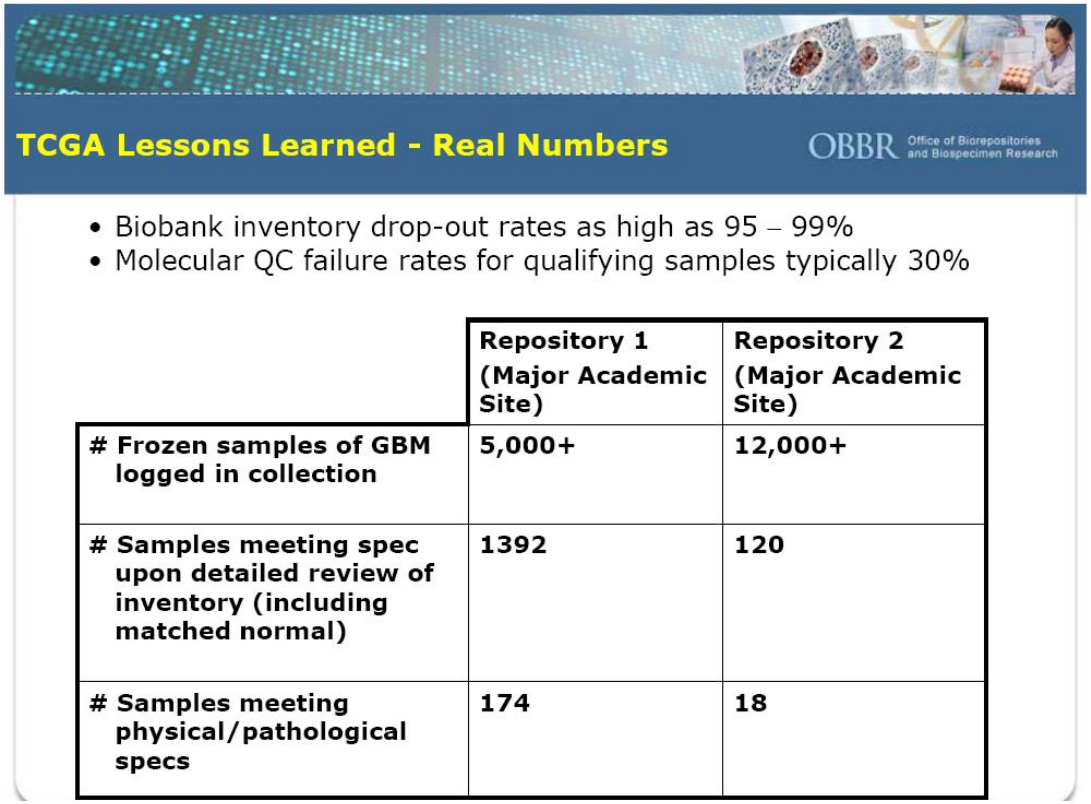
Biobanks

By ALICE PARK Thursday, Mar. 12, 2009

Inside Huntsman Cancer Institute's vaults: Pancreatic tumors on ice.

Cincinnati Children's
change the outcome

A BioBank is NOT just a freezer with samples!



TCGA Lessons Learned - Real Numbers

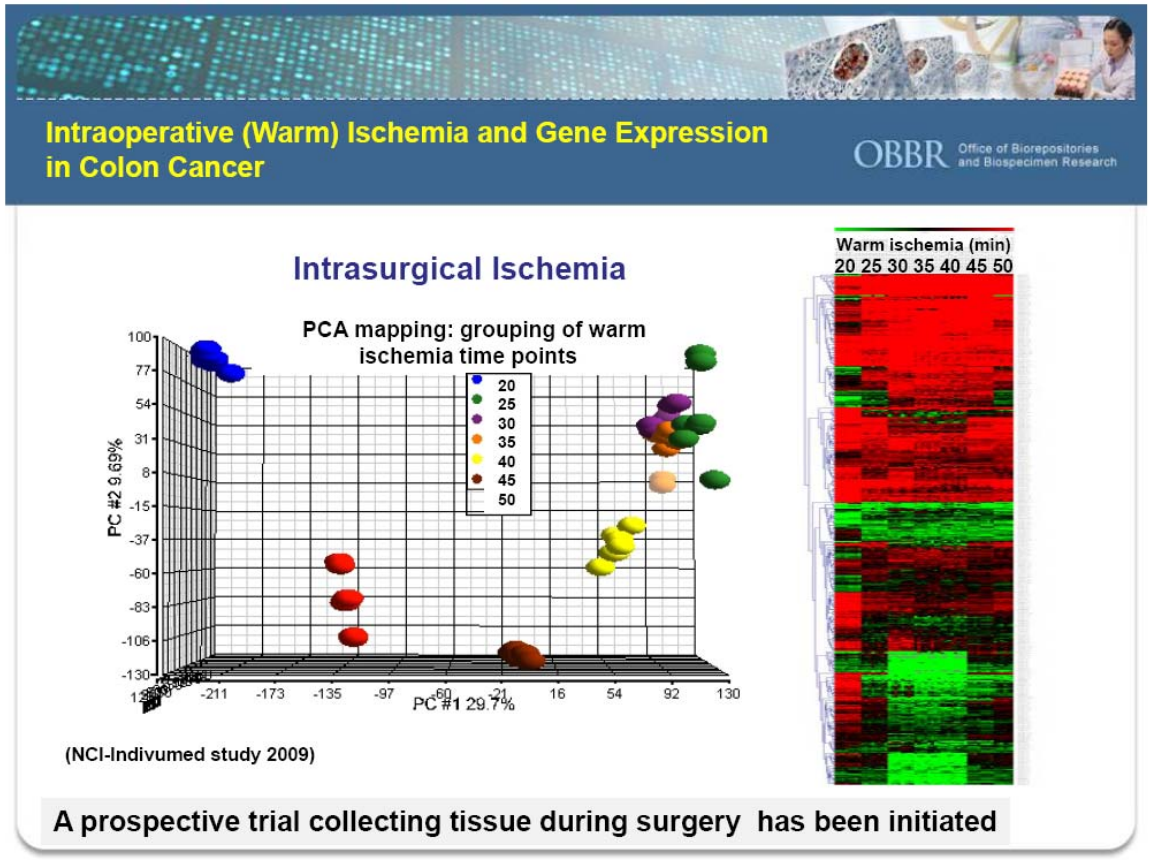
OBBR Office of Biorepositories and Biospecimen Research

- Biobank inventory drop-out rates as high as 95 – 99%
- Molecular QC failure rates for qualifying samples typically 30%

	Repository 1 (Major Academic Site)	Repository 2 (Major Academic Site)
# Frozen samples of GBM logged in collection	5,000+	12,000+
# Samples meeting spec upon detailed review of inventory (including matched normal)	1392	120
# Samples meeting physical/pathological specs	174	18

Dr. Carolyn Compton, The Science of BioBaking.

A BioBank needs quality specimens

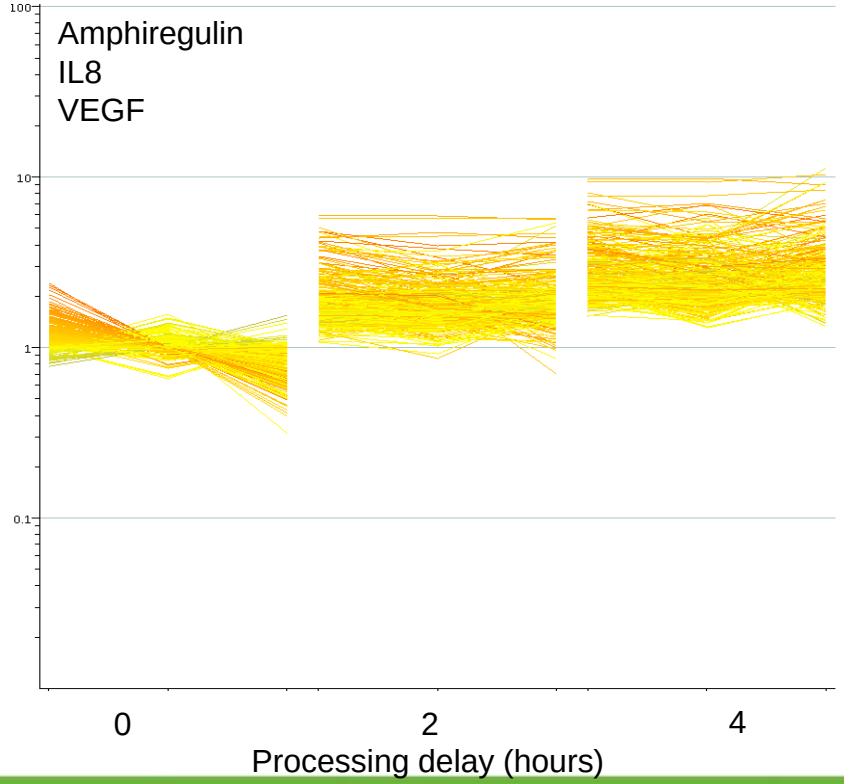


Dr. Carolyn Compton, The Science of BioBanking (Indivumed)

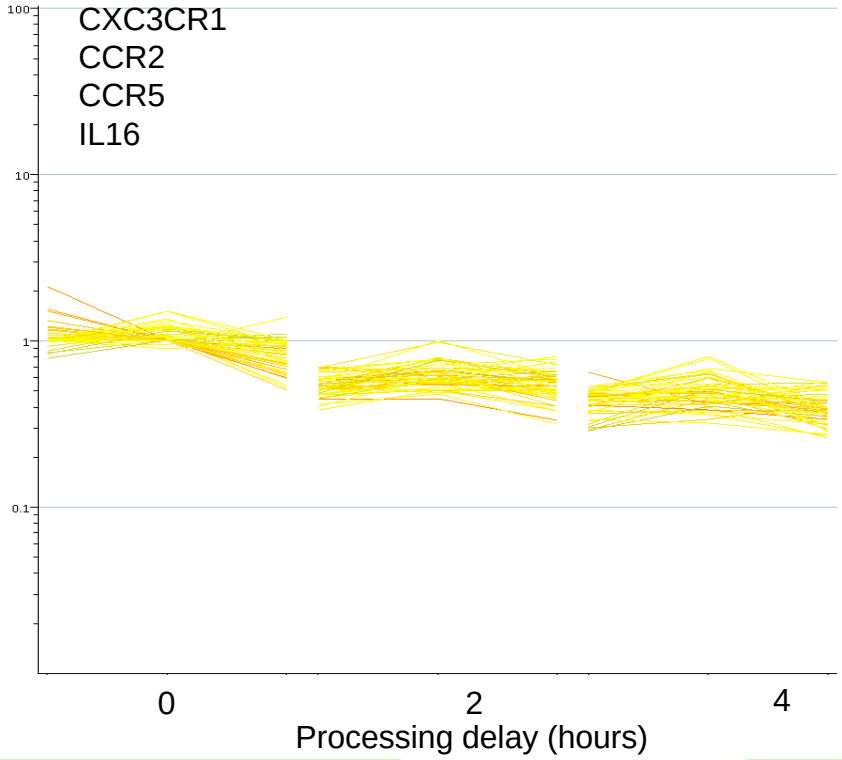
Cincinnati Children's
change the outcome

Gene expression from PBMC

311 probe sets increased
2-fold; p < 0.05



45 probe sets decreased
2-fold; p < 0.05



Cincinnati Children's
change the outcome

Overview

- Introduction
- Biobanking
  - Specimen quality is paramount
  - Variables must be controlled and/or tracked
- Cincinnati BioBank Core Facility
- Biomaterial Tracking and Management (BTM)

Mission Statement

The Cincinnati Biobank will **establish the prerequisite knowledgebase and infrastructure** to expedite cutting edge translational research at Cincinnati Children's Hospital Medical Center and the University of Cincinnati by:

- Providing centralized sample collection, processing, storage and distribution.
- Developing innovative methods for banking using biospecimen research to develop evidence-based methodologies
- Providing timely access to pre-existing sample collections
- Promoting collaboration

Our ultimate goal is to increase **competitiveness for grant funding** for researchers at the medical center.

Physical Infrastructure

- Laboratory space
  - Core, Building B 4th floor
  - Lab in “R”
  - Off-site in development
- Secured sample storage facilities with security and 24/7 monitoring
- Access to informatics resources (computer, barcode scanner, internet, sample tracking software)

Steve and Coldtable

Cincinnati Children's
change the outcome®

Overview

- Introduction
- Biobanking
- Cincinnati BioBank Core Facility
  - Available to members of the Medical Center
  - Sample procurement, processing, storage, retrieval
  - Specific projects (or pre-existing sample collections)
- Biomaterial Tracking and Management (BTM)

BTM

1. Ease of deployment and maintenance
2. Security
3. Legacy data
4. Interact with other databases
5. Costs (in development)
6. Demo

1. Ease of Deployment and Maintenance

- Web-based
  - Internet Explorer, Firefox
  - “Any” computer connected to the internet
- Server hosted
- BMI maintained (within ~ 1 month)
  - Backed-up
  - 24/7 availability

2. Security

- Encrypted communication (https://)
- Username
- Password
- Accounts
  - Restrict access to “banks”
  - Restrict access to “tabs”

3. Legacy Data

- Excel upload of core data
  - 22 elements including:
    - Person ID
    - Sample ID
    - Sample Type
    - Sample Amount
    - Storage Location
    - Specific project
- More complex uploads?
  - Talk to Michael Barnes or Keith Marsolo

4. Interact with other databases

- caBIG, NCI initiative
- BINDs, BTM specific
- i2b2 (Research data warehouse)

Costs – current plans

- Still developing cost structure
  - New bank: Free (Generic setup only)
    - Similar to a project drive (M. Wagner)
  - Modification of dropdowns: ~$50 first field
    - Pays for personnel time
  - New users: Free
  - Modifying program/interface
    - New fields: Custom
    - New functions: Custom
  - Training and support: Free / Custom

BTM

- Demo
  - Login
  - Create
    - Project
    - Subject
    - Sample
    - Aliquot/Derivative
  - View Inventory
  - Place sample in inventory

- http://207.200.46.35:8080/btmresearch5/startup/Login.jsf

Acknowledgements

- Executive Committee
  - Dave Witte
  - Susan Thompson
  - John Perentesis
- Informatics
  - Keith Marsolo
  - John Hutton
- BioBank Associated Personnel
  - Steve Esslinger
  - Erika Bowe
  - Pam Groen
  - Todd Boyd

Cincinnati Children's
change the outcome