

Biospecimen Resources for Population Scientists for Cancer Research

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Overview of Presentation

- Why Biospecimens?
- What Resources Are Available?
 - Help to Design Your Study
 - Biospecimen Sources
- How Can These Resources Help You?

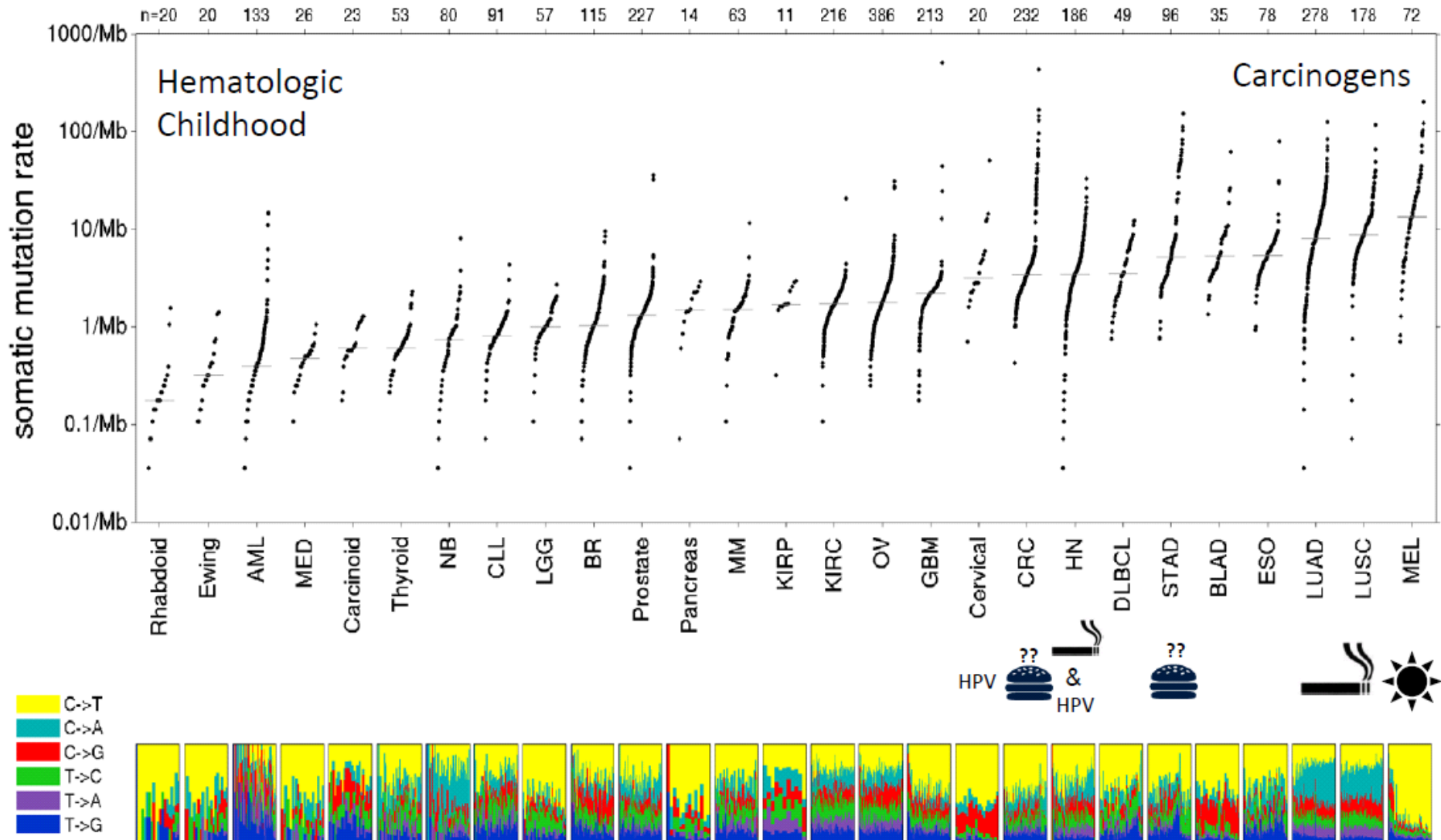
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Why Biospecimens?

- Understand disease etiology
- Identify susceptible subgroups
- Select most appropriate treatments
- Develop effective screening methodologies

The Cancer Genome Atlas
(<http://cancergenome.nih.gov/>)



http://www.genome.gov/multimedia/slides/tcga1/tcga1_lawrence.pdf

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Biospecimen Resources for Population Scientists

<http://epi.grants.cancer.gov/biospecimens.html>



Research Resources

Overview

Biospecimens

Cancer Epidemiology Cohorts

Cancer Epidemiology Consortia

Cancer Genomics and Epidemiology
Navigator

Cancer Patient and Survivor Cohort
Studies

Genomic Resources

Maps and Geographic Information

Systems

Biospecimen Resources for Population Scientists

- ▼ [Potential Sources of Biospecimens for Investigators](#)
 - [Compiled lists and search tools for sources of biospecimens](#)
 - [Biospecimen information for NCI-supported studies](#)
 - [Other study-specific biospecimen information](#)
- ▼ [Policies and Best Practices for Biospecimen Research](#)
 - [NIH Biospecimen Resources](#)
 - [Other Resources](#)
- ▼ [Contacts](#)

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**Information to help
design your study**

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NCI Best Practices for Biospecimen Resources

(<http://biospecimens.cancer.gov/bestpractices/>)

Introduction

Scope, Applicability, Implementation

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Technical and Operational Best Practices

Ethical, Legal, and Policy Best Practices

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Glossary of Terms

Acronym List

Appendix 1: Minimal Clinical Data Set (PDF)

Appendix 2: Additional Resources Related to Ethical, Legal, and Policy

Appendix 3: Governance Plan (PDF)

Appendix 4: Sample Material Transfer Agreement (PDF)

2007 Best Practices - ARCHIVED (PDF)

2011 Best Practices (PDF)

ALERT: After an extensive process and the inclusion of feedback from the public comment period, the National Cancer Institute (NCI) is pleased to release the 2011 Best Practices for Biospecimen resources [Learn more](#).

One of the most widely recognized and significant roadblocks to progress is cancer research is the lack of standardized, high-quality biospecimens. The National Cancer Institute (NCI) developed the NCI Best Practices for Biospecimen Resources (NCI Best Practices) based on extensive research and expert input into the state of NCI-funded biospecimen resources and the quality of biospecimens used in cancer research. The NCI Best Practices outline the operational, technical, ethical, legal and policy best practices for NCI-supported biospecimen resources.

Scope, Applicability, Implementation



The NCI Best Practices incorporate key principles that:

- define state-of-the-science biospecimen resource practices
- promote biospecimen and data quality
- support adherence to ethical and legal requirements

The NCI Best Practices define principles to guide procedures developed by biospecimen resources. They are intended to be adapted based on the mission and scientific needs of biospecimen resources. While adoption of the NCI Best Practices is voluntary, the NCI believes that these principles optimize biospecimens for cancer research. [Learn more](#)

Technical and Operational Best Practices



Although the specific mission of a biospecimen resource will define its collection and processing procedures, common principles apply to all

Standard Operating Procedures

(<http://biospecimens.cancer.gov/resources/sops/>)

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Research Branch

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Standard Operating Procedures (SOPs)

In this section, you will find Standard Operating Procedures (SOPs) for various biobanking practices. Many of these SOPs are currently being used in BBRB led initiatives, such as but not limited to, the Cancer Human Biobank (caHUB). SOPs will be labeled based on the projects of their use and are available for public use and guidance. BBRB will continue to release SOPs as they become available.

The statements, conclusions, and recommendations contained in these documents reflect opinions of caHUB staff members and are not intended to represent the official position of the National Cancer Institute, the National Institutes of Health, or the U.S. Department of Health and Human Services, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

[Overview](#)

[Standard Operating Procedures \(SOPs\)](#)

[Introduction](#)

[The NIH Genotype-Tissue Expression \(GTEx\) Project](#)

[Reason Behind caHUB SOP Release](#)

[Important Notes on SOPs](#)

[GTEx SOP Library](#)

[Recommendations, Templates, and Other Resources](#)

- Genome Tissue Expression (GTEx) SOPs
 - [Introduction](#)
 - [The NIH GTEx Project](#)
 - [Reasons Behind caHUB SOP Release](#)
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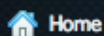
Sources of Biospecimens

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Specimen Resource Locator

(<https://specimens.cancer.gov/>)



Home



Search



Resources



Other Information



Contact



Login

About the Specimen Resource Locator

The SRL is a biospecimen resource database designed to help researchers locate resources that may have the samples needed for their investigational use. This publicly searchable database includes information about biospecimen banks and sample procurement services. The specimens and samples come from non-commercial, either NCI or non-NCI-funded resources. Investigators can search the database and gain access to thousands of specimens of various tumor, organ, and preservation methods.

In the event you are unsuccessful in finding the appropriate specimen resource you may contact the NCI Tissue Expediter, a scientist, who can further assist you. Also, the Tissue Expediter can assist researchers to identify potential collaborators when needed. The NCI and the NCI's SRL do not oversee or take responsibility for the content, quality or data of the specimen collections or resources participating in the SRL.

Resources

- ➡ [Participating Resources](#)
- ➡ [Other Resources](#)


Other Information on Human Specimens


- ➡ [NIH Bioethics Resources on the Web](#)
- ➡ [More information on human specimens](#)

 [Click here to start searching](#)

Quick Links

 [Search Resources](#)

 [Add a Resource](#)

 [Contact the Expediter](#)

•More Population Based Resources Coming Soon to SRL

Example NCI Supported Studies

- Agricultural Health Study (AHS)
- AIDS and Cancer Specimen Resource (ACSR)
- Alpha-Tocopherol, Beta-Carotene Cancer Prevention Study (ATBC)
- Atherosclerosis Risk in Communities Study (ARIC) Cancer
- Breast and Colon Cancer Family Registries (CFRs)
- Carotene and Retinol Efficacy Trial (CARET)
- Cooperative Breast Cancer Tissue Resource (CBCTR)
- Cooperative Human Tissue Network (CHTN)
- Health Professionals Follow-Up Study (HPFS)
- The Nurses' Health Study (NHS)
- Prostate, Lung, Colorectal, and Ovarian (PLCO) Cancer Screening Trial
- Southern Community Cohort Study (SCCS)
- Southwest Oncology Group (SWOG) – Prostate Cancer Prevention
- SEER Residual Tissue Repository (RTR) Program

Colon Cancer Family Registries (CFR)

- Resource for conducting studies on the genetics and molecular epidemiology of colon cancer
 - >41,000 men and women from 14,500 families
 - DNA, tissue sections, lymphocytes, lymphocyte cell lines, plasma
- Contact Principal Investigators to initiate collaborations

For more information about the Colon CFR:
http://epi.grants.cancer.gov/CFR/about_colon.html

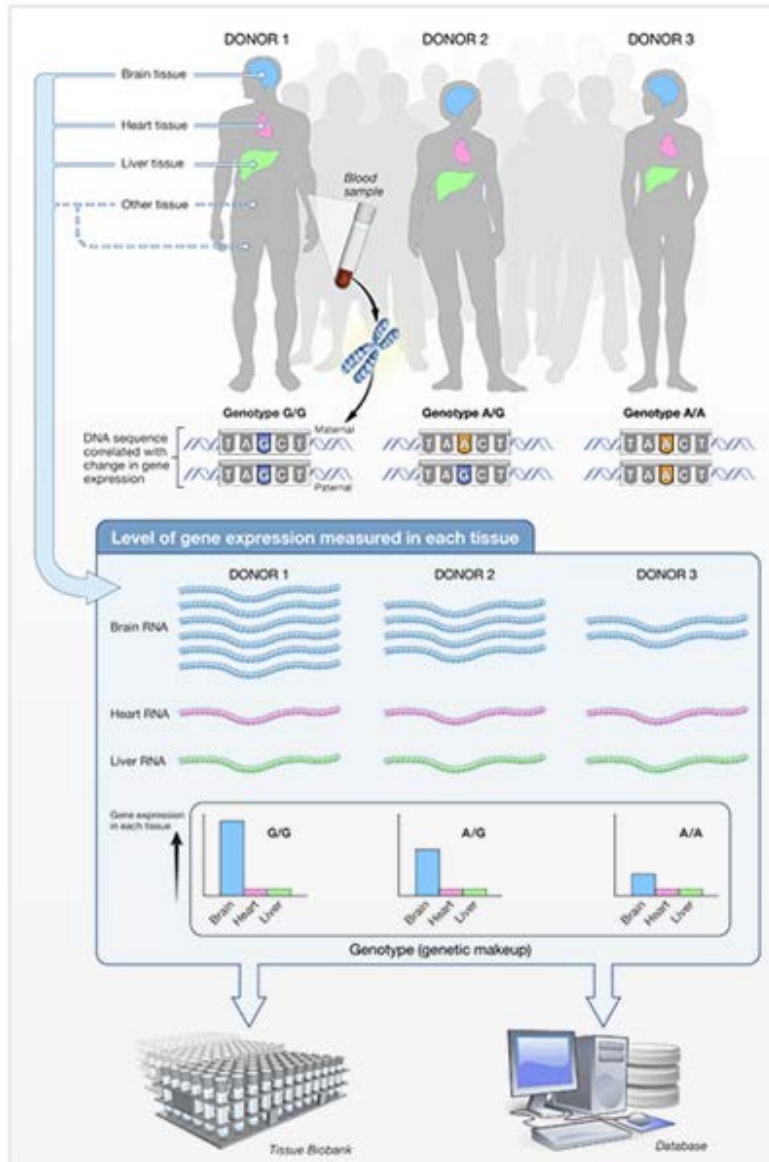
Cancer Research Network (CRN)

(<http://crn.cancer.gov/>)

- Goal to facilitate cancer research in non-profit health care delivery setting
 - Supports data and research infrastructure for 9 CRN sites (9 million members)
- CRN Encourages Collaboration
 - Scientific Working Groups
 - CRN Scholars Program
 - Pilot and Developmental Projects Program
 - Data Inquiry and Proposals
- NCI Contact: Paul Doria-Rose (doriarop@mail.nih.gov)

Genotype-Tissue Expression Project (GTEx)

(<http://www.broadinstitute.org/gtex/>)



- Data resource for study of genetic variation and regulation of gene expression in multiple reference human tissues
- Biospecimen resource including tissues, nucleic acids, and cell lines
- > 185 donors and ~9-30 tissues collected per donor

DCCPS GTEx Contact:
Danielle Carrick (carrick@mail.nih.gov)

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Leveraging Existing Resources Is More Efficient

DCCPS Biospecimen Portfolio (Active Grants July 2012)

Estimated cost per/participant (based on target enrollment)

Grant Mechanism	Using Existing Biospecimens	Using Existing and Collecting New	Collecting New Biospecimens	P-value
All mechanisms	\$362	\$699	\$1508	P<0.0001
R01	\$262	\$647	\$926	P<0.0001

Limited to grants with serum/plasma (N=183)

Average number of publications/year

Grant Mechanism	Using Existing Biospecimens	Using Existing and Collecting New	Collecting New Biospecimens	P-value
All mechanisms	2.1	2.9	1.5	P=0.0005

All biospecimen grants (N=455)

Example of Leveraging Existing Resource

Association of Circulating Cytokines with Lung Cancer

Cytokine Level		NCI-MD Case-Control Study OR (95% CI)	PLCO Nested Case-Control OR (95% CI)
IL-6			
	1 st quartile	1.0	1.0
	2 nd	0.98 (0.51-1.86)	1.14 (0.79-1.65)
	3 rd	2.28 (1.29-4.06)	1.25 (0.88-1.78)
	4 th	3.29 (1.88-5.77)	1.48 (1.04-2.10)
IL-8			
	1 st quartile	1.0	1.0
	2 nd	1.48 (0.84-2.63)	1.03 (0.72-1.48)
	3 rd	2.62 (1.52-4.51)	1.41 (0.99-2.01)
	4 th	2.44 (1.46-4.08)	1.57 (1.10-2.24)

Adjusted ORs and CIs are reported.

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Thank you

Extra Slides

DCCPS Breast and Colon Cancer Family Registries

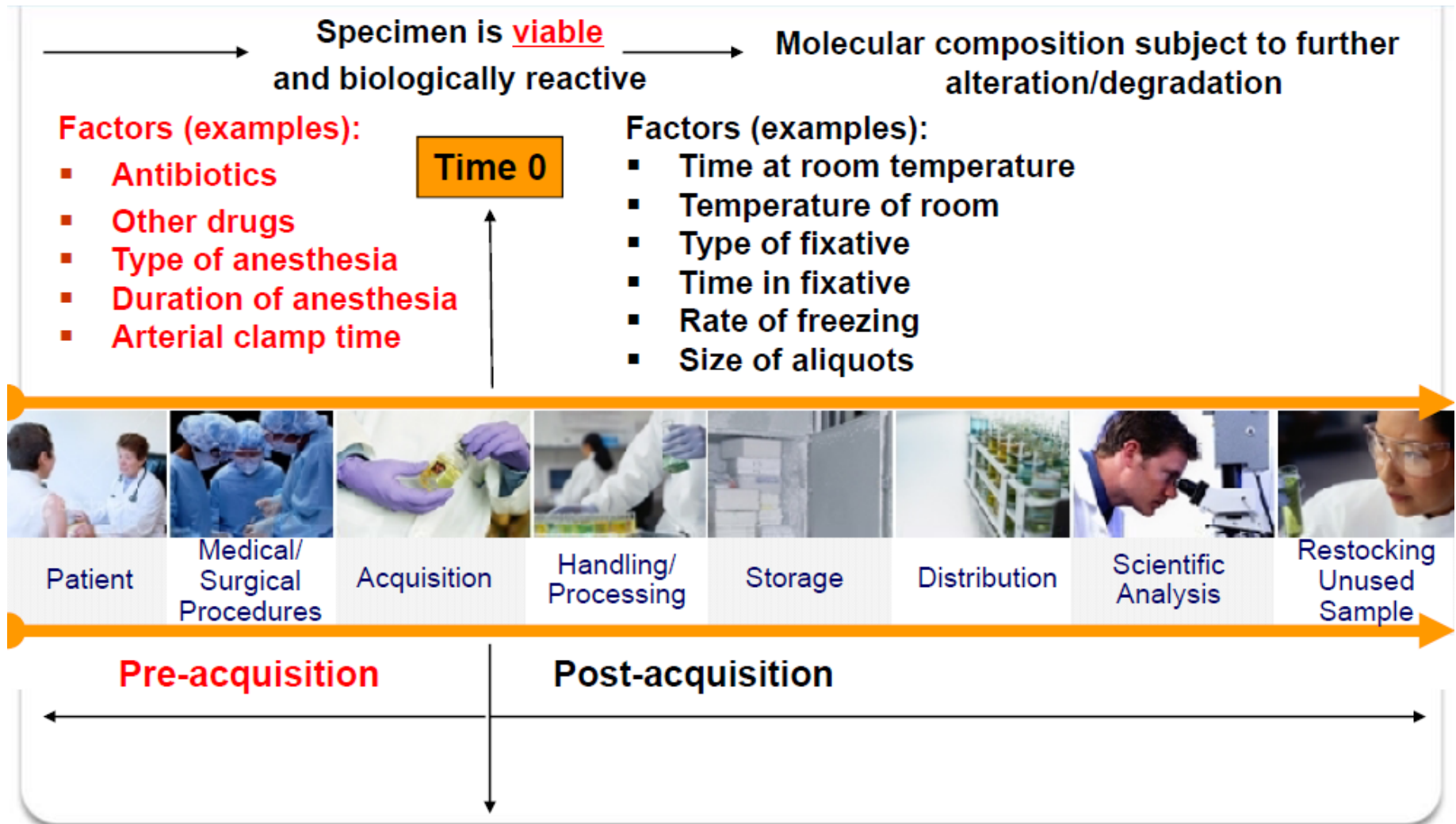
http://epi.grants.cancer.gov/CFR/about_breast.html

http://epi.grants.cancer.gov/CFR/about_colon.html

Sample Type	B-CFR # of Individuals	C-CFR # of Individuals
Genomic DNA	22,952	31,413
Tissue sections on slides	5,318	8,722
Slow-frozen lymphocyte cells	11,704	22,928
Plasma	16,119	24,694
LCL (lymphoblast cell line)	8,556	4,718

Sheri D. Schully, Ph.D (schullys@mail.nih.gov)

Pre-analytical Factors Can Affect Biomarkers



Tissue types

(#s are as of Sept. 2012)

- Blood (PAXgene RNA) (n=149)
- Skin for fibroblast cell line (~90% success)
- Blood (ACD) for lymphoblastoid cell line (~60% success)

PAXgene* Preserved Tissues

- Adipose - SubQ and Visceral (n= 144;17)
- Adrenal Gland (n=107)
- Artery – Aorta (n=133)
- Artery – Coronary (n=97)
- Artery – Tibial (n=142)
- Bladder (n=121)
- Breast - Mammary Tissue (n=87)
- Cervix – Ecto- & Endocervix (n=32;34)
- Colon – Transverse & Sigmoid (n=144;15)
- Esophagus - Gastroesoph Junction, Mucosa, & Muscularis (n=16;139;140)
- Fallopian Tube (n=32)
- Heart – Atrium & Left Ventricle (n=12;116)
- Kidney – Cortex & Medulla (n=73;41)
- Liver (n=81)
- Lung (n=129)
- Muscle – Skeletal (n=146)
- Nerve – Tibial (n=139)
- Ovary (n=45)
- Pancreas (n=130)
- Pituitary (n=33)
- Prostate (n=83)

(n= Number of times sampled in the first 150 donors)

- Skin – Lower leg and Suprapubic (n=147;17)
- Spleen (n=137)
- Stomach (n=144)
- Terminal Ileum (Peyer's patch) (n=15)
- Testis (n=92)
- Thyroid (n=126)
- Uterus (n=41)
- Vagina (n=48)
- Brain – Cerebellum (n=36)
- Brain – Frontal Cortex (n=35)

Overnight Shipped Brain Regions

- Brain – Cerebellum (n=35)
- Brain – Frontal Cortex (BA9) (n=35)
- Hippocampus (n=34)
- Substantia nigra (n=33)
- Anterior cingulate cortex (BA24) (n=35)
- Amygdala (n=34)
- Caudate (basal ganglia) (n=35)
- Nucleus accumbens (basal ganglia) (n=35)
- Putamen (basal ganglia) (n=33)
- Hypothalamus (n=34)
- Spinal cord (cervical c-1) (n=24)

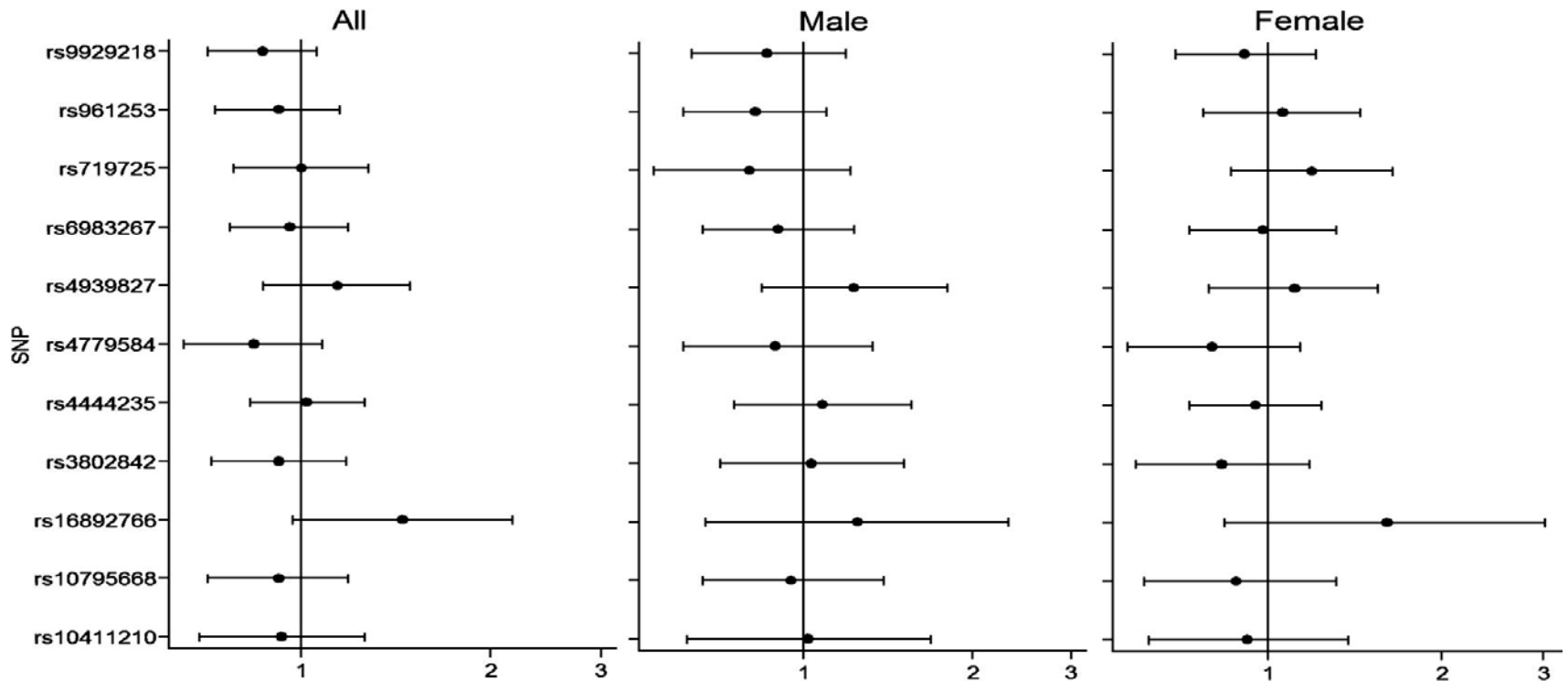
Highlighted brain tissues are used to compare immediate PAXgene & Frozen

* Tissues fixed in an alcohol-acetic acid based fixative (PAXgene Tissue, Qiagen)

Are the common genetic variants associated with colorectal cancer risk for DNA mismatch repair gene mutation carriers?

For All 11 SNPs

HR per risk allele 0.97 (95% CI: 0.88-1.07)



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Cancer



Mutation screening