



New Faculty Orientation

23 October, 2008

Shared Research Resources at VCU

Paul Fawcett, Ph.D.

Director of Research Resources for VCU and Massey Cancer Center

- Basic Research service cores
- Clinical / Translational service cores
- Instrumentation cores
- Consultative cores



Molecular Biology Shared Resource

www.pubinfo.vcu.edu/mlbiocre Sanger Hall 6-047



Shirley Taylor, Ph.D.
Director

- **Routine molecular biology procedures**
 - Mini, midi, maxi scale plasmid preps
 - Bacterial transformation
 - Insert purification
 - Genomic DNA, RNA, and miRNA isolation
 - siRNAs from Invitrogen and Qiagen
- **Custom Services**
 - Custom subcloning
 - Library screening
 - Site directed mutagenesis
 - Recombinant protein production



Nucleic Acids Research Facilities

<http://www.narf.vcu.edu/> Sanger Hall 5-050

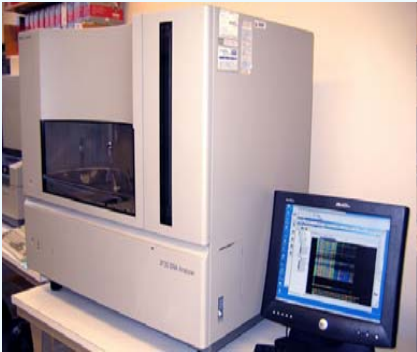


Gregory Buck, Ph.D.
Director

- DNA Sequencing core
- Oligo synthesis core
- Real Time PCR core
- Microarray core
- ABI freezer programme
- Seqweb – web based GCG bioinformatics suite



Nucleic Acids Research Facilities



ABI 3730 Genetic Analyzer



454 Genome Sequencer FLX

- “Traditional” Sanger sequencing by capillary electrophoresis : ABI 3730
 - choice for routine sequencing
- “Next Generation” sequencing capability:
 - 454 Genome Sequencer FLX
 - 4×10^5 250 bp reads in one run
 - whole genome sequencing
 - Illumina/Solexa 1G
 - 6×10^7 25 bp reads in one run
 - re-sequencing and variant detection



Illumina 1G



Nucleic Acids Research Facilities

Quantitative Real-Time PCR
Using TAQMAN chemistry

- mRNA quantitation
- sequence detection of SNPs



ABI Prism® 7900 Sequence Detection System

- Convenience
- ~24 hr turn around
- biotinylated & fluorescent oligos
- HPLC purification

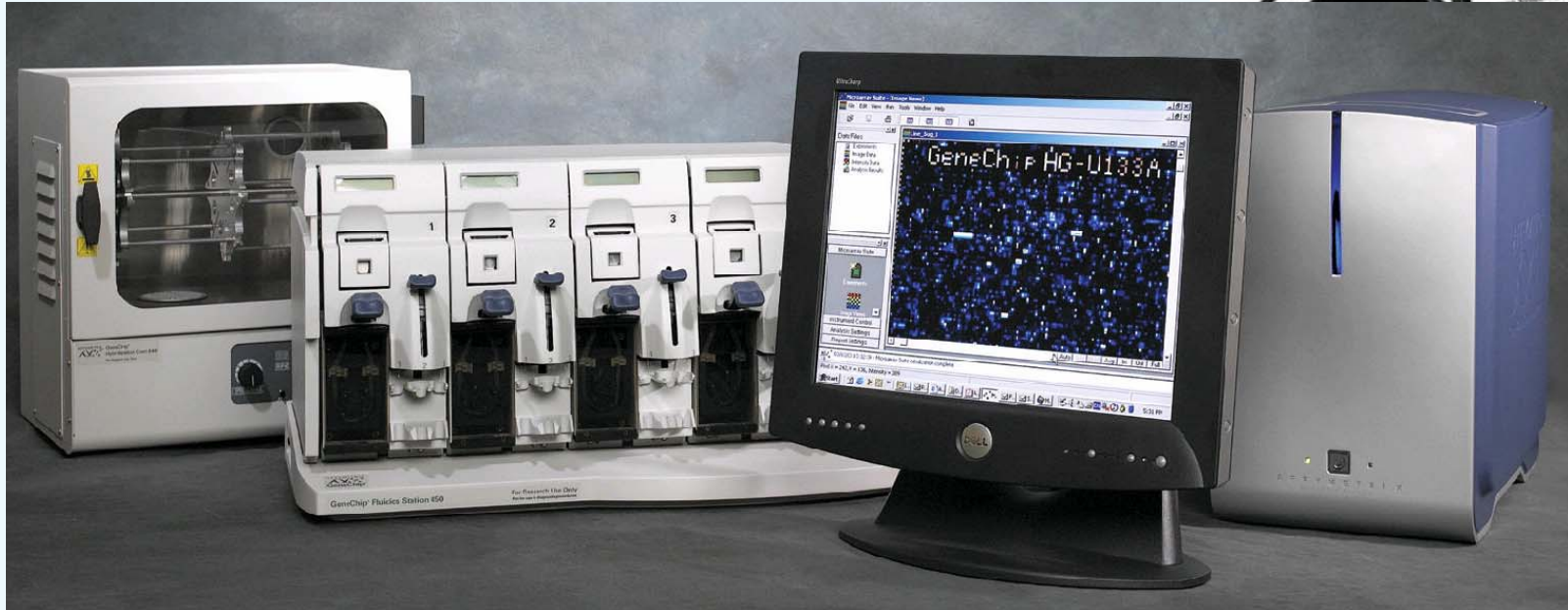


ABI DNA synthesizer



Nucleic Acids Research Facilities

Microarray core

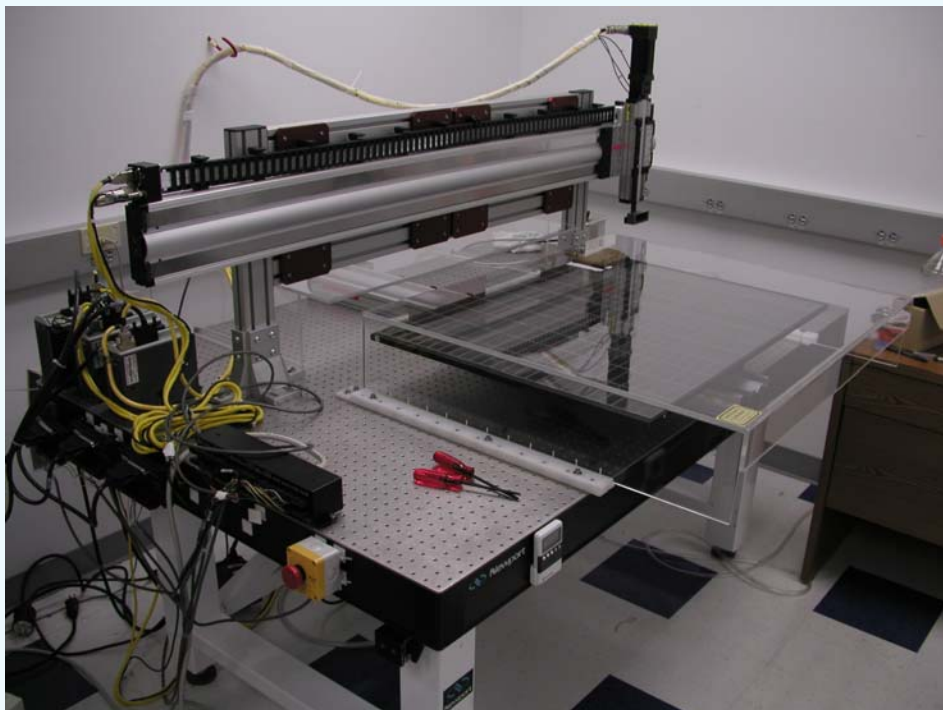


Fully equipped for hybridization and image acquisition of Affymetrix gene chips, including Human Genome U133A 2.0 and Mouse Genome 430A 2.0 chips (in stock)



Nucleic Acids Research Facilities

Microarray core



Custom spotted array production facilities are also available on a collaborative basis.

Microarray data archive and analysis platform available online:

<http://ramhorn.vcu.edu>



Mass Spectrometry Resources

- **Bioanalytical Core Laboratory**

quantitative small molecule MS

www.pharmacy.vcu.edu/pharmaceutics/page.aspx?id=130

- **Mass Spectrometry Resource for the study of Biological Complexity**

Geared towards high MW proteomics

www.vcu.edu/csbc/msrsbc/



Thomas Karnes, Ph.D.
Director, BACL

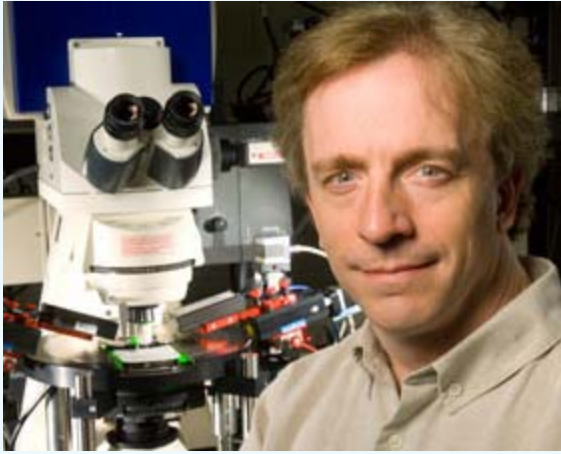




Microscopy Facility

www.vcu.edu/anatomy/microscopy/

Sanger Hall 9th Floor



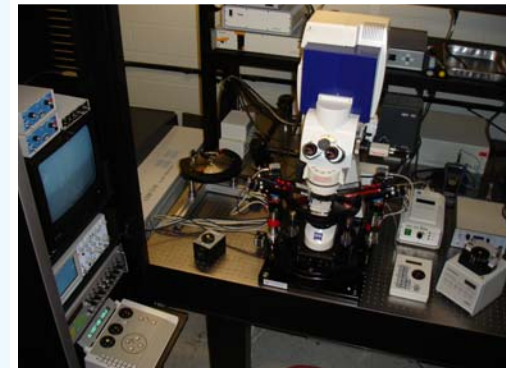
S.C. Henderson, Ph.D.
Director

- Access to advanced equipment
- Instruction
- Consultation
- Collaboration
- Service
- Grant applications



Microscopy Facility

- multi-photon laser scanning microscope
- confocal laser scanning microscope
- multi-channel TIRF microscope
- widefield fluorescence microscope
- transmission electron microscope (TEM)
- scanning electron microscope (SEM)
- scanning probe atomic force microscope
- stereology system
- microdissection system
- multi-dimensional image analysis
- deconvolution
- live cell imaging
- FRET / FRAP
- molecular localization
- cyro-ultramicrotomy





Transgenic/ Knock Out Mouse Core

<http://www.massey.vcu.edu/research/?pid=2003>



Jolene Windle, Ph.D.
Director

- Transgenic mouse production
- Knock-out/knock-in mouse production
 - ES cell electroporation
 - Colony selection and screening
 - Blastocyst injection
- Mouse line re-derivation
- Embryo cryopreservation
- DNA purification and genotyping
- Consultation on project and vector design,
- Training in mouse husbandry protocols, *etc.*



Structural Biology Shared Resource

<http://www.massey.vcu.edu/research/?pid=2002>



Jan Chlebowski, Ph.D.
Director/Coordinator

- **X-ray crystallography**
 - H. T. Wright, Ph.D.
 - Martin Safo Ph.D.
- **NMR spectroscopy**
 - J. Neel Scarsdale, Ph.D.
- **Molecular Modeling Facility**
 - Glen Kellog, Ph.D.

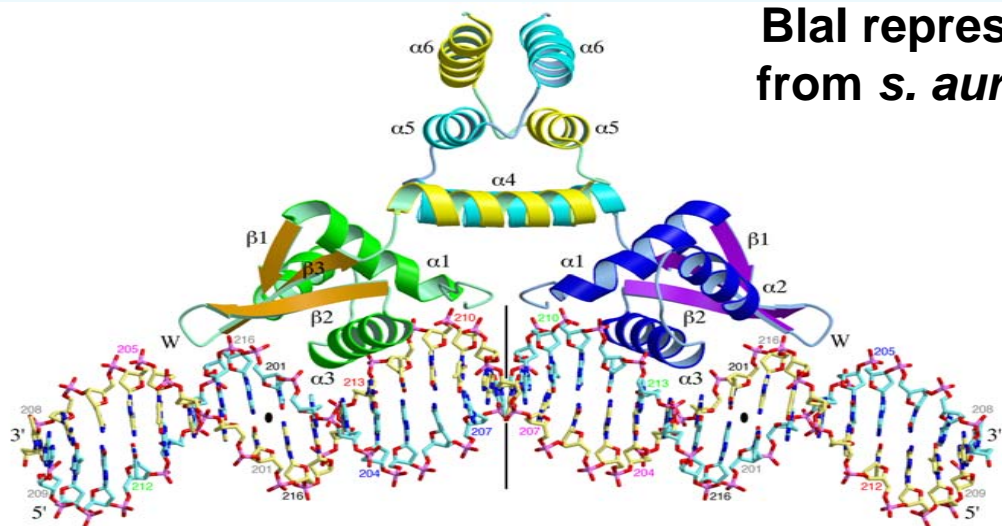


Structural Biology Shared Resource

X-ray crystallography resources



Martin Safo, Ph.D.



- Raxis-IV++ imaging plate detection system
- X-Stream cryogenic system
- MicroMax-007 high frequency rotating anode
- Blue Max-Flux Confocal optical system
- Raxis-IV++ 2θ stage
- CrystalClear software (data acquisition and processing)



Structural Biology Shared Resource

NMR Spectroscopy Resources



J. Neel Scarsdale, Ph.D.

- Varian Gemini 2000, 300 MHz spectrometer
- Varian Unity + 500 MHz spectrometer
- Dual (^{13}C , ^1H),
Triple (^{13}C , ^{15}N , ^1H)
Quad (^{31}P , ^{13}C , ^{15}N , ^1H)
probes



New 400, 600, and 700 MHz instrument acquisition is pending!



Structural Biology Shared Resource

Molecular Modeling Resources



Glen Kellog, Ph.D.

- **Hardware**
 - 16 SGI graphics Workstations
 - Linux File Server
 - Laser Printers
- **Software**
 - Sybyl • HINT •
 - Insight II
 - Biopolymer • Delphi
 - Felix • Homology
 - Other Modeling Software
 - Databases:
 - NCI 3D
 - Pomona MedChem
 - Developmental Software





Center for High Performance Computing (CHiPC)



Gregory Buck, Ph.D.
Director

- **Bach**

~500 processor
supercomputing Linux
beowulf cluster supporting
single and multiprocessor
parallel jobs

- **Software support**

- Extensive suite of
bioinformatics and
modeling software



Current plans call for expansion of Bach to ~4000
processor cluster within 2 year timeframe



Flow Cytometry Shared Resource

www.massey.vcu.edu/research/?pid=1995

Flow Cytometry

Analysis: Full range of analyses including DNA/cell cycle, 4-color immunofluorescence, apoptosis, viability/cytotoxicity, membrane potential

Sorting: Sterile or clean sorting of viable or fixed cells with >95% purity

Autocloning: Sorting >1 cell into media-filled plates, 6-96 wells, or into PCR plates

High Speed Sorting: Sterile, 1- to 4-way sorting with >95% purity

Confocal Imaging

Also offered in this core!!



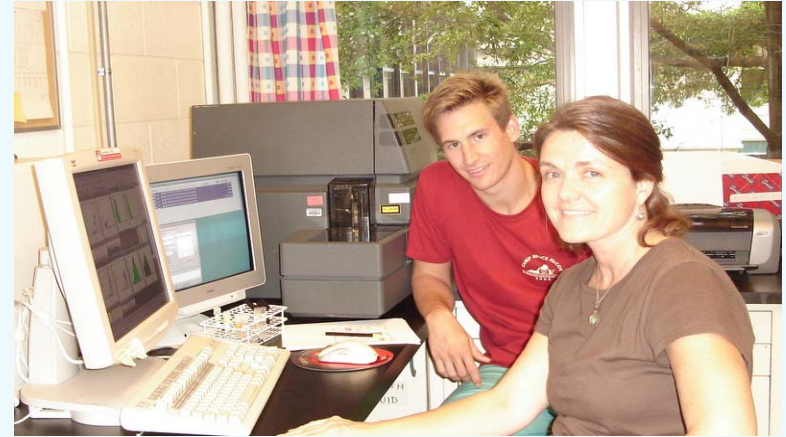
William Grogan, Ph.D.
Director



Flow Cytometry Shared Resource



Moflo High Speed Cell Sorter



XL-MCL Flow Cytometer



Elite Flow Cytometer and Sorter

**Coming soon:
BD FACSAria Cell-Sorting System**





Flow Cytometry Shared Resource

Confocal Imaging Instrumentation



**The Zeiss LSM 510
Meta Confocal Imaging
System**





Tissue & Data Acquisition & Analysis Core

www.pathology.vcu.edu/research/TDAAC/



Carleton Garrett,
M.D., Ph.D. Director

- **Sample processing**

Catherine Demur, Ph.D.

- obtain biomolecules for analysis
- gene expression analysis

Amy Ladd, Ph.D.

- Laser Capture Microdissection

- **Clinical annotation**

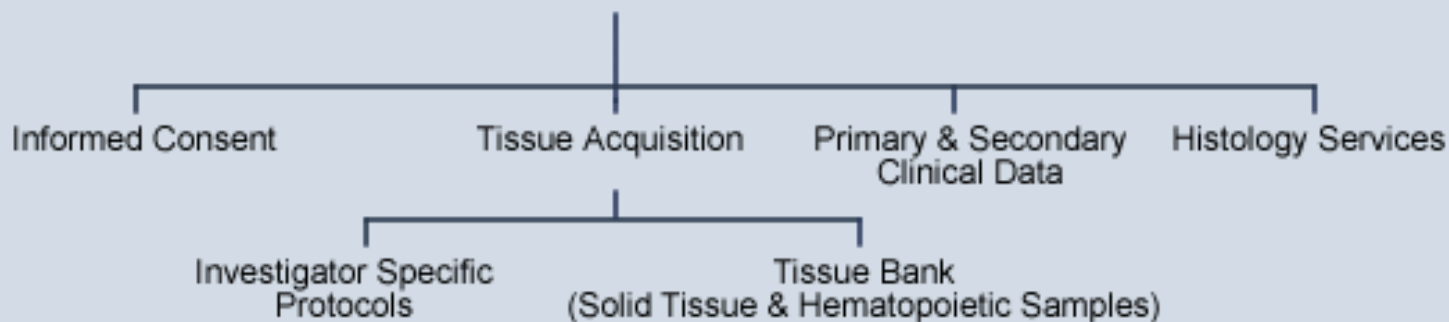
Lynne T Penberthy, M.D. Ph.D.

TDAAC is a *portal of entry* for VCU investigators to access *human tissue samples* to support IRB approved research projects.

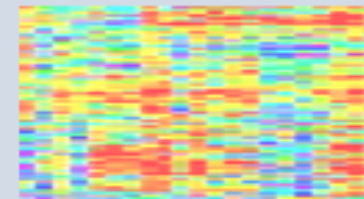
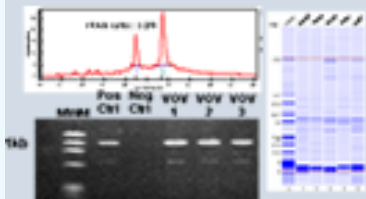
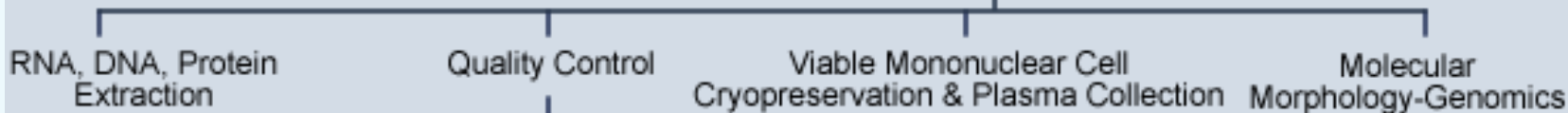


Tissue & Data Acquisition & Analysis Core

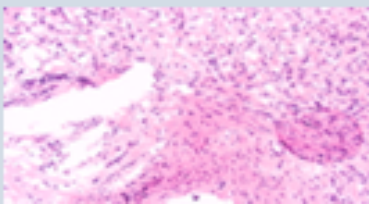
Specimen Procurement & Related Services



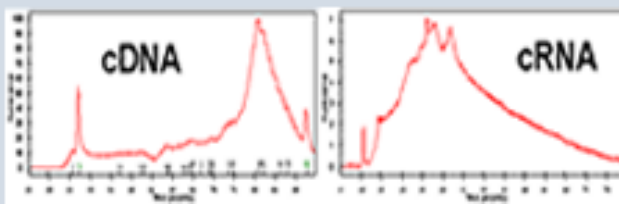
Clinical Specimen Processing



Histological Parameters



Molecular Parameters





Clinical Trials and Research Specimen Processing Service

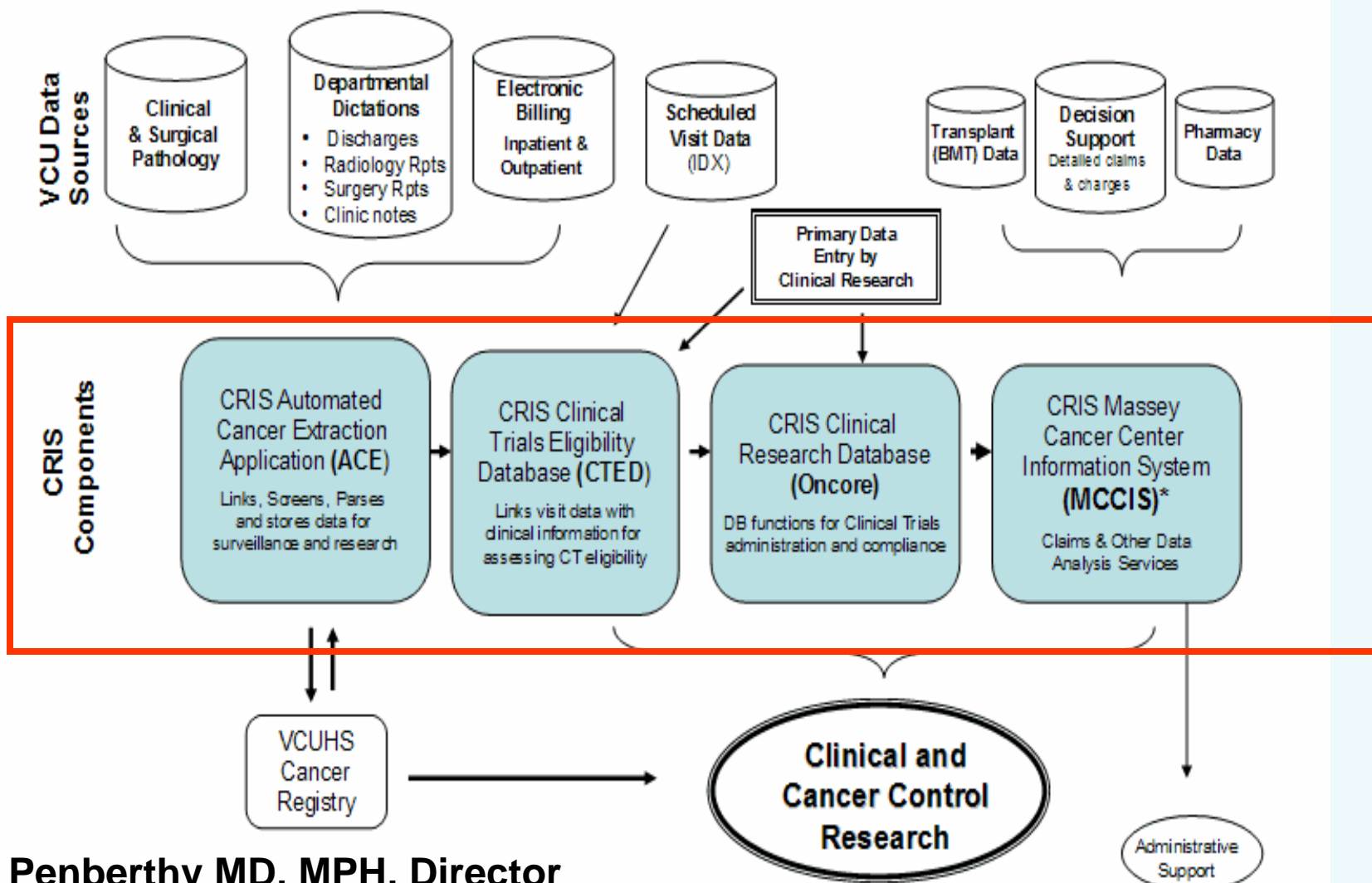
www.pathology.vcu.edu/clinical/outreach/research.html

- **Routine Clinical Laboratory Testing**
 - Chemistry, Hematology, Immunology, Microbiology, Molecular Testing
 - Anatomic Pathology
- **Specimen Collection (Phlebotomy, Urine Collection)**
- **Specimen Processing Services**
 - Processing for Central & PK/PD laboratories
 - Centrifugation (custom rcf & temp)
 - Custom aliquotting
 - Storage at flexible temperatures (-70°C, -20°C, 4°C, RT)
 - Shipping (Certified for diagnostic, infect, IATA, Hazmat)



Cancer Research Informatics and Services

www.massey.vcu.edu/research/?pid=2176



Lynne Penberthy MD, MPH, Director



Cancer Research Informatics and Services

In addition to data and informatics support, services provided by CRIS include:

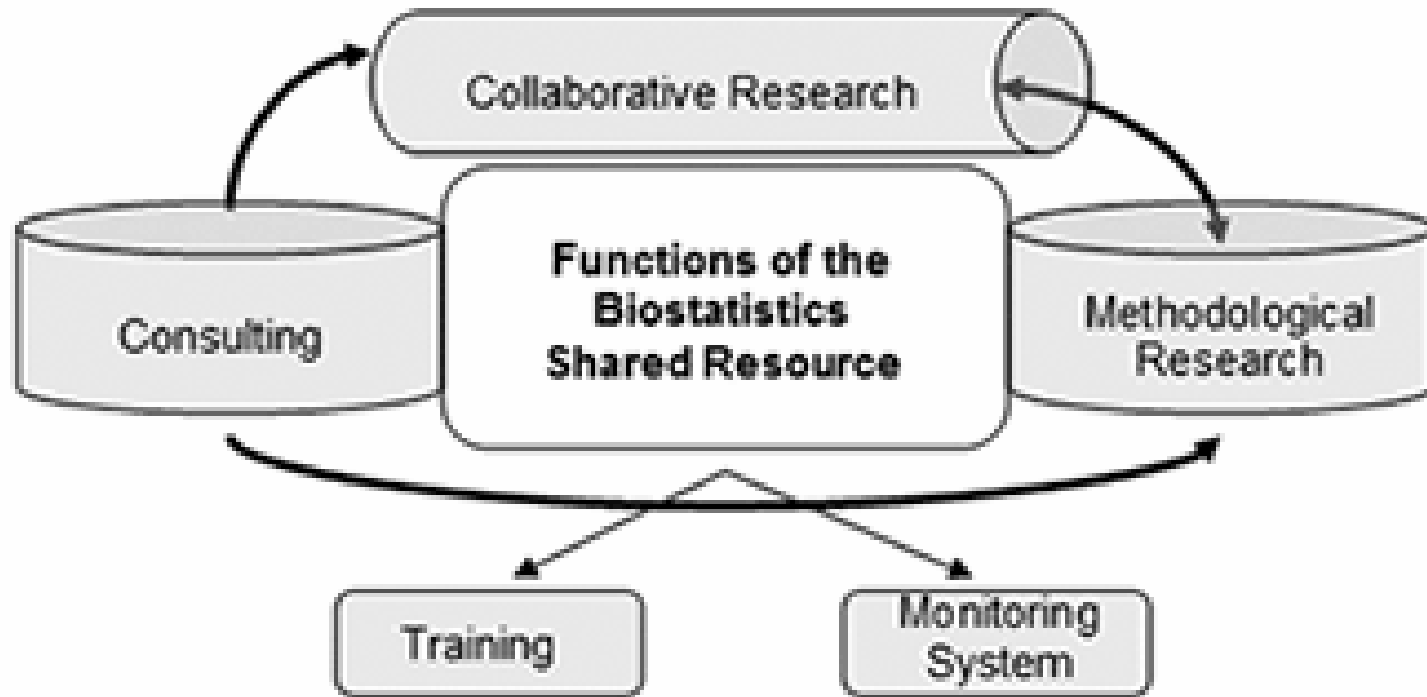
- Population sample estimates.
- Study sample creation.
- Consulting for grant applications.
- Analysis of data.
- Creation of customized data sets.
- Query development and report development.

Lynne Penberthy MD, MPH, Director



Biostatistics Shared Resource Facility

www.massey.vcu.edu/research/?pid=1994



BSR consultations are FREE for MCC members!



Mid-Atlantic Twin Registry

www.matr.vcu.edu

- Population-based registry of twin pairs from Virginia, North Carolina, and South Carolina
- ~300,000 identical and fraternal twin pairs born between 1915 and 1998
- Assist with identifying twin pairs, research compliance, assurance of privacy, etc.



One of the world's largest twin registries!