

St. Joseph's Hospital and Medical Center

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V.P. Academic Affairs and Research**



St. Joseph's Hospital
and Medical Center

History and Mission

- **St. Joseph's Hospital & Medical Center (SJHMC)**
 - Founded by the Sisters of Mercy in 1895
 - First hospital in the state of Arizona
 - The *only* religious sponsored acute care facility in Phoenix.



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St. Joseph's Hospital & Medical Center is unique in its approach to care:



**CLINICAL
EXCELLENCE**

TEACHING

RESEARCH



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CHW

Tertiary, academic medical
center in community

Differentiated through
balance in teaching,
research, and clinical
excellence.

As a Teaching Hospital, SJHMC has...

Physician, Nursing & Ancillary staff training:

- Over 150 medical school graduates in 11 different Residencies
- 18 Fellowships
- Extensive nursing education programs - Magnet Status
- Multiple affiliations for technologist training



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As a Research Hospital SJHMC Has ...

- Has 502 active basic and clinical research studies
- Research spans:
 - Neurological diseases such as epilepsy, brain tumors, MS, cerebrovascular disease, Muscular dystrophy, neuroimmunology, movement disorders, and cognitive disorders
 - Trauma
 - Genetics
 - Cardiovascular disease
 - Device development
 - Pediatrics
- NIH, State & private foundation grants equaling \$40 million annually



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Barrow Neurological Institute[®] (BNI)

- BNI is an internationally renowned medical center that offers care for people with brain and spine diseases, disorders and injuries
- BNI actively participates in ongoing clinical and basic neuroscience research to further the prevention and treatment of brain, nerve and spinal cord diseases and injuries
 - Admissions each year 10,500
 - Neurosurgeries each year 4,800
 - Neurosurgery Residents 28
 - Neurosurgery Fellows 5
 - Neurology Residents 16
 - Neurology Fellows 6
 - Professional Neuroscience Conferences 13



BNI Centers of Excellence



- Neurosurgery
- Neurology
- Neuropsychology
- Neuro Rehabilitation
- Neuroradiology
- Neuropathology
- Neuroscience Research
 - Neurobiology
 - Neuroimaging
 - Cell and Molecular Biology



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Barrow Neurological Institute

Translational Genomics Research Institute

Childrens Healthcare Center



Pediatric Neurogenetics Center

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Administrative Support

Secretarial/Scheduling
Fund Raising

Clinical Support

Pediatric Nurse Practitioner
Genetics Counselor
Social Worker

BNI-CHC-TGEN Pediatric Neurogenetics Center

Diagnostic evaluation of genetic/metabolic disorders

- Neurodegenerative diseases (metabolic)
- Mitochondrial disorders
- Familial disorders
- Neuromuscular disorders
- Single gene disorders (Rett syndrome, TSC, NF)
- Complex disorders – multidisciplinary evaluation

Center for Clinical Research

Interface with Basic Research Labs

Education
Web based

DNA Diagnostics

1. Clinical assays
2. Development of chip based tests

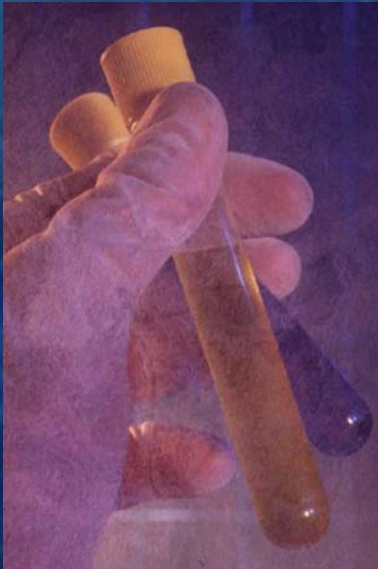
Basic Research

TGen
Neurology and Neurobiology Labs at BNI

Clinical Research

Clinical trials coordinator
Database manager

Clinical Research Proteomics at SJHMC



Richard S. Burns, M.D., Director
Mohamed Ali Parkinson Center

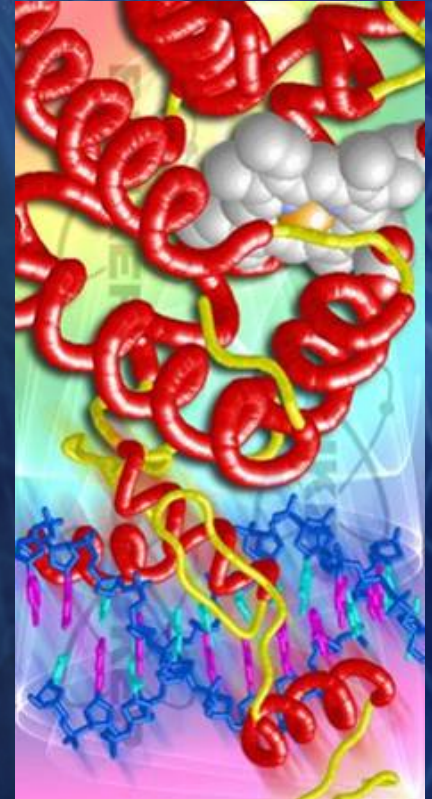


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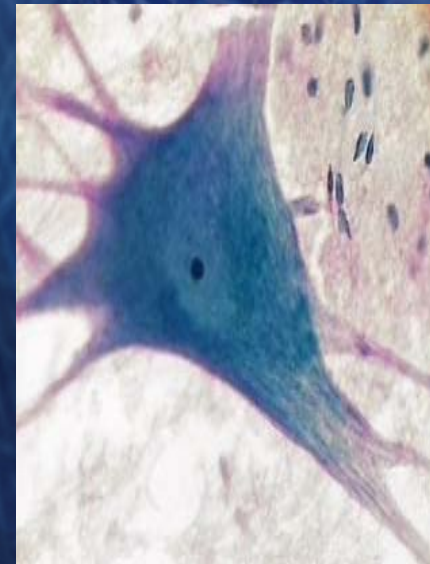
The BNI Proteomics Research Facility Goal is to...

- Provide investigators in Basic & General Clinical Research throughout the BNI with tools needed for proteomic analyses
- Provide services and establish strong collaborative relationships in focused areas of cell protein expression, protein quantitation, protein-protein interactions and protein structure and function



Clinical Research Proteomics at the BNI...

- **Identify & Investigate...**
 - Molecular markers for neurodegenerative diseases such as Alzheimer's and Parkinson's
 - Prognostic molecular markers for multiple sclerosis
 - Proteins associated with cancers of the brain and central nervous system
- **Brain and central nervous system research to determine post-translational modifications of protein**
- **Mass spectrometry imaging for determine spatial distribution of biomolecules in the brain**



Current BNI Proteomic Capabilities Include...

- Bruker Ultraflex II MALDI TOF/TOF MS with tissue imaging capabilities for cells and tissue extracts
- Bruker HCTplus ESI-Ion Trap MSn
- The PROTEINEER™ suite; automated 1 μ L spotter
- Cryostat Leica CM3050
- Laser Capture Dissection Microscope



Applying BNI Resources & Expertise toward a Regional Arizona Proteomics Initiative

- Extensive Research Tissue Bank
Case Representation for Brain &
CNS Research
 - Neurodegenerative diseases
 - Neuromuscular diseases
 - Traumatic and ischemic diseases of
the nervous system
 - Metabolic brain diseases



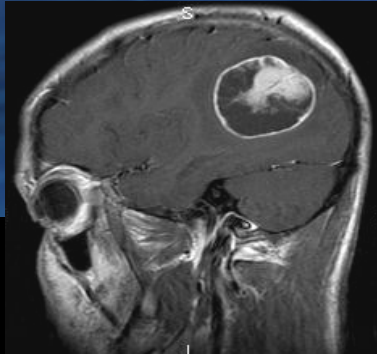
Applying BNI Resources & Expertise toward a Regional Arizona Proteomics Initiative

- BNI experienced in harvesting brain tissue useful for both proteomic & genomic analysis
 - Intact RNA message compliments proteomic studies
- Expertise in the annotation & handling of human tissue specimens
 - IRB tissue policies regarding research using human tissue
 - HIPAA compliant
- Leveraging clinical expertise in disease knowledge with basic scientists knowledge of biotechnology to test specific research hypotheses of the brain and CNS

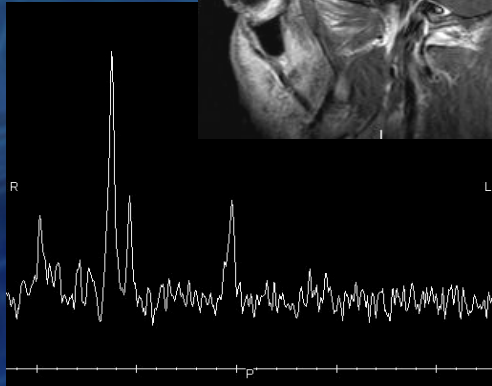
How can this Regional Arizona Proteomics Initiative Collaborate & Contribute to Challenges we all Face?..

- **Methods and protocols to cover the 9 to 12 log dynamic range of the human serum proteome when using mass spectroscopy analysis**
 - Plasma and CSF samples
- **Developing and applying technologies to reduce protein sample complexity**
- **Standardization of sample preparation protocols and the benefits from having clinical expertise in this area**
- **In biomarker identification, using antibody based quality control methods such as antibody chips for sensitivity and reproducibility checks and validation**
- **Application to prognostic and diagnostic molecular pathology**

Imaging Center



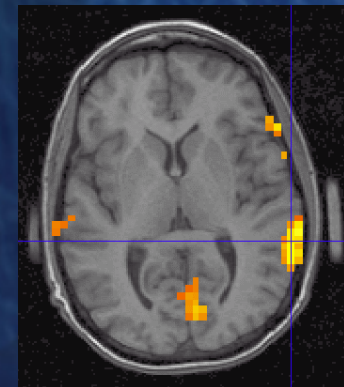
Magnetic Resonance Imaging (MRI)



Advanced Magnetic Resonance Spectroscopy (MRS)



Magnetic Resonance Angiography (MRA)



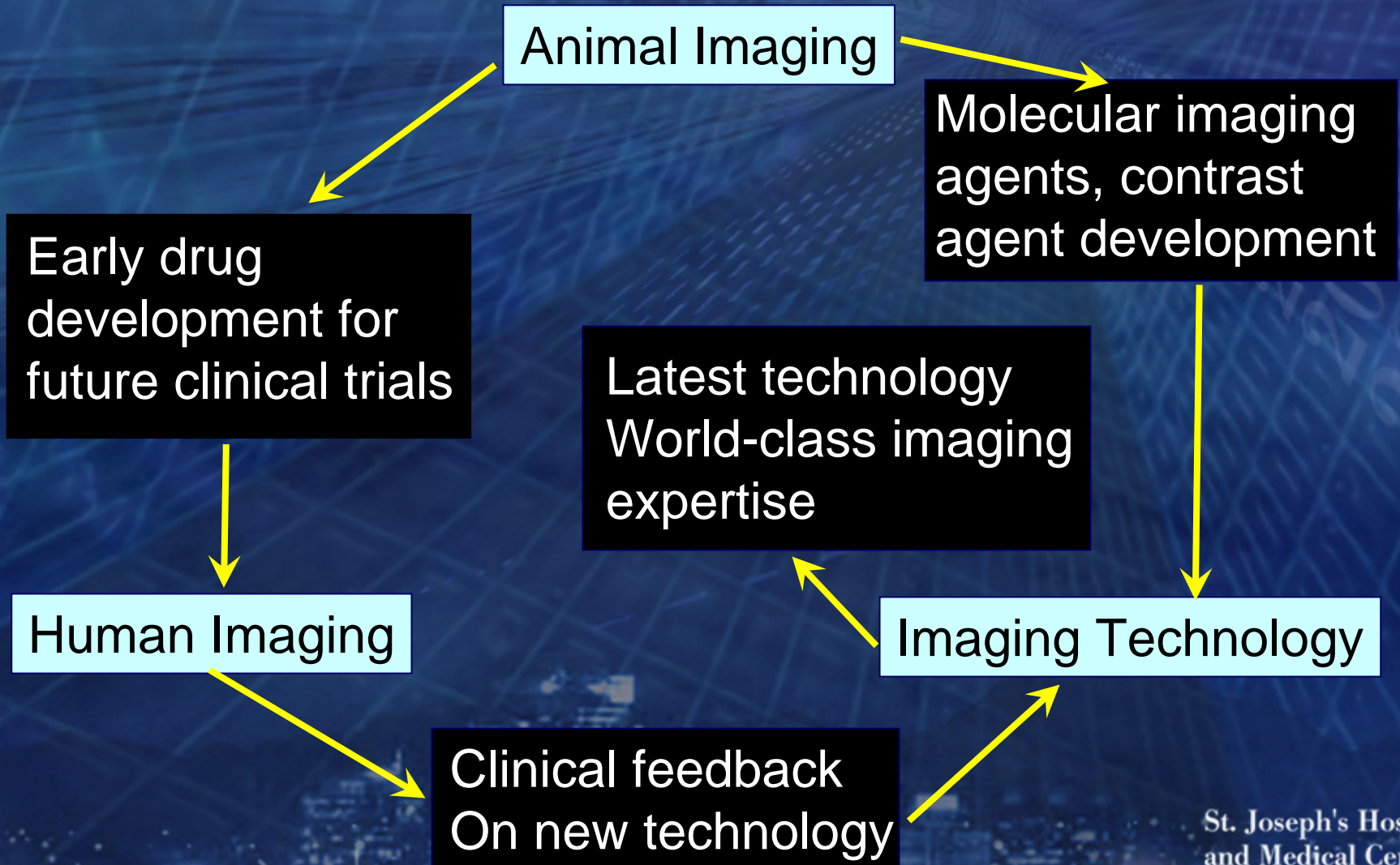
Functional MRI (fMRI)

Dr. James Pipe, Research Director

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Imaging Research



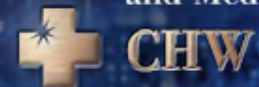
Imaging Research: Locations, Requirements

Animal Imaging: Requires a vivarium and this needs to be in the vicinity of the scanners. A need to scan both large and small animals.

Human Imaging: SJ/BNI. Facility needs to be located within a healthcare system to take advantage of clinical expertise and patient population.

Imaging Technology: Research scanners must keep platform same as clinical scanners in order to accomplish translational research
Consider isotope production for PET.

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Summary

- **Healthcare systems partnered with basic scientists has the potential to develop productive translational research**
- **Tissue availability, clinical expertise, and specialized laboratory equipment are resources that can be shared between partners**
- **Offers additional peer reviewed funding opportunities.**

Synergistic Imaging Research

- Increased grant opportunities
- Possible corporate support
- IP royalties
- Healthcare industries aligned with local universities



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Heart/Lung Institute

Congenital Heart Center

Clinical Care
• Pediatric
• Adult
CV Surgery

Center for Thoracic Transplantation

**Lung Transplant.
Heart Transplant.
Ventricular Assist Devices (VADs)**
• Bridge therapy
• Destination therapy

Center for Thoracic Disease

**Pulmonary Hypertension
Esophageal Surgery
Thoracic Oncology
Single Lobar Surgery
Adult CV Surgery**
• CABG
• Minimally Invasive Valve Surgery
• Pulmonary Rehabilitation

Center for Cardiovascular Health

**Clinical Cardiology
Core Cardiology Staff
Cardiology Fellowships
Operational Leadership
Congestive Heart Failure
Imaging Diagnostics**
• MR
• CT
• Echo
Cardiac Rehabilitation

Center for CardioPulmonary Research

**Clinical Research
Translational Research
Basic Research**



Collaborative Imaging Research

Animal Imaging

Barrow

U of A

ASU

Banner

Human Imaging

Barrow

U of A

ASU

Banner

Imaging Technology

Barrow

U of A

ASU

Banner

Corporations

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