Intramural NIH Imaging Sciences Program

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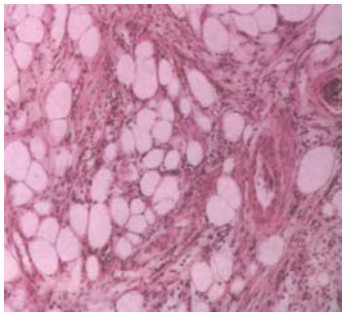
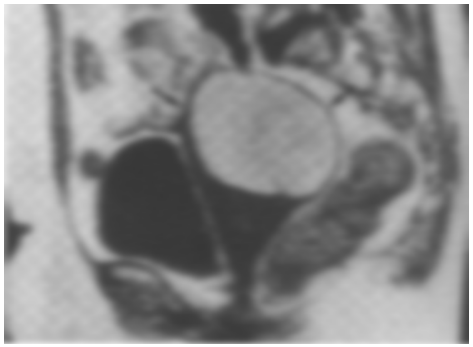
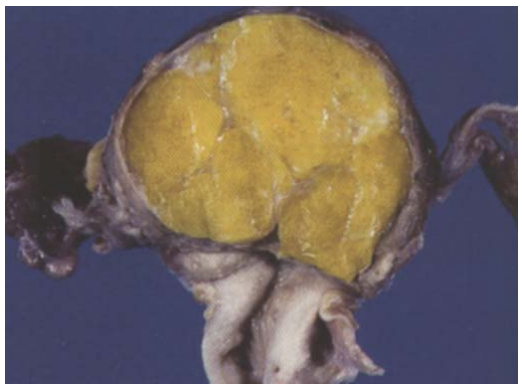
CURRENT CLINICAL PARADIGM



Histology

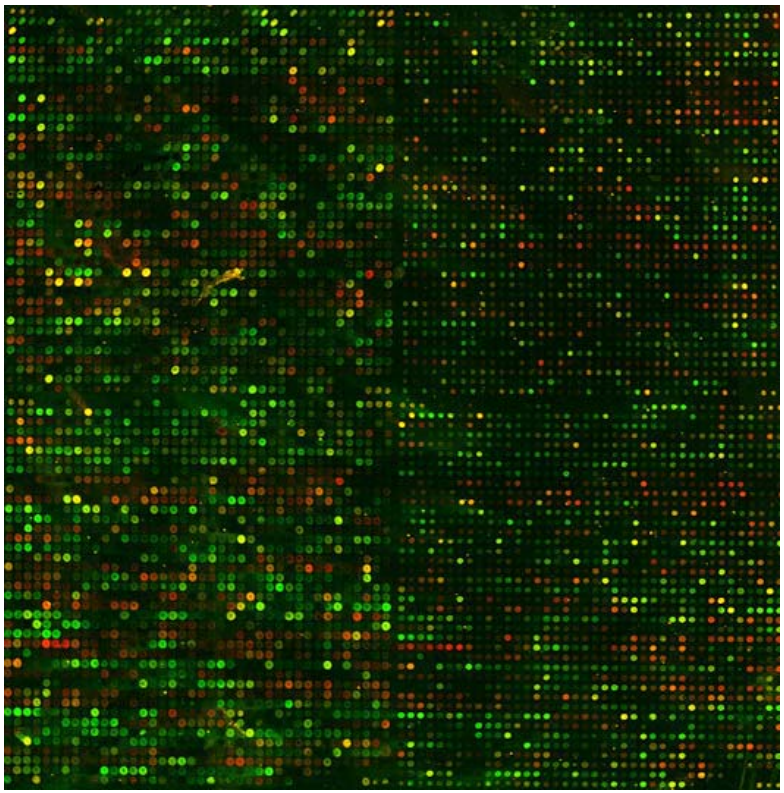


Imaging



Gross Pathology

NEW PARADIGM



Functional Genomics/Proteomics

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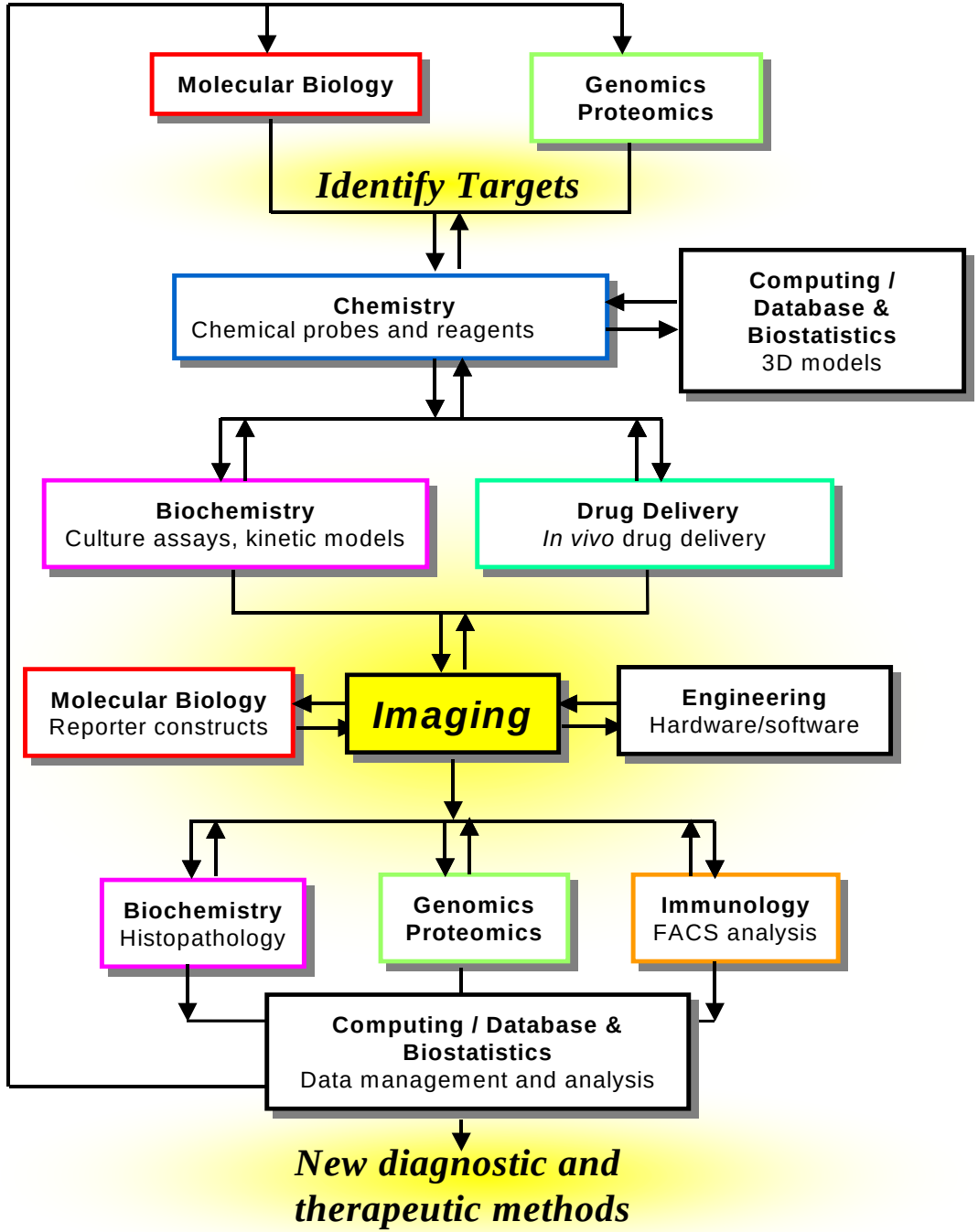
Molecular and Functional Imaging


Molecular Biology
Genomics
Proteomics
Identify Targets
Chemistry
Chemical probes and reagents
Computing /
Database &
Biostatistics
3D models
Biochemistry
Culture assays, kinetic models
Drug Delivery
In vivo drug delivery
Molecular Biology
Reporter constructs
Imaging
Engineering
Hardware/software
Biochemistry
Histopathology
Genomics
Proteomics
Immunology
FACS analysis
Computing / Database &
Biostatistics
Data management and analysis
New diagnostic and
therapeutic methods

Synergy between Imaging and Functional Genomics & Proteomics

- Facilitate target identification
- In vivo spatiotemporal localization of molecular targets
- Personalize treatment based on imaging and image guided tissue analysis
- Image guided minimally invasive therapy

Future Plan

- Co-registration of different imaging data
- Correlation of combined imaging findings with molecular analysis
- Image guided biopsies, therapies and drug delivery
- Molecular targeted diagnostics and therapeutics

Imaging Sciences Program

- Department of Radiology – King Li, MD
- Laboratory for Diagnostic Radiology Research (LDDR) – King Li, MD, Joe Frank, MD
- Molecular Imaging Laboratory – King Li, MD,
- Mouse Imaging Facility – King Li, MD, Alan Koretsky, PhD
- Nuclear Medicine Department – Ron Neuman, MD
- Positron Emission Tomography Department – Bill Eckelman, PhD

Department of Radiology

- 16 Radiologists
- 3 MRI (1 MRI planned in 2002)
- 1 intra-operative MRI planned in 2002
- 3 helical CT scanners
- 7 ultrasound units (one 3D ultrasound unit planned in 2002)
- 2 biplane angiography suites (1 Angio-CT suite planned in 2002)

Nuclear Medicine and PET Departments

- 6 SPECT cameras
- 3 PET tomographic units (1 high resolution head PET unit planned for 2002)
- Three medical cyclotrons
- GMP facility planned for 2003

Mouse Imaging Facility

- 3 animal MRI scanners (4.7T, 7T, 9T)
- 2 micro-CTs
- 2 micro-PET scanners
- 3 ultrasound units (1 3D+therapeutic unit planned for 2002)
- 1 micro-SPECT scanner with 8-pin-hole design being built
- 1 luminescence imager (planned for 2002)

The Imaging Sciences Training Program

- Created in 1998
- Fellowships of 1-4 years duration
- Clinical and basic imaging research
- MDs and PhDs

Collaborative Efforts with other NIH Institutes

- Existing collaborative efforts with 17 NIH institutes
- Preliminary plans to extend collaborations with planned new NCI intramural molecular imaging program
- Preliminary plans to collaborations with NIBIB

Collaborative Efforts with investigators outside NIH

- Joint fellowship programs with Georgetown and George Washington University
- Joint research programs with FDA, military hospitals
- Joint research programs with Johns Hopkins, Georgetown and many other institutions
- Planned program for training faculty members from any imaging department from US and abroad