Ultrasound Imaging Laboratory

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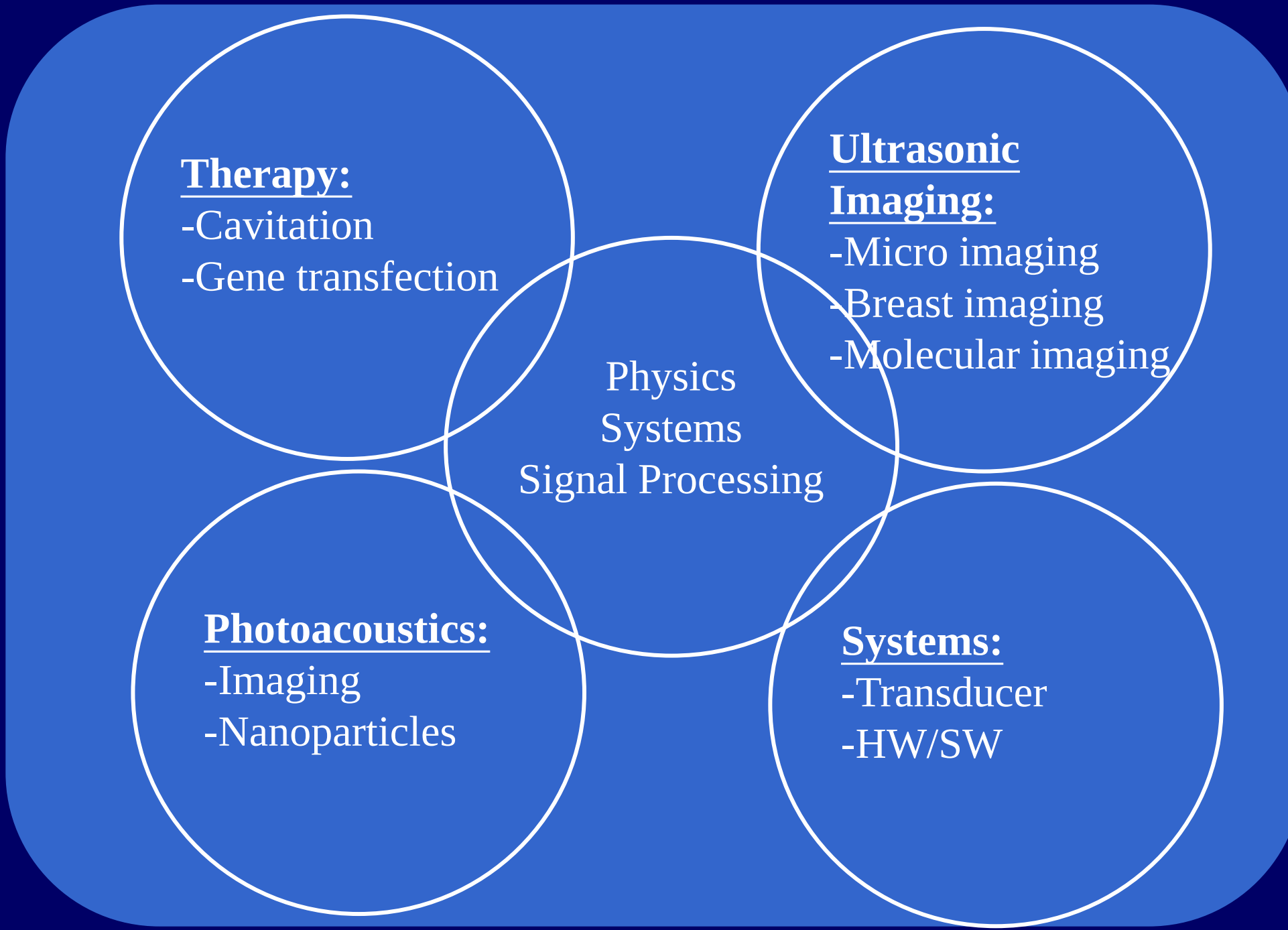
BEBI/EE

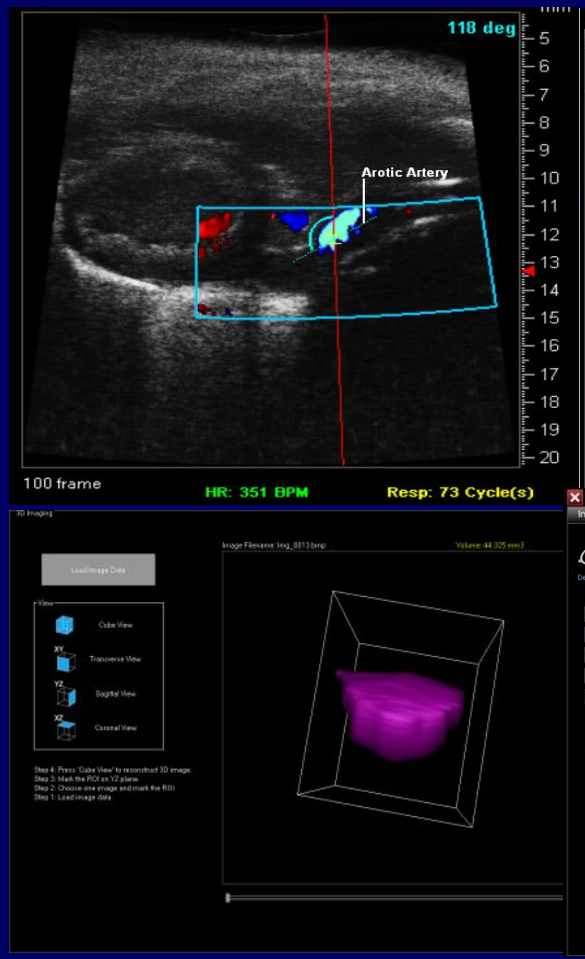
National Taiwan University

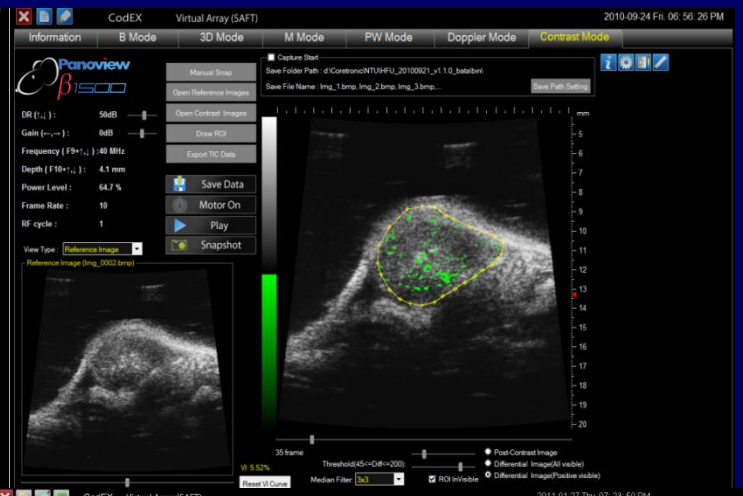

Therapy:
-Cavitation
-Gene transfection
Ultrasonic Imaging:
-Micro imaging
-Breast imaging
-Molecular imaging
Physics
Systems
Signal Processing
Photoacoustics:
-Imaging
-Nanoparticles
Systems:
-Transducer
-HW/SW

Ultrasonic Micro-Imaging

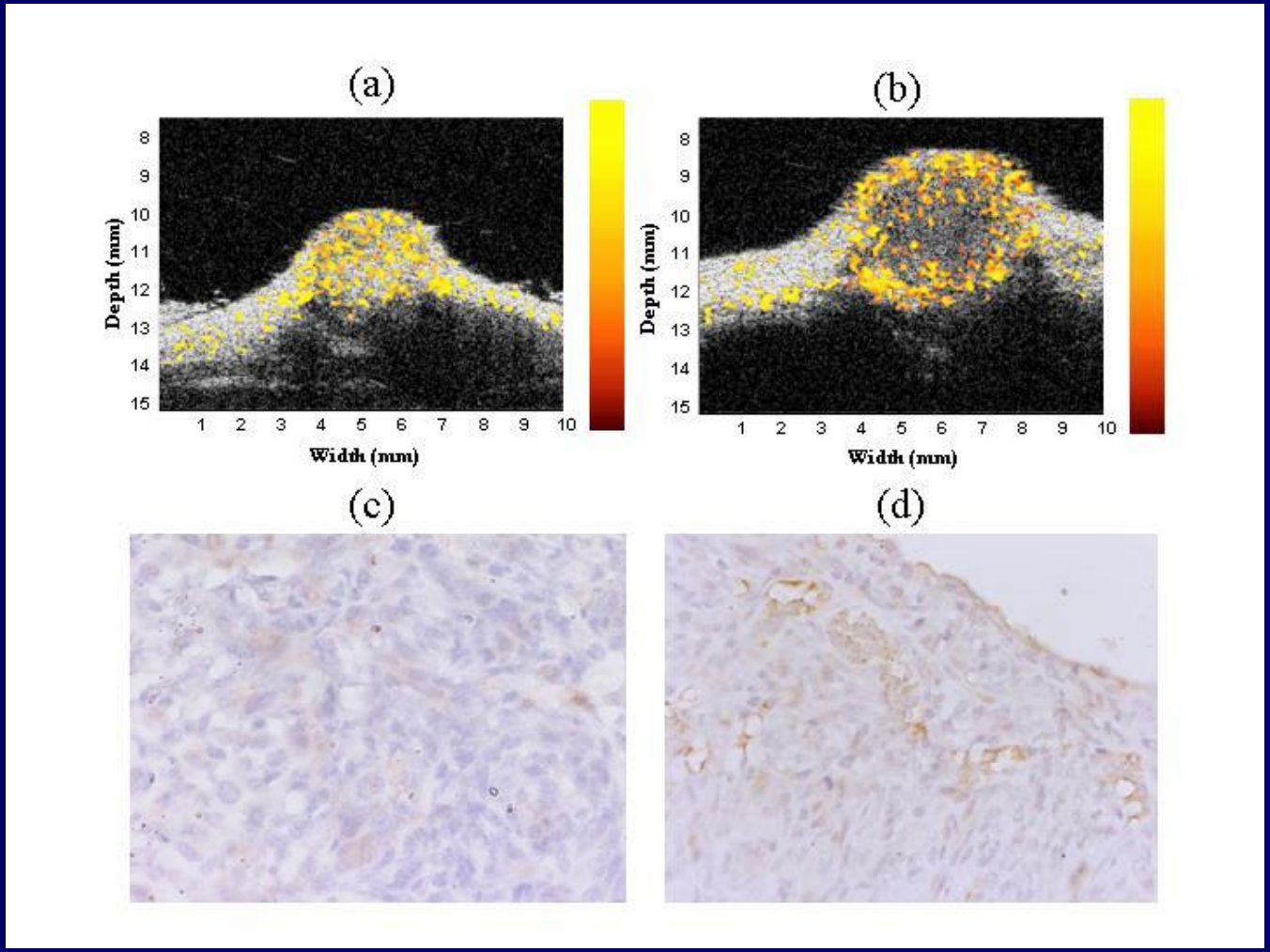
From Research to Commercialization

Panoview β1500





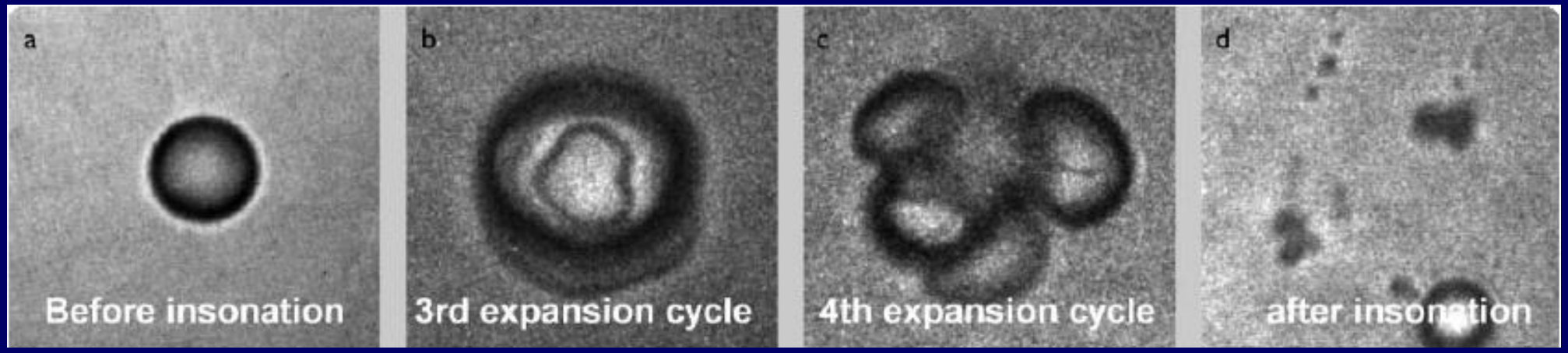
Mouse Tumor Micro-Imaging



Cover of IEEE Trans. on UFFC, Jan. 2004

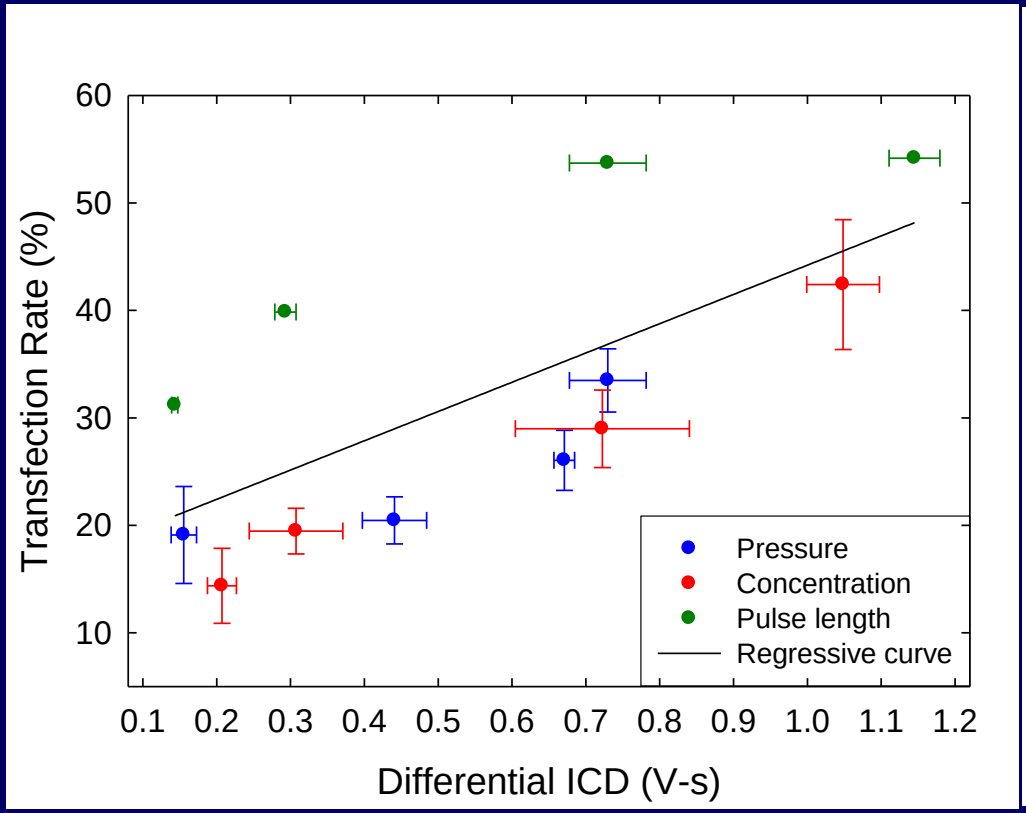
Ultrasound Assisted Therapy

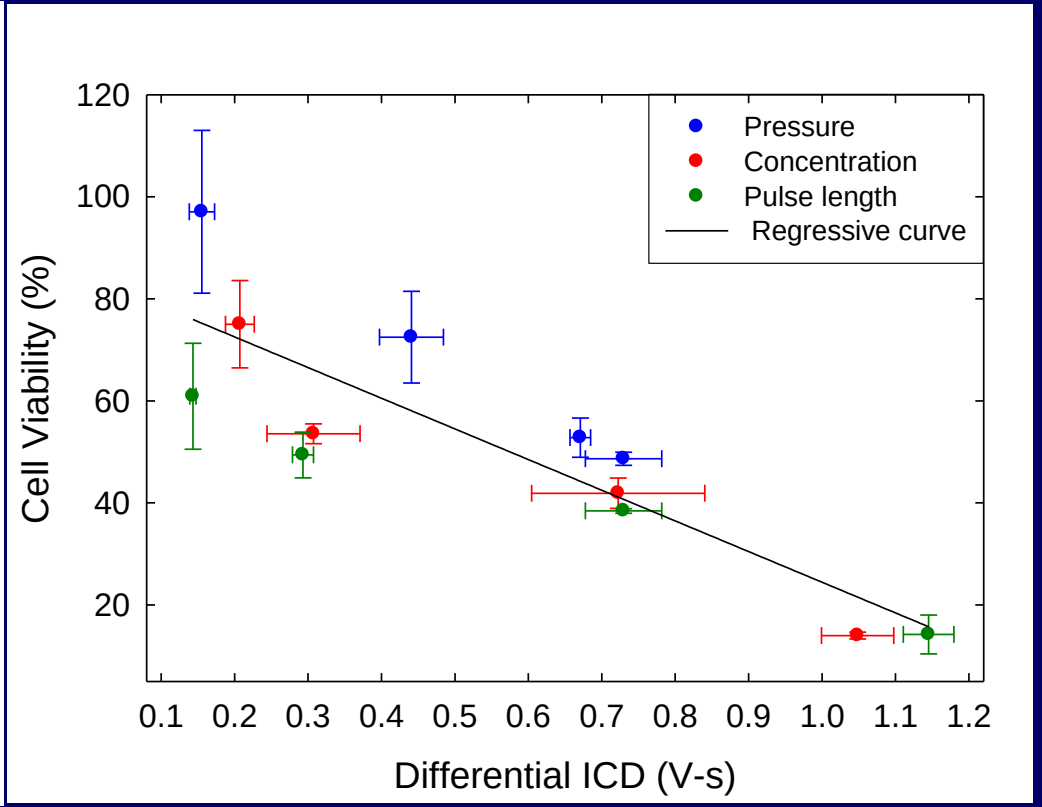
Microbubbles and Cavitation



From UC Davis

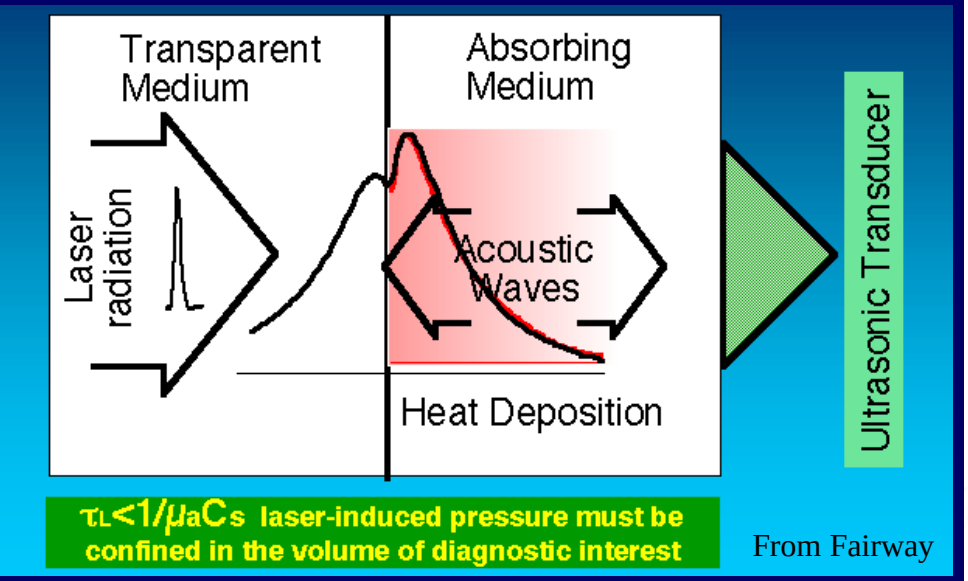
Cavitation vs. Gene Transfection/Cell Viability



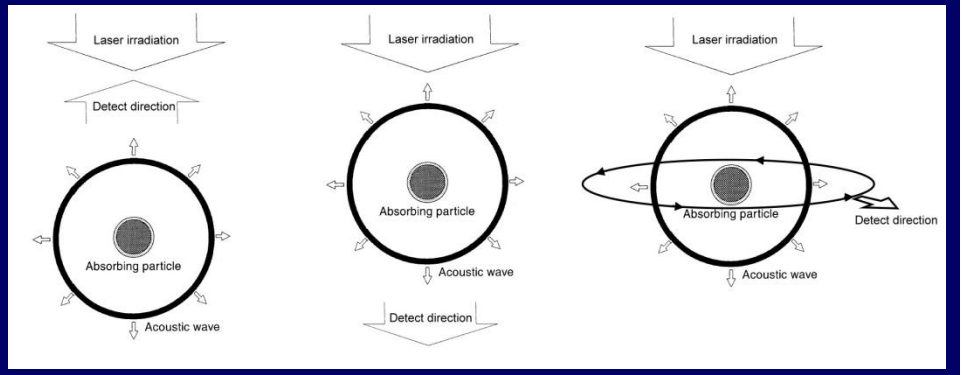


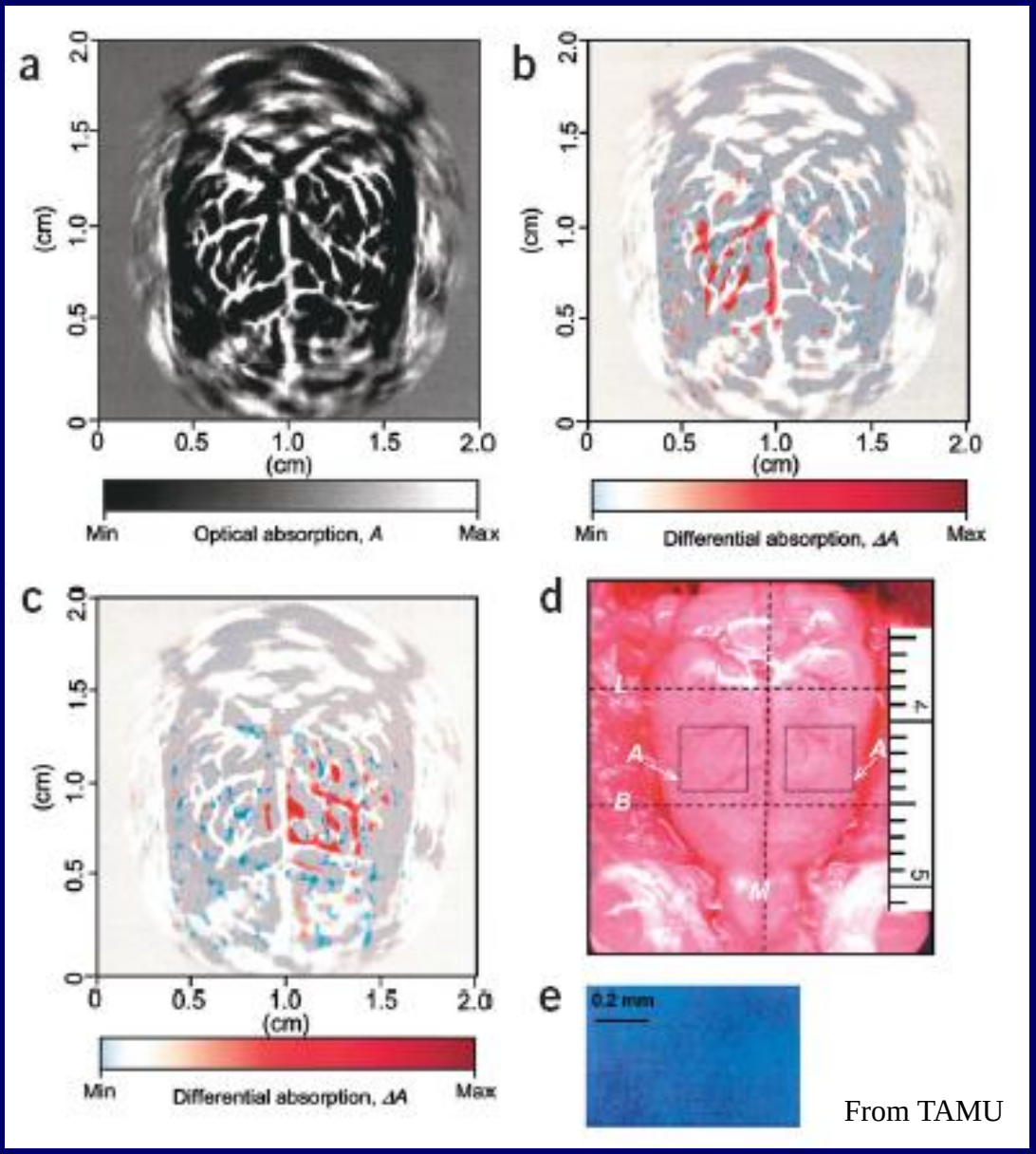
Photoacoustic Imaging and Gold Nanoparticles

Optoacoustic (Photoacoustic) Imaging



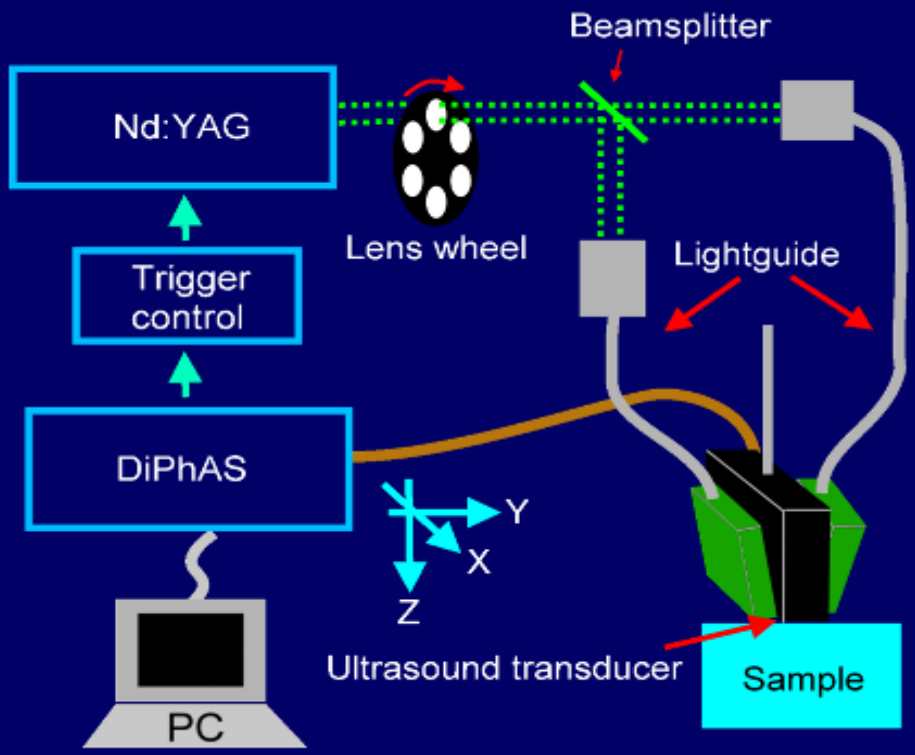
From Fairway

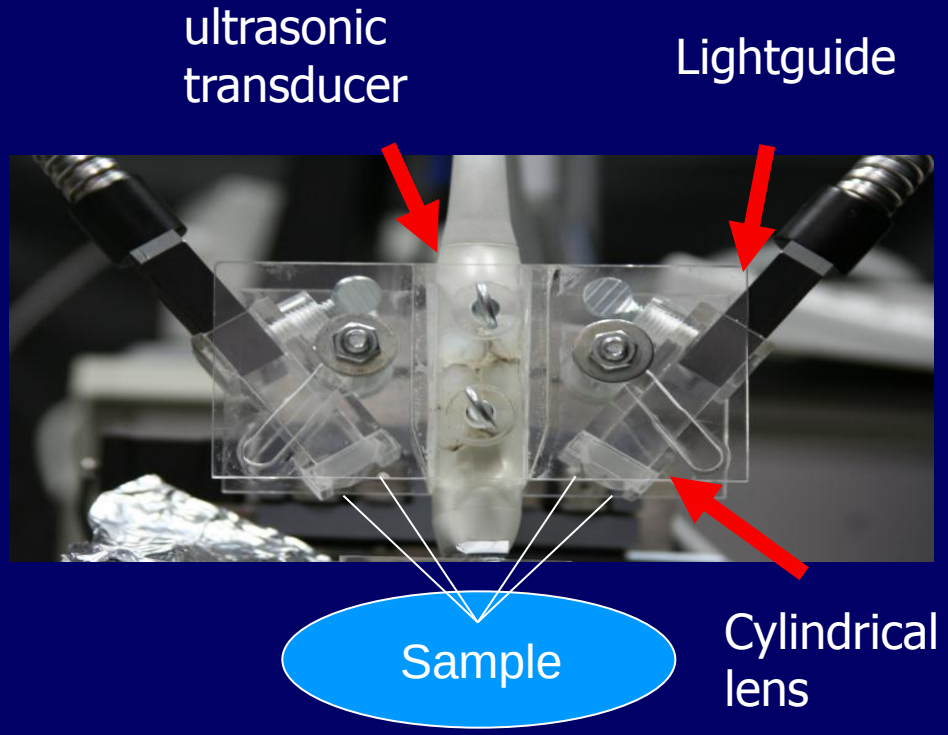




From TAMU

High frame rate photoacoustic imaging system





Laser system: Q-switched Nd:YAG

(wavelength 1064 nm, pulse duration 8 ns

Pulse repetition freq. **15 frames/s**)

Lightguides: fiber bundle (15,000 fibers)

(output: 3 mm X 30 mm illumination area)

Photoacoustic probe:

Optical: Light guide with cylindrical lens

Acoustic: Linear array with 128 channels

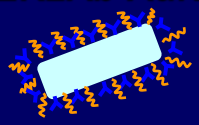
(pitch : 0.3 mm, f_c = 5 MHz)

Reflecting foil: 9 μm

Nanoprobe Designs

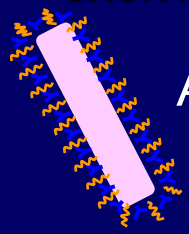
A

HER2Ab-AuNR$_{785}$



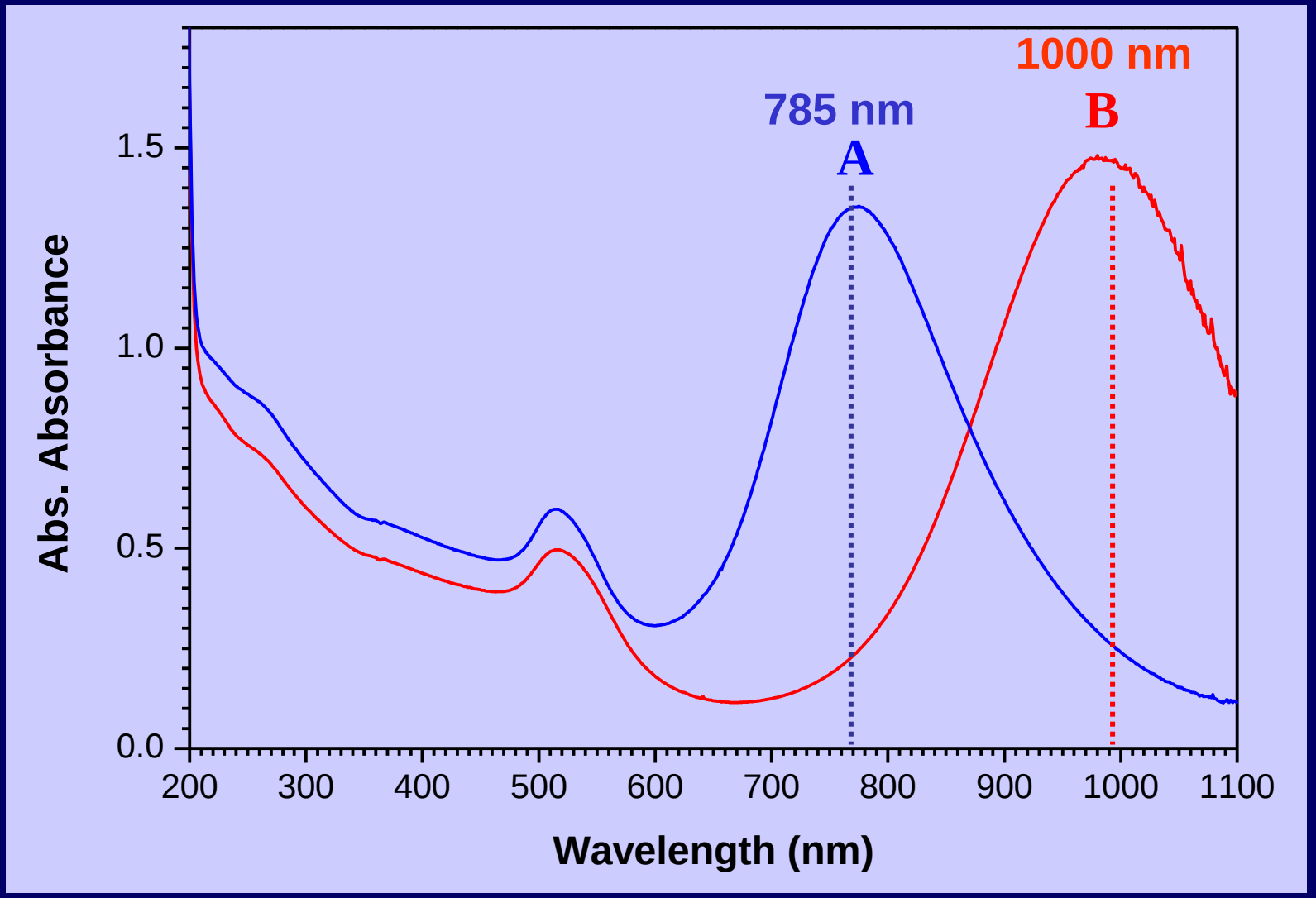
A.R.=3.7

CXCR4Ab-AuNR$_{1000}$

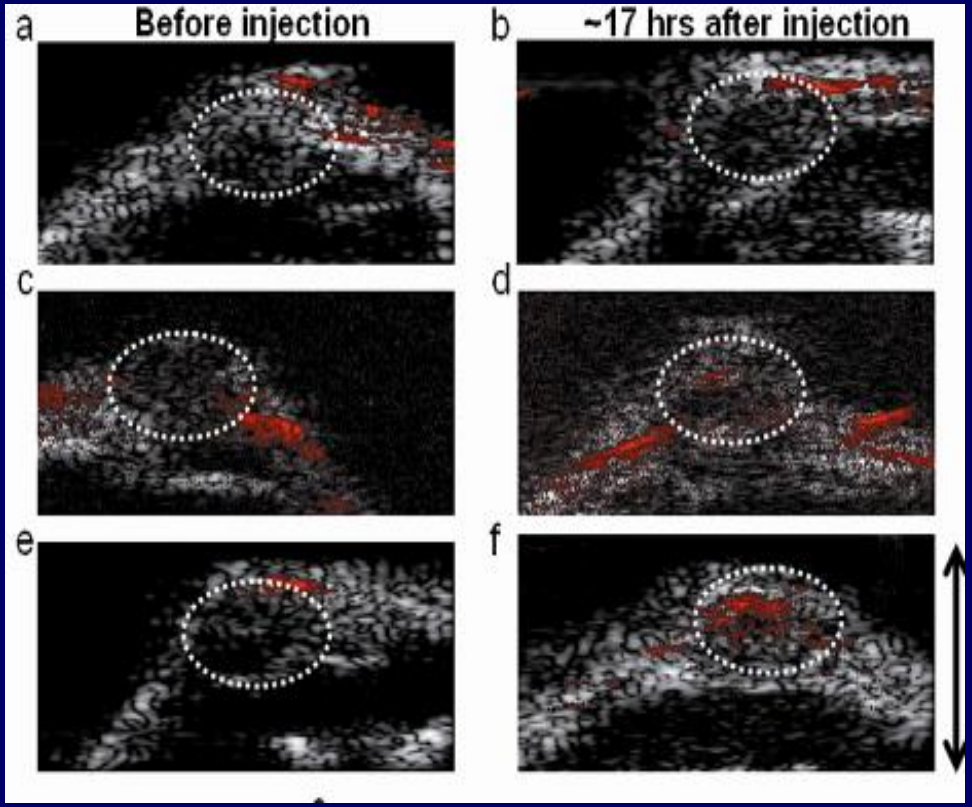


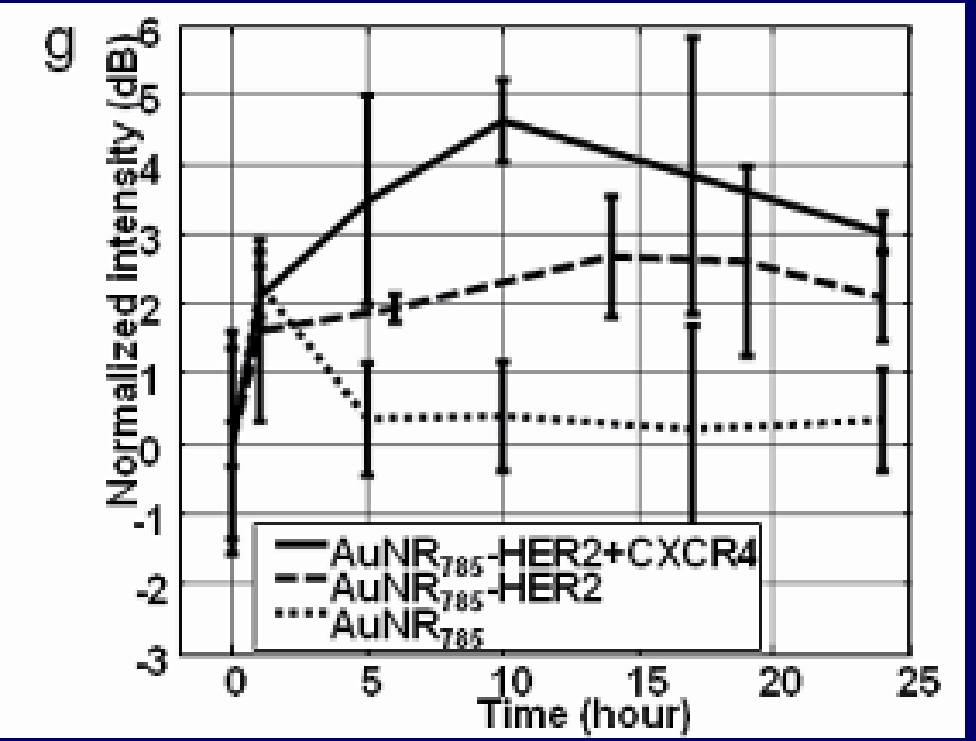
A.R.=5.9

B

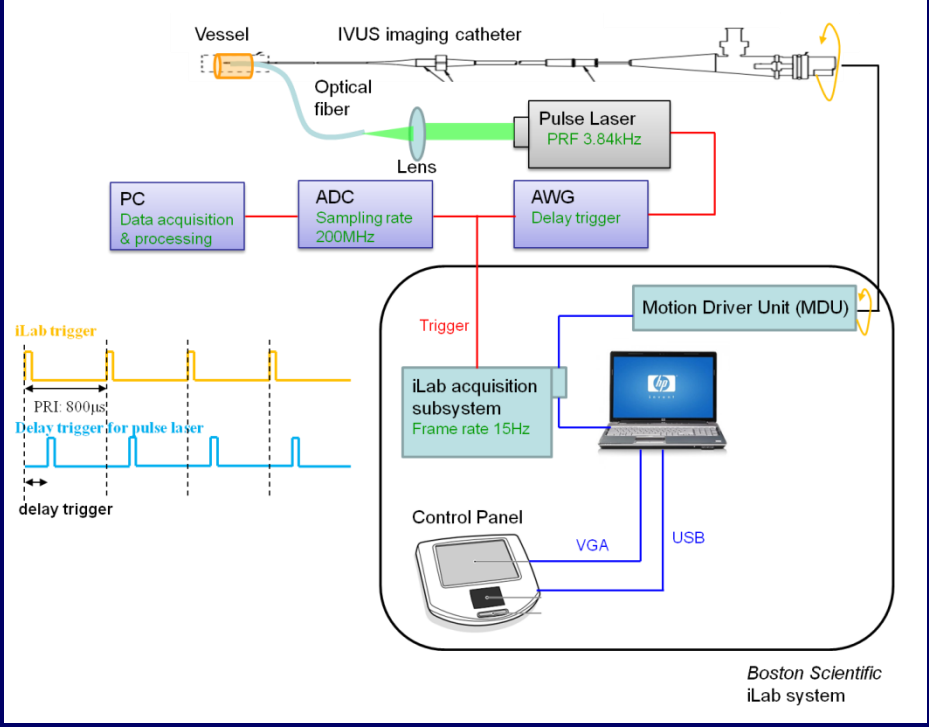


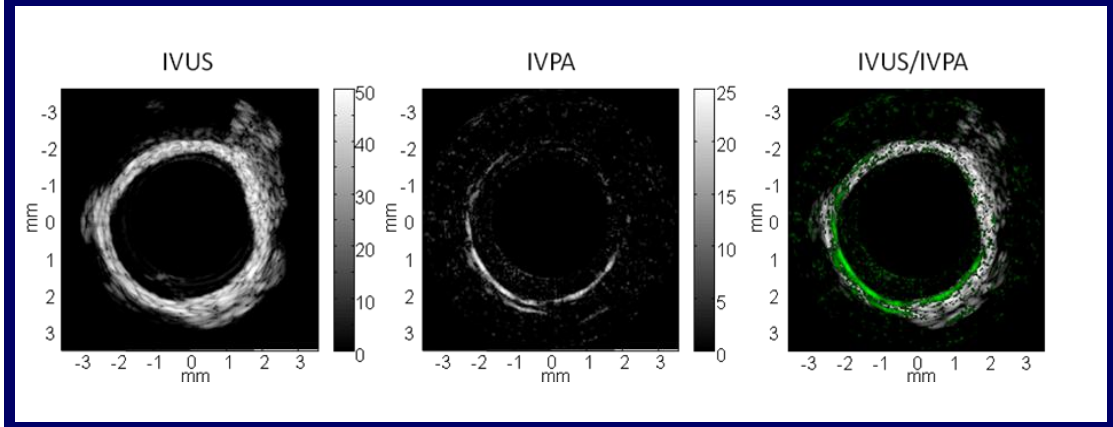
Molecular Imaging with Two Targets





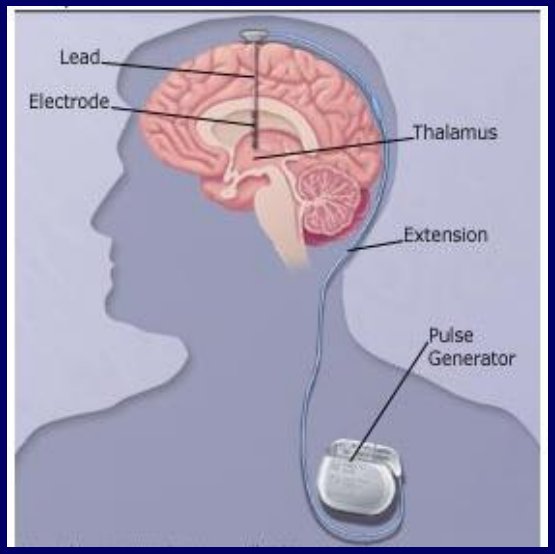
Intravascular PA Imaging

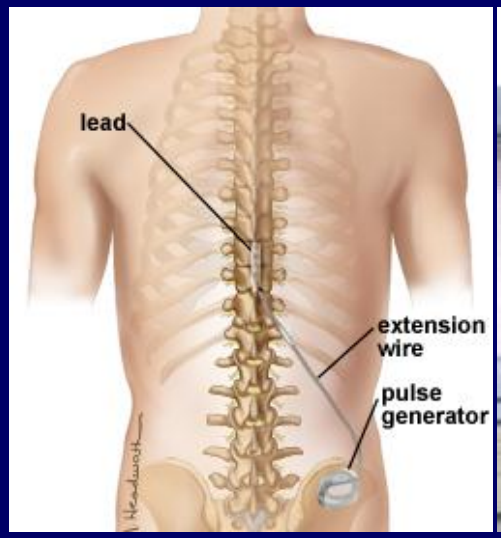


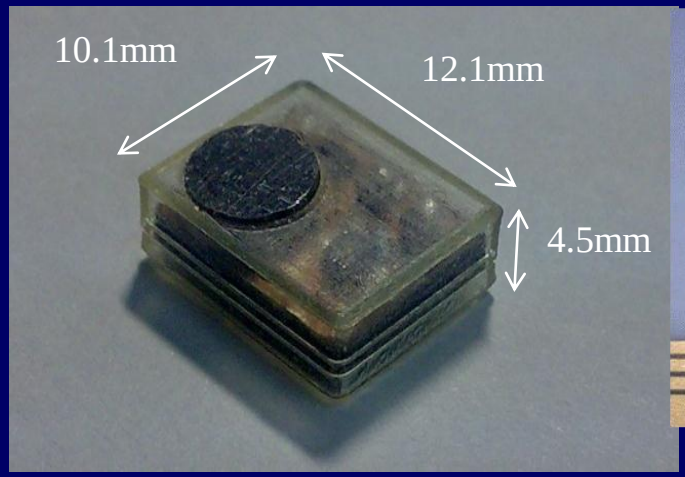


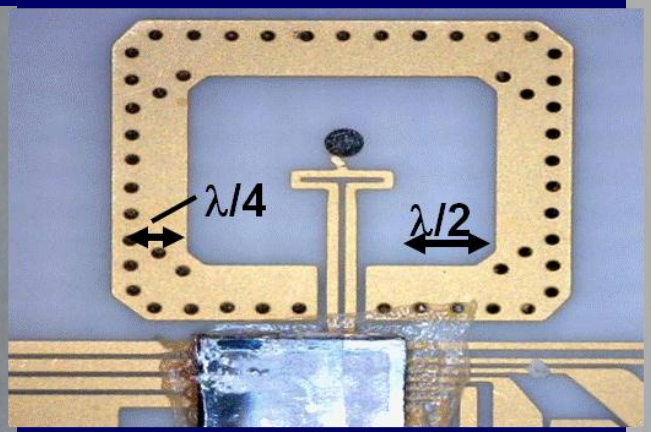
Wireless Medical Devices:

- Transcranial Doppler
- Neural Stimulator


Lead
Electrode
Thalamus
Extension
Pulse
Generator


lead
extension
wire
pulse
generator


10.1mm
12.1mm
4.5mm


λ/4
λ/2

Chip


Pulse
PA0700NL
1038-S CHINA

THANK YOU!