

JAFOE 2014

Bioimaging session



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Dept of Biomedical Engineering

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New York

USA



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Center for Advanced Photonics

RIKEN

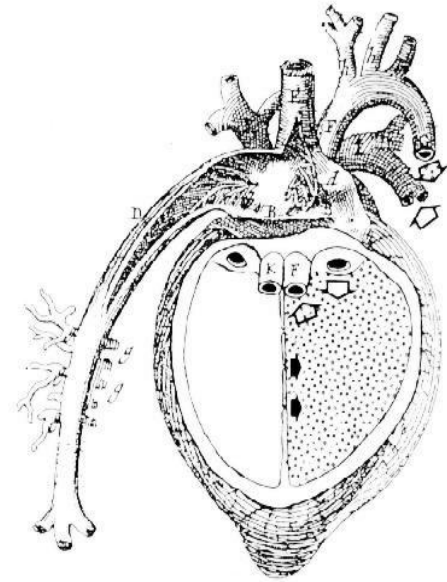
Waiko

JAPAN

Galen's Teaching



**Treated Roman Emperor Commodus
and Gladiators**



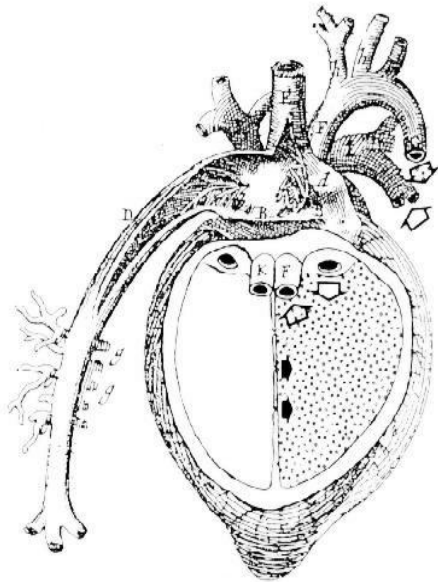
Barbary Ape Heart

Galen, 131-201 AD

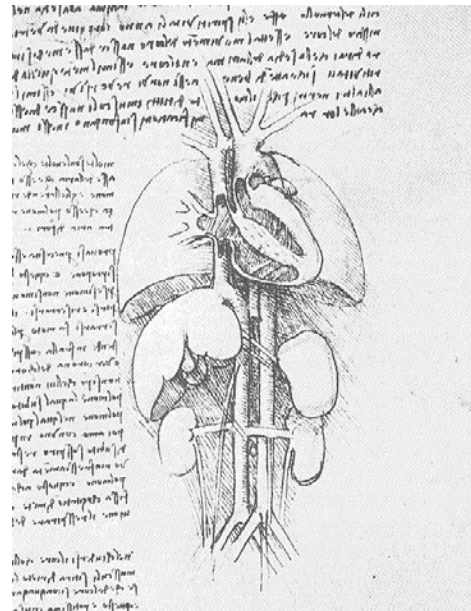
The Heart



2-Chamber Heart

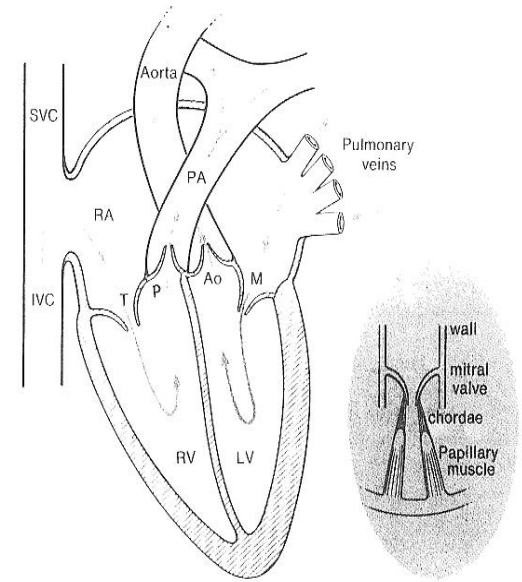


Galen, 131-201 AD



**da Vinci
1452-1519 AD**

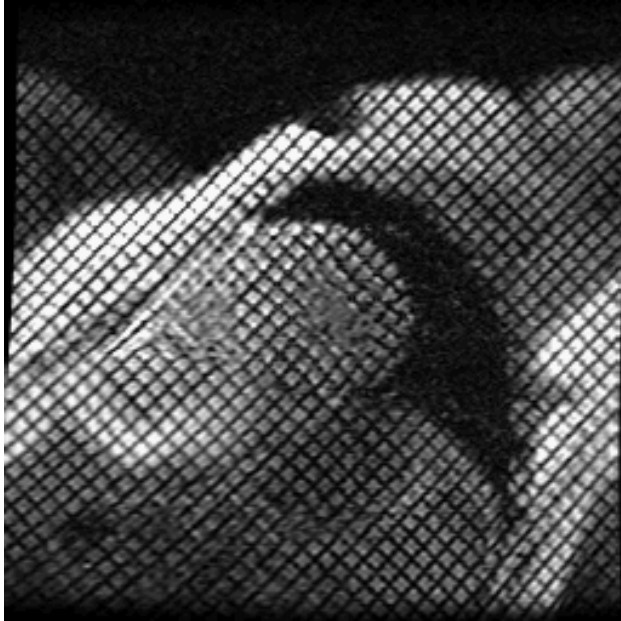
4-Chamber Heart



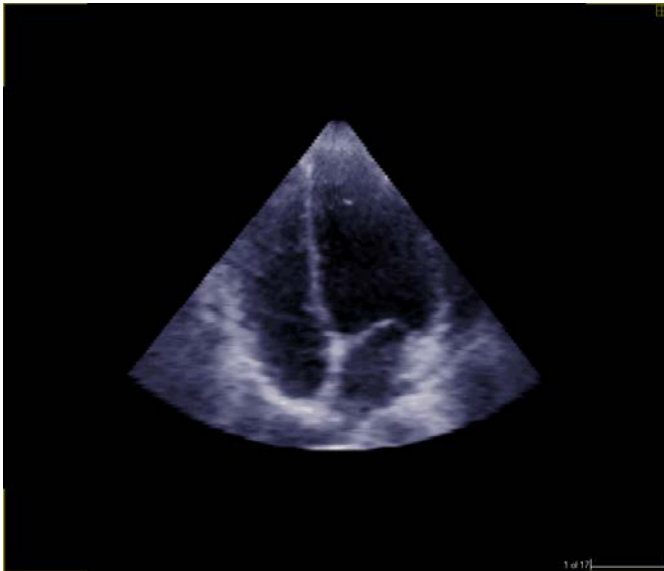
**Andreas Vesalius
1514-1564 AD**

Cardiac imaging

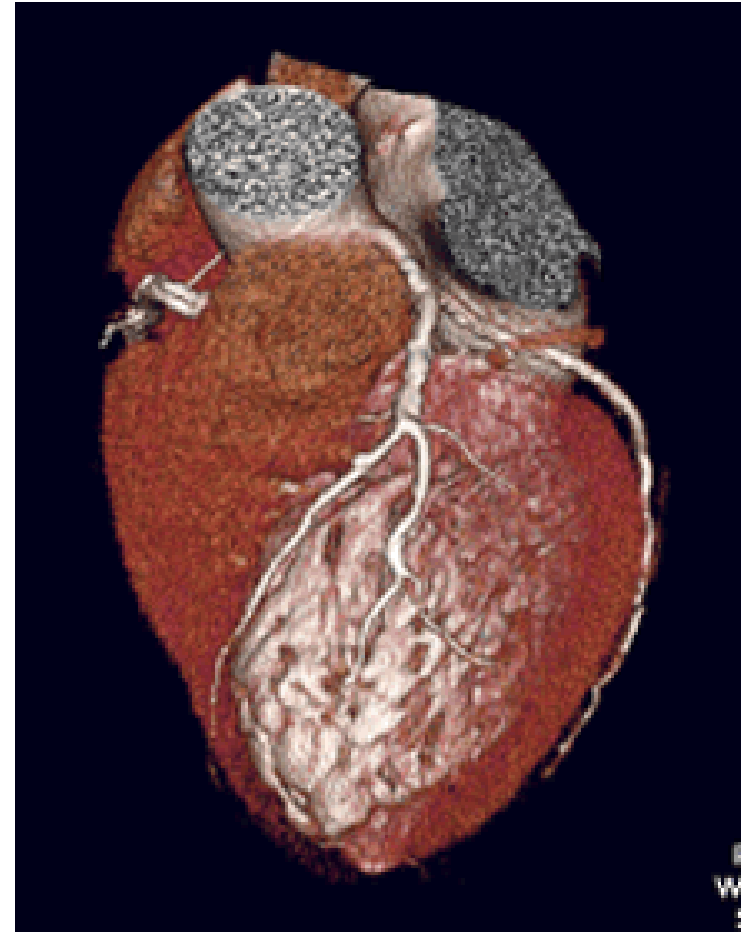
MRI



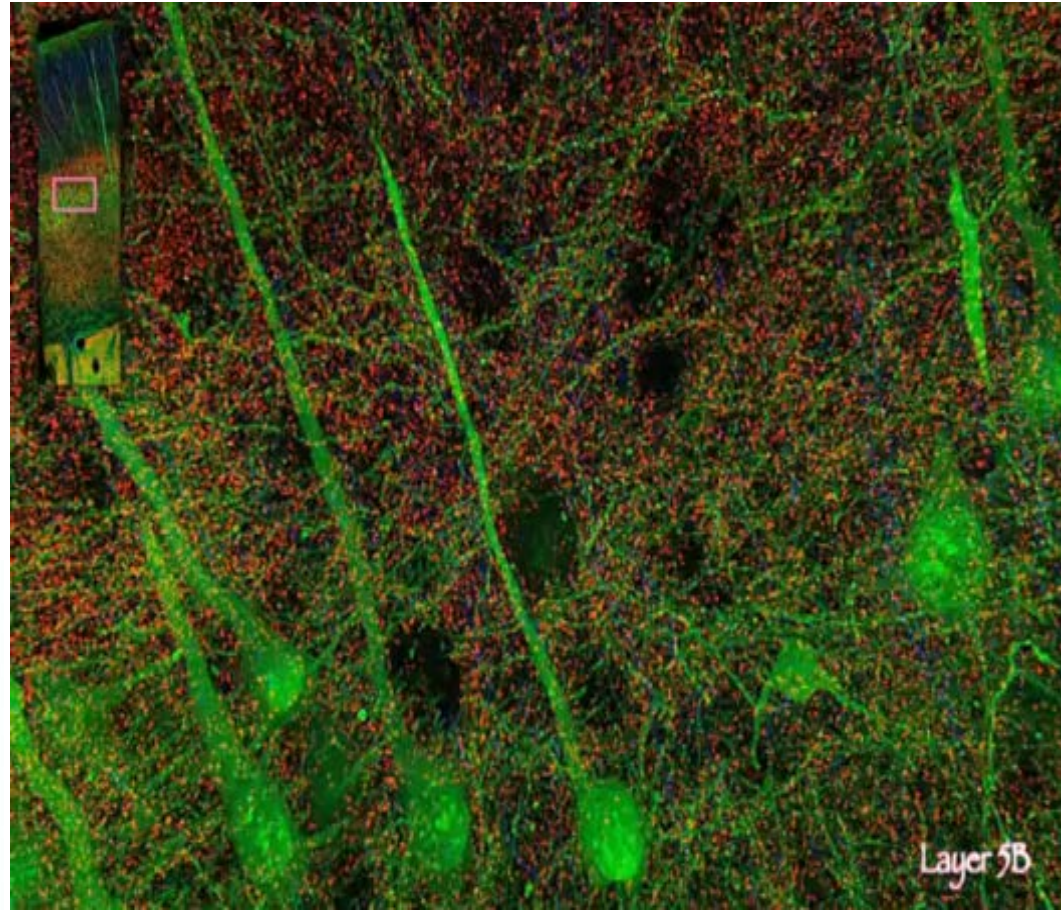
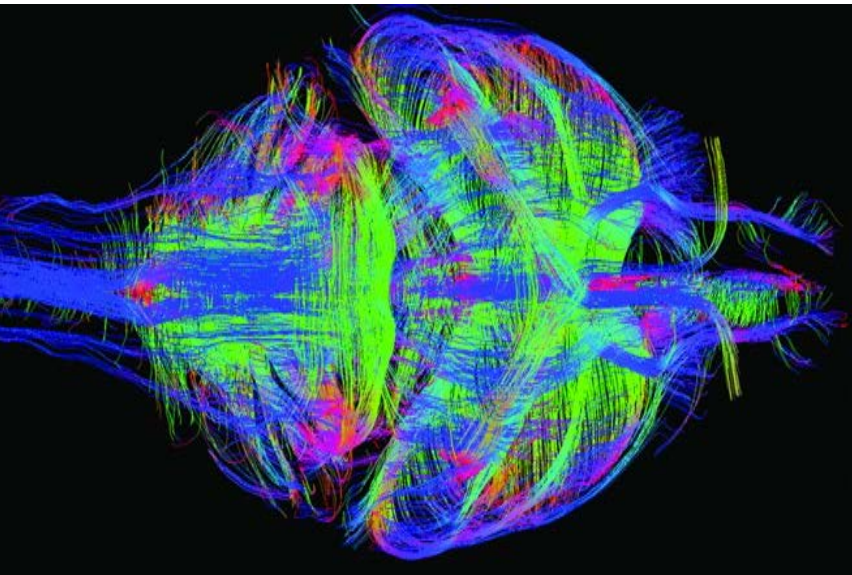
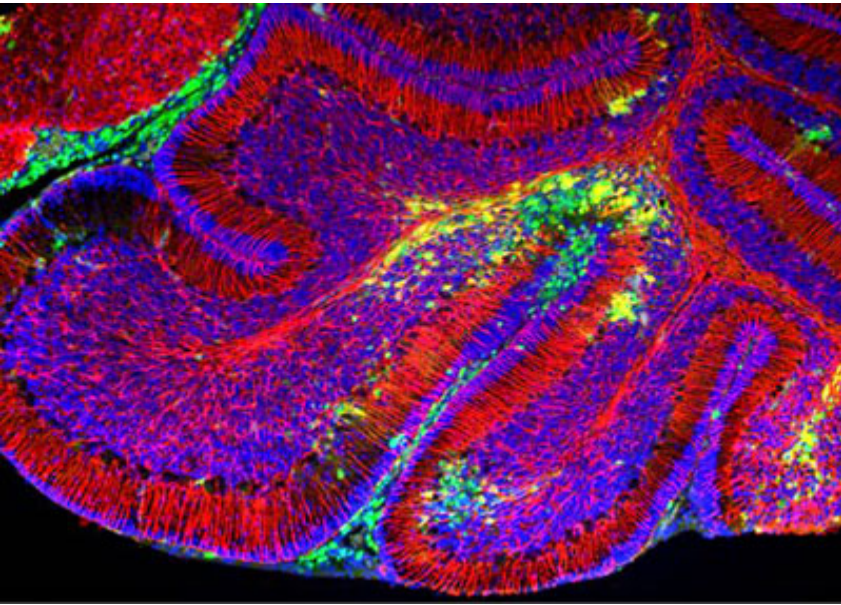
Ultrasound



CT



Brain imaging



Molecule

Organelle

Cell

Organ

Whole-body

nm

μm

cm

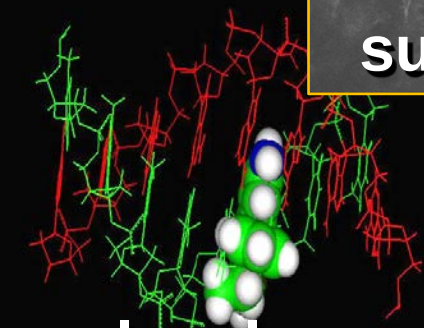
m

organ

tissue

cellular

subcellular



molecular

Presenters in Bioimaging



Kazuhiro Aoki, Kyoto University

'Imaging and Mathematical Modeling of Molecular Activities in Living Cells'



Alan Jasanoff, Massachusetts Institute of Technology

'New Technologies for Molecular Imaging of Brain Function'

Makoto Igarashi, Olympus Medical Systems Corp.

'Advanced endoscopic imaging technologies'



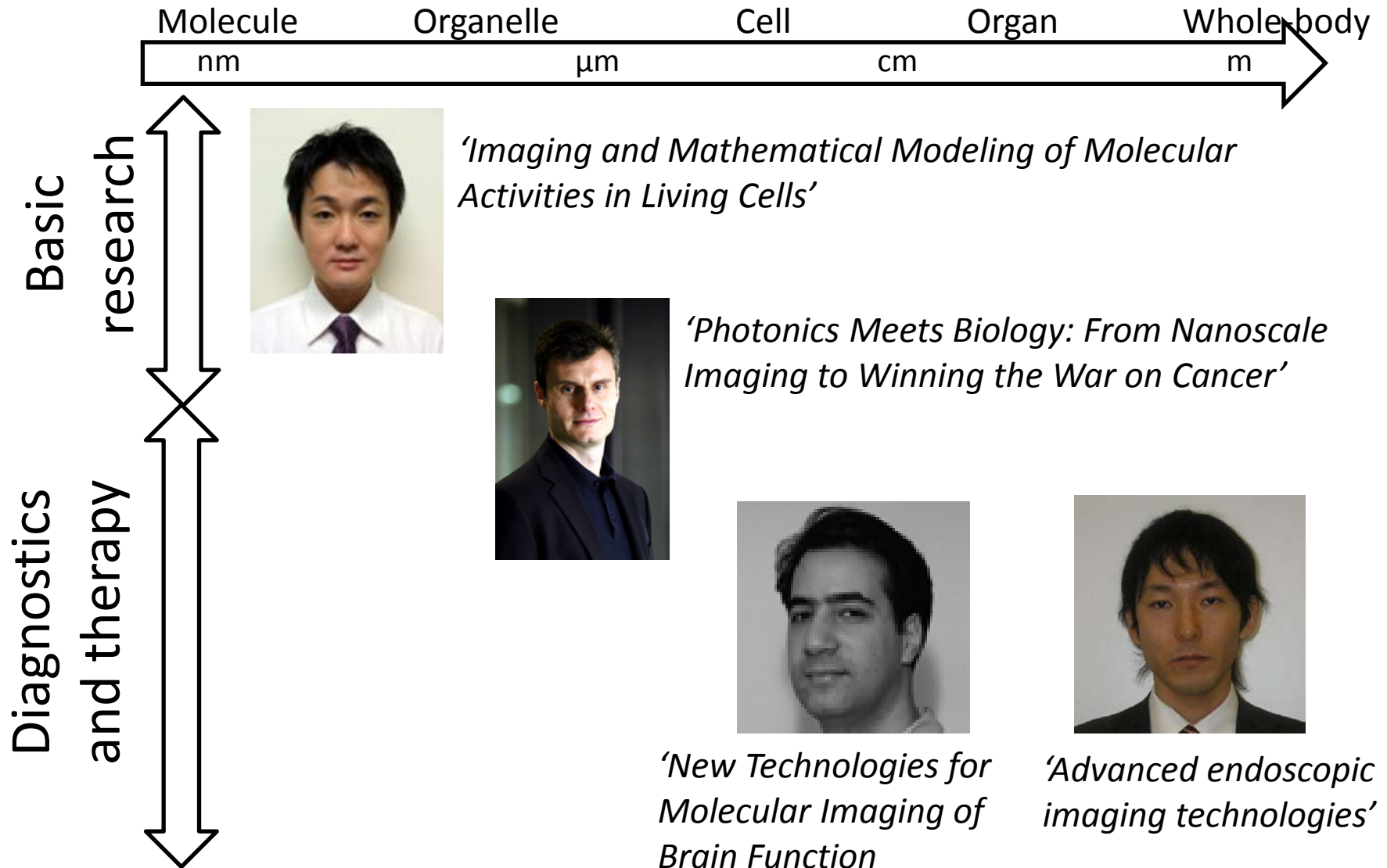
Vadim Backman, Northwestern University

'Photonics Meets Biology: From Nanoscale Imaging to Winning the War on Cancer'



Bioimaging

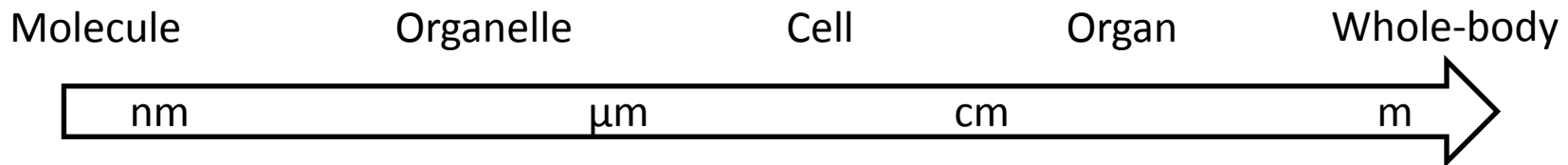
Objective size



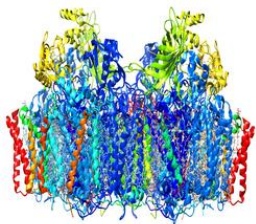
Thank you for your attention

Bioimaging

Technology



PS II

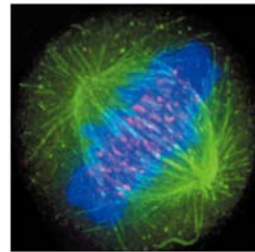


X-RAY DIFFRACTION with resolution of
2.90 Å Guskov A, et al. (2009)
Nat.Struct.Mol.Biol. **16**: 334-342

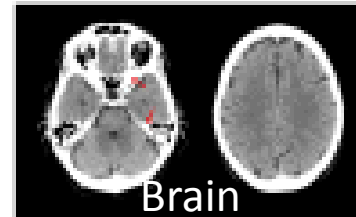
Golgi *trans*



cis

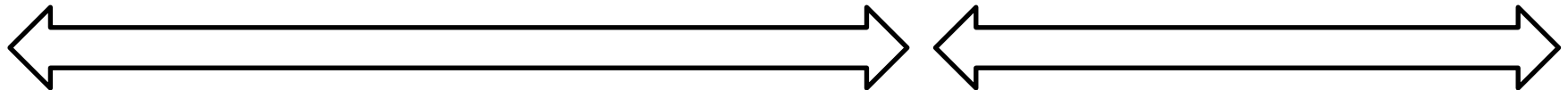
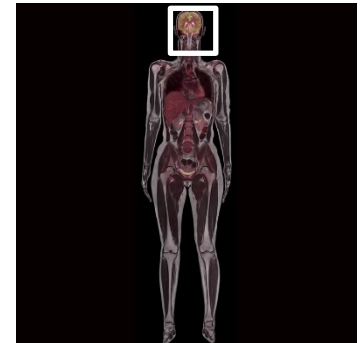


*Molecular Biology of THE
CELL*, 5th Edition



Brain

Shenton ME, et al.
Brain Imaging Behav. Jun
2012; 6(2): 137-192.



Basic research

Diagnosis and therapy



X-ray
crystallography

Optical microscope

Electron microscope

Scanning probe microscope

Radiography

CT

NMR/MRI

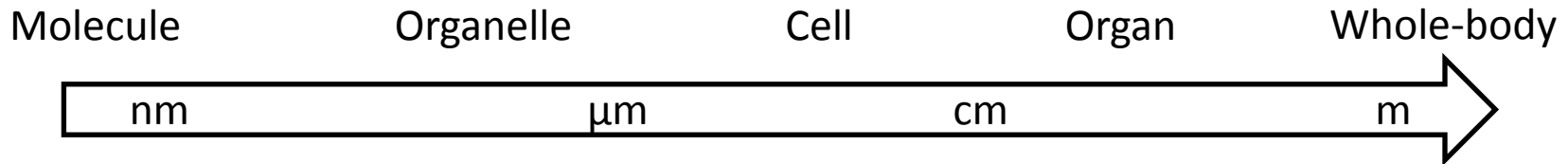
Ultra sound

SPECT/PET

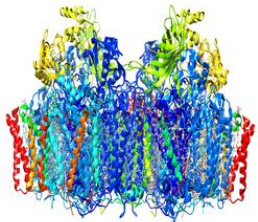
Endoscope

Bioimaging

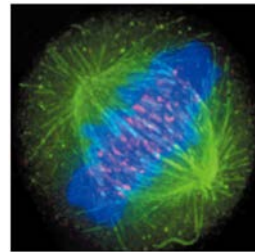
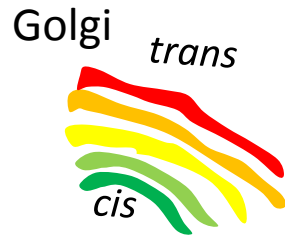
Objective size



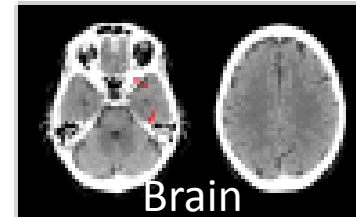
PS II



X-RAY DIFFRACTION with resolution of 2.90 Å Guskov A, et al. (2009)
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Molecular Biology of THE CELL, 5th Edition



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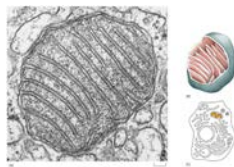
Siemens.com

H-Ras

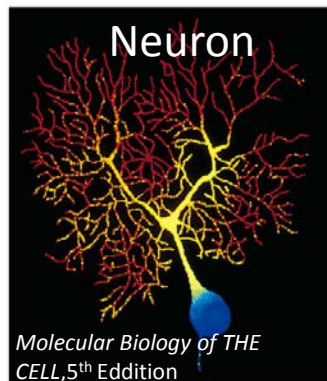


X-RAY DIFFRACTION with resolution of 2.00 Å
Fetics S, et al. (2010)
Proc.Natl.Acad.Sci.USA **107**: 4931-4936

Mitochondria

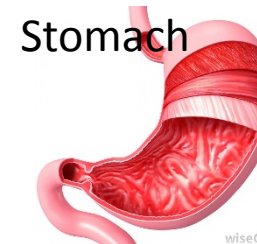


Molecular Biology of THE CELL, 5th Edition



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100 μm



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