Live Animal Imaging

- Humane Animal Research

Innovation with Integrity
Stop Sacrificing

MRI: Magnetic Resonance Imaging
BioSpec, ICON, & MRI CyroProbes

Replace: Expand with 3D Histology
Bruker’s patented MRI CyroProbe™ opens up possibilities for MR-histology. Compared to traditional histology, MRI covers the entire 3D volume, with no sharp distortions from slice to slice. High quality digital data can be stored at minimal cost without physical disintegration or quality loss.

Optical Imaging
In-Vivo Xtreme

Replace: Cell Studies Instead of Animals
In many cases, animal experiments can be replaced by cell studies, using molecular markers for cell or cell compartment labelling.

Reduce: Eliminate Unnecessary Sacrifices
The Xtreme is small enough to be placed within an animal housing facility, so experiments can be performed on site. Animals can be scanned repeatedly within the vivarium, so they do not have to be sacrificed.

Refine: Use More Effective Methods
"Unlike caliper measurements, fluorescence imaging eliminates interference from the non-tumor cell-derived volume, e.g. capsule, edema, necrotic areas, blood vessels or immune cell infiltration.” Martin Ulrich, Institute of Radio-pharmaceutical Cancer Research, Helmholtz Center Dresden-Rossendorf, Germany

Reduce: Re-use Individual Animals
MRI is a non-ionizing method, ensuring the measurement has no effect on the model or treatments being tested. A single animal can be imaged multiple times, significantly reducing the number of animals needed for statistical relevance.

Refine: More Insightful Studies
MRI opens up a multitude of application possibilities to acquire data that complement each other. For example, brain imaging can include simple morphology, information about the diffusion along fibers, and functional imaging in response to stimuli. All of this data taken together form a better picture of the disease.

*Histology, left; MRI, right. Courtesy of Y. Yoshioka, Osaka University, Osaka, Japan

Fluorescence imaging of swarm migration of Pseudomonas aeruginosa. Courtesy of Joshua Morris, Sarah Chapman, Joshua Shrout and W. Matthew Leevy, University of Notre Dame, USA

Fluorescence imaging of Glioblastoma multiforme C57BL/6 mouse model on days 1 and 4. Courtesy of Serena Pellegatta, Ileana Zucca, Fondazione IRCCS Istituto Neurologico C. Besta, Milan, Italy

Multimodal NIR fluorescence co-registered with X-ray

Refine: Use More Effective Methods
"Unlike caliper measurements, fluorescence imaging eliminates interference from the non-tumor cell-derived volume, e.g. capsule, edema, necrotic areas, blood vessels or immune cell infiltration.” Martin Ulrich, Institute of Radio-pharmaceutical Cancer Research, Helmholtz Center Dresden-Rossendorf, Germany
PET/SPECT: Positron Emission Tomography/Single Photon Emission Computed Tomography

Albira

Replace: Less Biopsies

PET/SPECT imaging can indicate whether a biopsy is justified, thus eliminating unnecessary surgery on the animal. In vivo imaging means that the course of the tumor can be followed over time in the same animal, dramatically reducing the number of animals required.

Reduce: Multipurpose Your Animals

Acquire PET, SPECT, and CT images with a single Albira system, eliminating the need to transfer animals between instruments, or the use of multiple animals.

Refine: Benefit from More Meaningful Data

The Albira scanner measures up to four mice simultaneously, enabling true 1:1 comparisons between test animals and controls.

“The results that we can achieve with this new equipment will find their way into patient care within the next few years.”

Prof. Björn Wängler at the opening ceremony of the Bruker Reference Center for Preclinical Imaging which focuses on tumor and Alzheimer research, equipped with an ICON, Xtreme, and Albira.
Micro-CT: Micro Computed Tomography

SkyScan

Replace: More From A Single Experiment

See the complete picture, with micrometer resolution throughout the entire mouse or rat. Obtain the maximum amount of information possible from one experiment yet at the lowest possible dose in the industry.

Reduce: Create Better Protocols

Repetitive scanning of the same animal with minimal dose allows for studying the kinetics of disease models.

Refine: Improve Animal Well-being

A fast experiment means a shorter endurance time for your animals. Micro-CT imaging is an extremely fast technique, lending whole body visualizations in less than 8 seconds, minimizing side-effects of the measurement itself.

"In order to reduce the number of animals involved, the experiments will maximize the information from each individual: MRI study will be used to follow each animal during the treatment, thus limiting the number of animals to use to small cohorts. MRI is a non-invasive technique allowing to monitor the same animal over time without need to sacrifice at each time point."

Serena Pellegatta, Fondazione IRCCS Istituto Neurologico C. Besta, Milan, Italy

Whole body micro-CT scan of a mouse’s bones and vasculature.
Drawing on over 50 years of expertise in the life and animal sciences, Bruker designs preclinical imaging systems that deliver outstanding research results. Furthermore, in designing its product line, Bruker has always placed an emphasis on providing optimal, humane treatment of study animals while they are being imaged.

Performing in vivo imaging with Bruker instruments has minimal to no adverse effects on study animals, allowing the same animal to be imaged multiple times over the course of an experiment. This has the benefit of minimizing data variability, of documenting true progression in an animal model, and of reducing the overall number of animals required for any given study.
Non-Invasive Techniques

When you go to the doctor, you expect the diagnosis to be conducted with utmost care and minimal side effects. Your animals deserve the same. *In vivo* imaging does just this for your animals. As the animal sleeps, in comfort, the most amazing images of it are produced with Bruker’s instruments.

While your animal is safely anesthetized, Bruker’s instruments acquire structural images and quantitative data. MRI and CT can be performed completely noninvasively, and PET, SPECT, and optical imaging require only minimal intervention, with the injection of a contrast agent.

**Soft tissue structures not even visible in histology are seen with MRI**


Multimodal Animal Bed

Bruker’s multimodal animal bed and supported animal monitoring system ensure that your animal is as comfortable as possible throughout the experiment. The animals freely breathe anaesthetic gas, eliminating the need for intubation or intravenous anaesthetics.

Respiration, temperature, and heart-rate are monitored constantly, alerting the researcher if the animal requires assistance.

Bruker’s multimodal animal bed (center) with adapters for MRI, optical, micro-CT, and PET-SPECT-CT