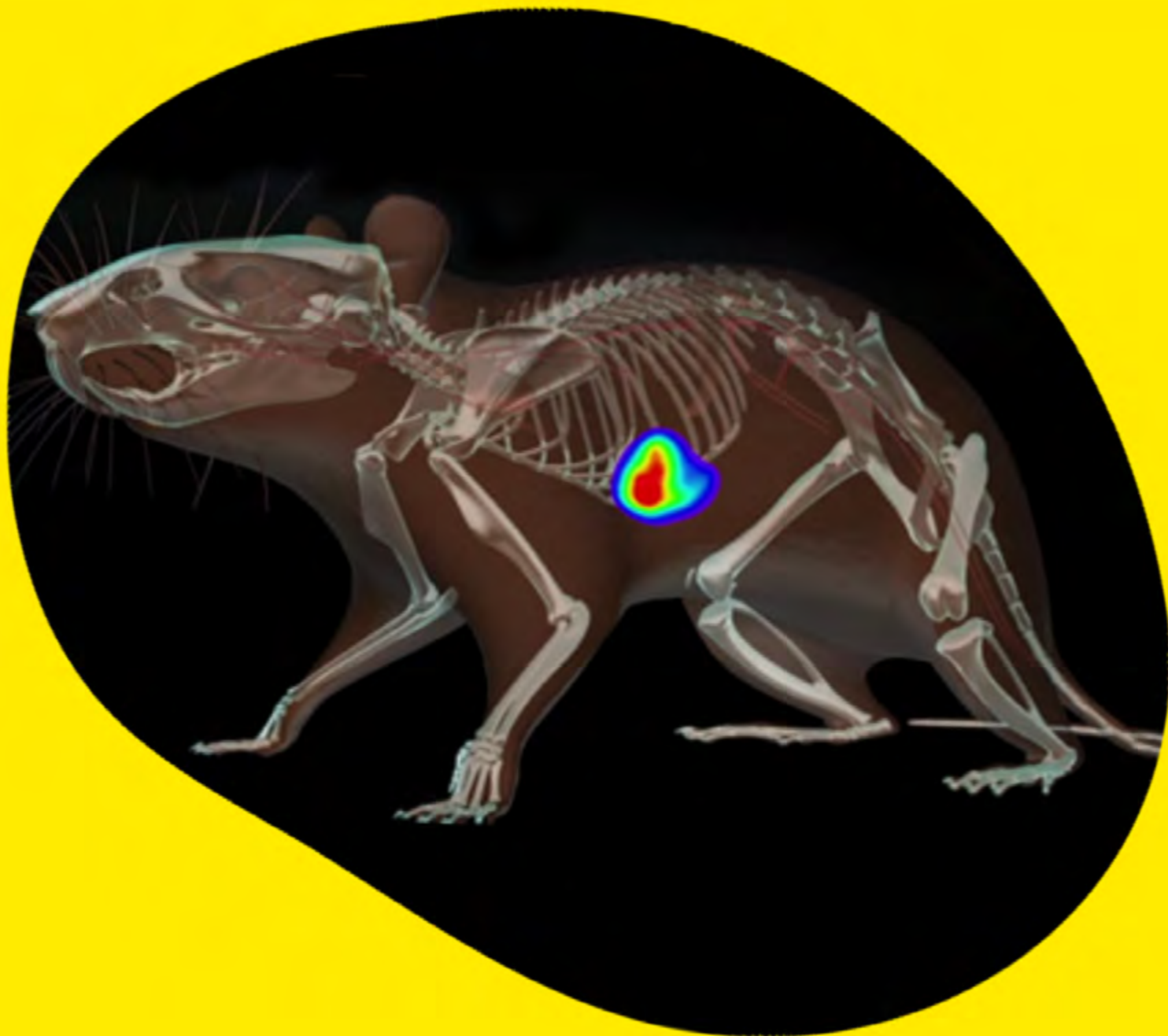


In vivo
imaging
solutions.



revvity

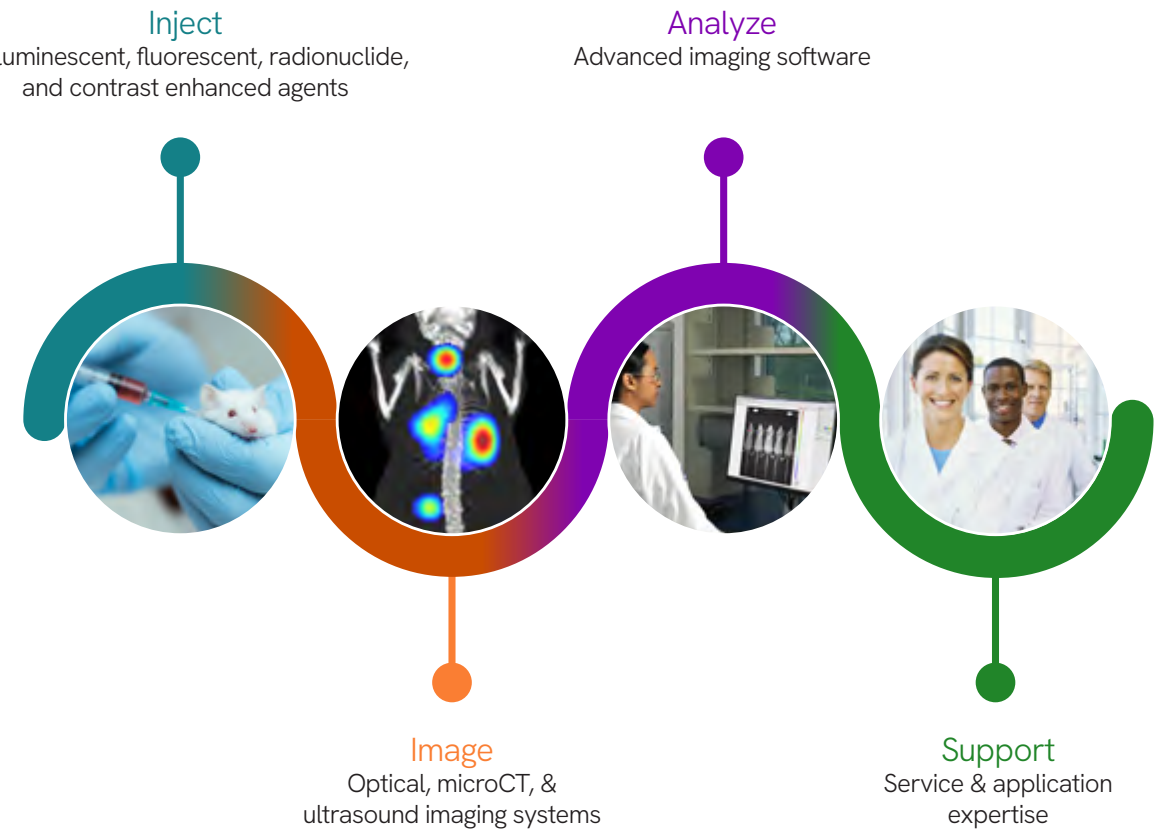


Leading the way in preclinical imaging

Gain a greater understanding of disease and therapeutic efficacy using our wide range of *in vivo* imaging solutions.

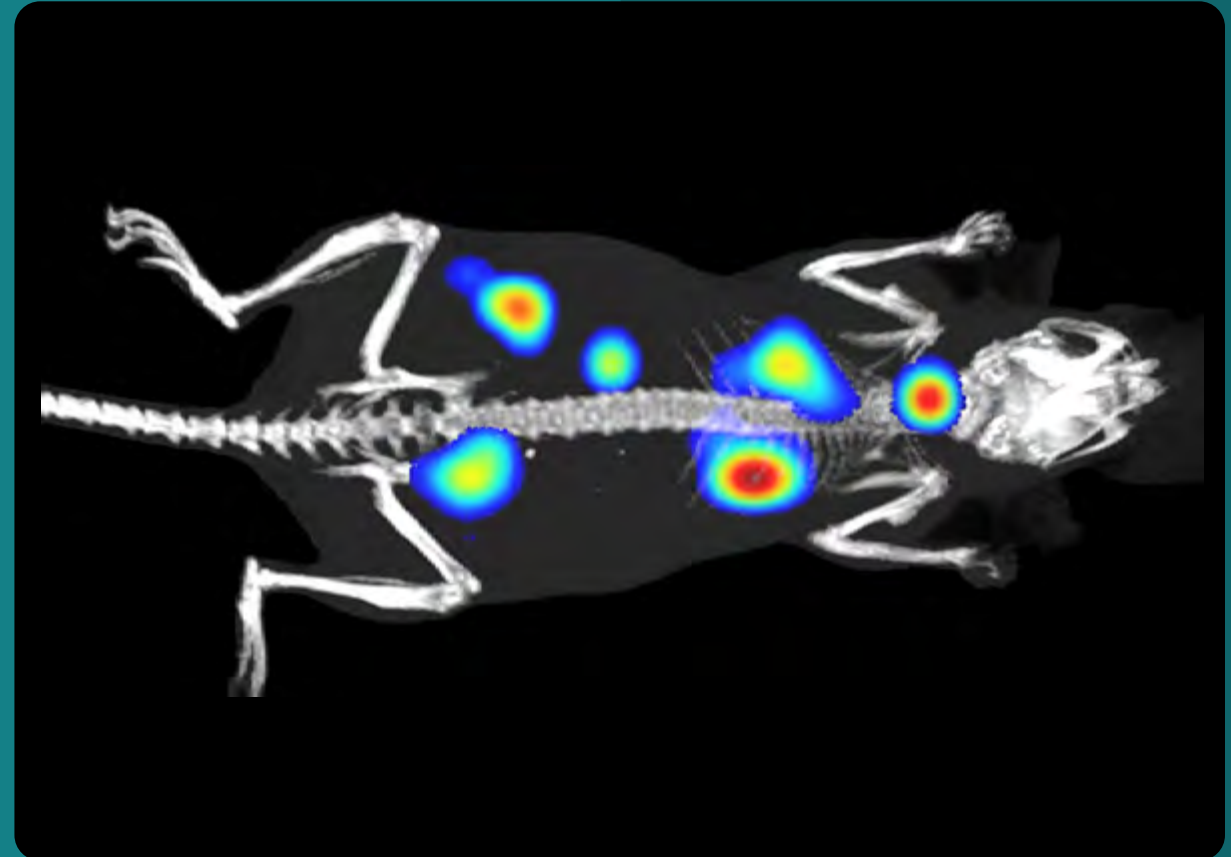
Researchers trust our *in vivo* imaging solutions to give them reliable, calibrated data that reveals pathway characterization and therapeutic efficacies for a broad range of indications. Our reagents, instruments, and applications support have helped hundreds of research projects over the years. And our hard-earned expertise makes us a trusted provider of pre-clinical imaging solutions—with thousands of peer-reviewed articles as proof.

Your path to discovery starts here



In vivo imaging reagents

In vivo imaging solutions start with our comprehensive portfolio of imaging reagents built around your applications.



| Metastases of IVISbrite tumor cancer cell Line imaged using the IVIS SpectrumCT



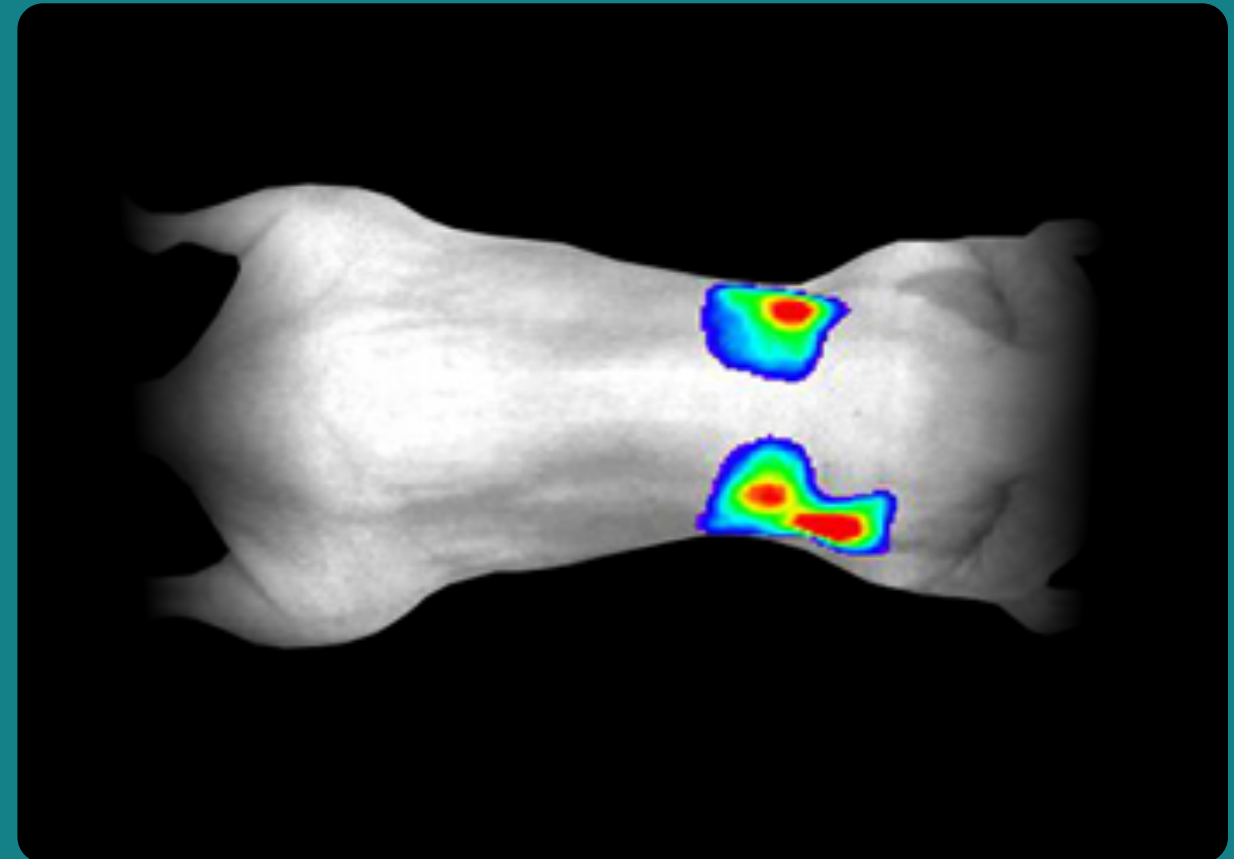
IN VIVO IMAGING REAGENTS

Bioluminescent reagents

Obtain more information from your target with Revvity's wide range of IVISbrite™ bioluminescent reagents optimized on the IVIS® platform.

- Bioluminescent substrates
- Bioluminescent tumor cell lines
- Bioluminescent bacteria
- Lentiviral particles

Bioluminescent reagents



| IVISbrite MCF7 Red F-luc bioluminescent cells (BW119262) imaged using IVIS

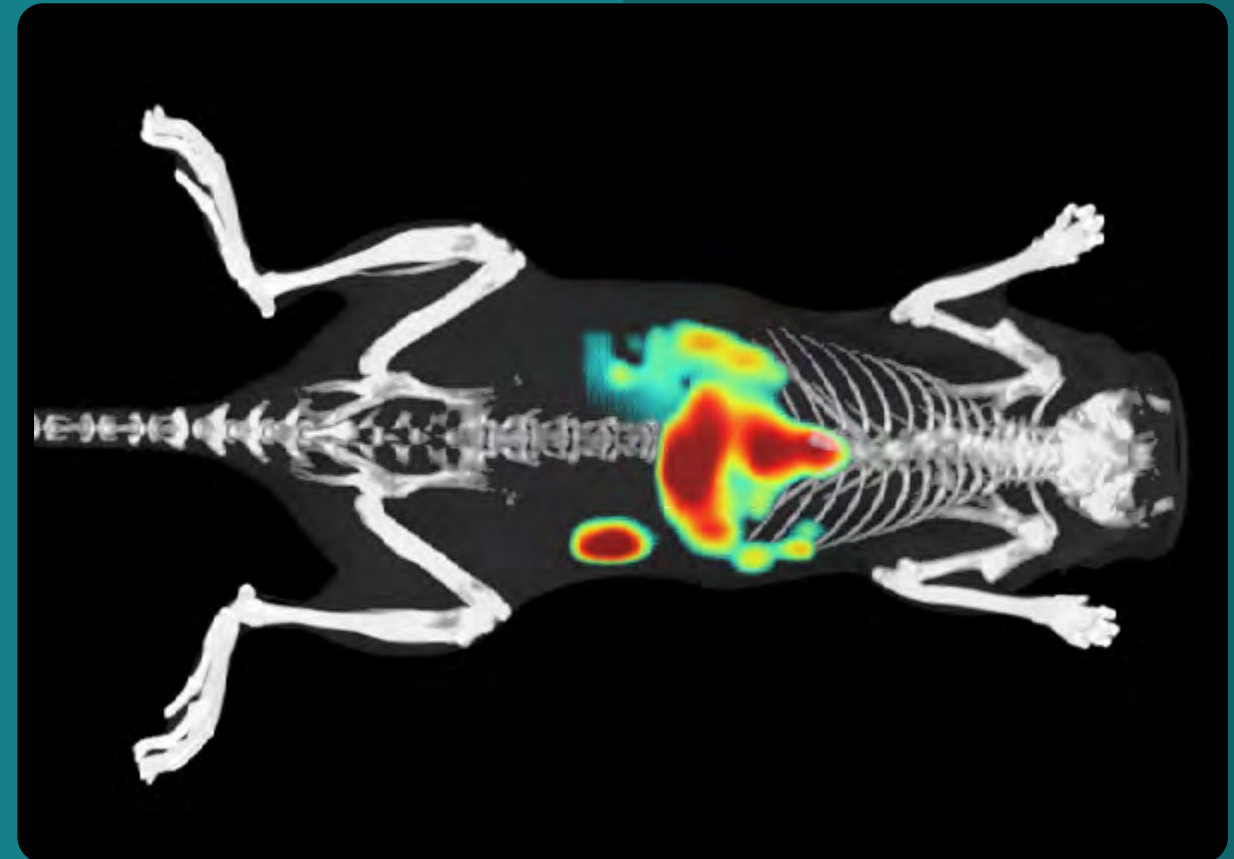
IN VIVO IMAGING REAGENTS

Fluorescent reagents

Our comprehensive suite of IVISense™ fluorescent *in vivo* imaging agents enables unmatched imaging of a broad range of disease-related biomarkers and pathways in your research models.

- Fluorescent probes
- Fluorescent dyes
- Fluorescent cell labeling dyes
- Fluorescent nanoparticles

Fluorescent reagents

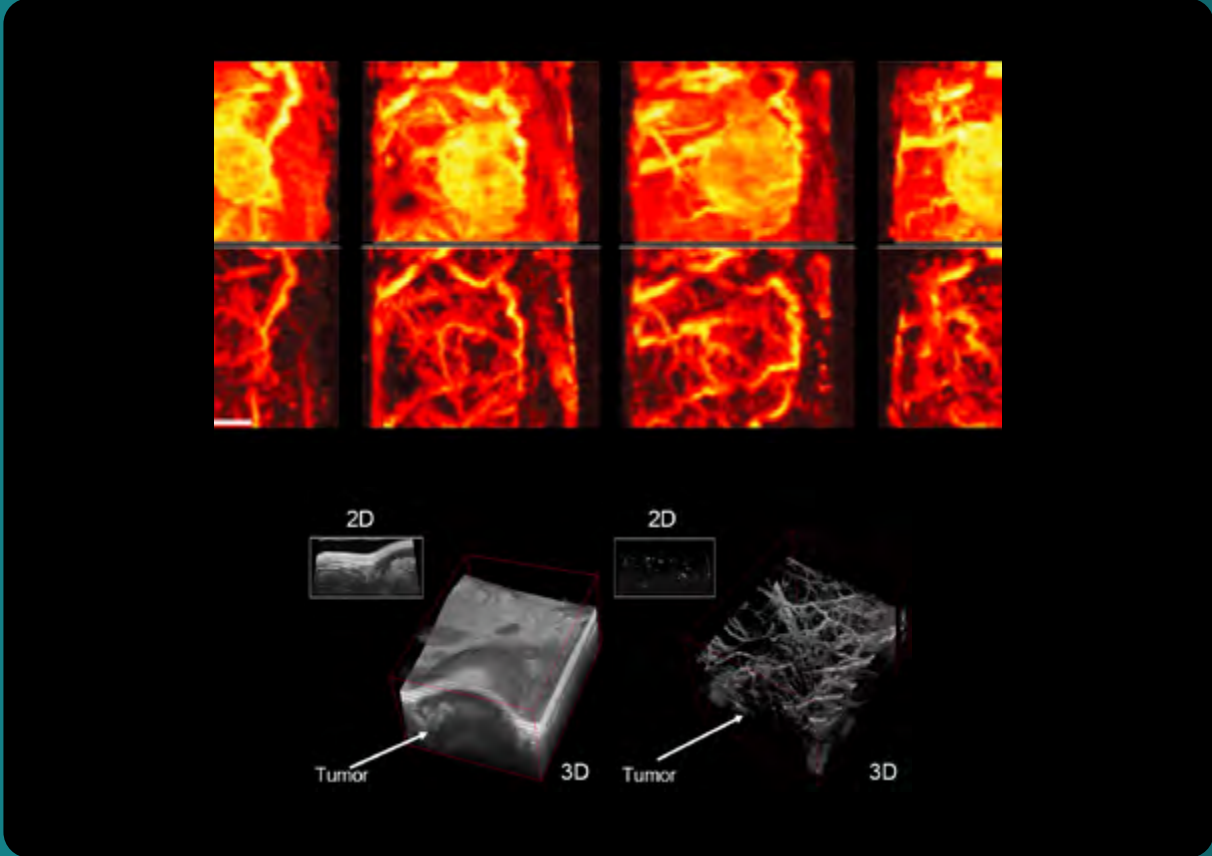


| IVISense Annexin V 750 Fluorescent Agent (Cat# NEV11053) imaged using the IVIS SpectrumCT

Contrast agents

Study tissue perfusion and blood flow characteristics on ultrasound systems equipped with CEUS imaging modes with VesselVue® microbubble contrast agent. Using VesselVue in combination with Revvity's exclusive Acoustic Angiography mode on the Vega® ultrasound system, a unique form of CEUS imaging, researchers can obtain high resolution images of microvessel density and morphology, which are biomarkers useful for studying angiogenesis and vascular bed development.

Contrast agents



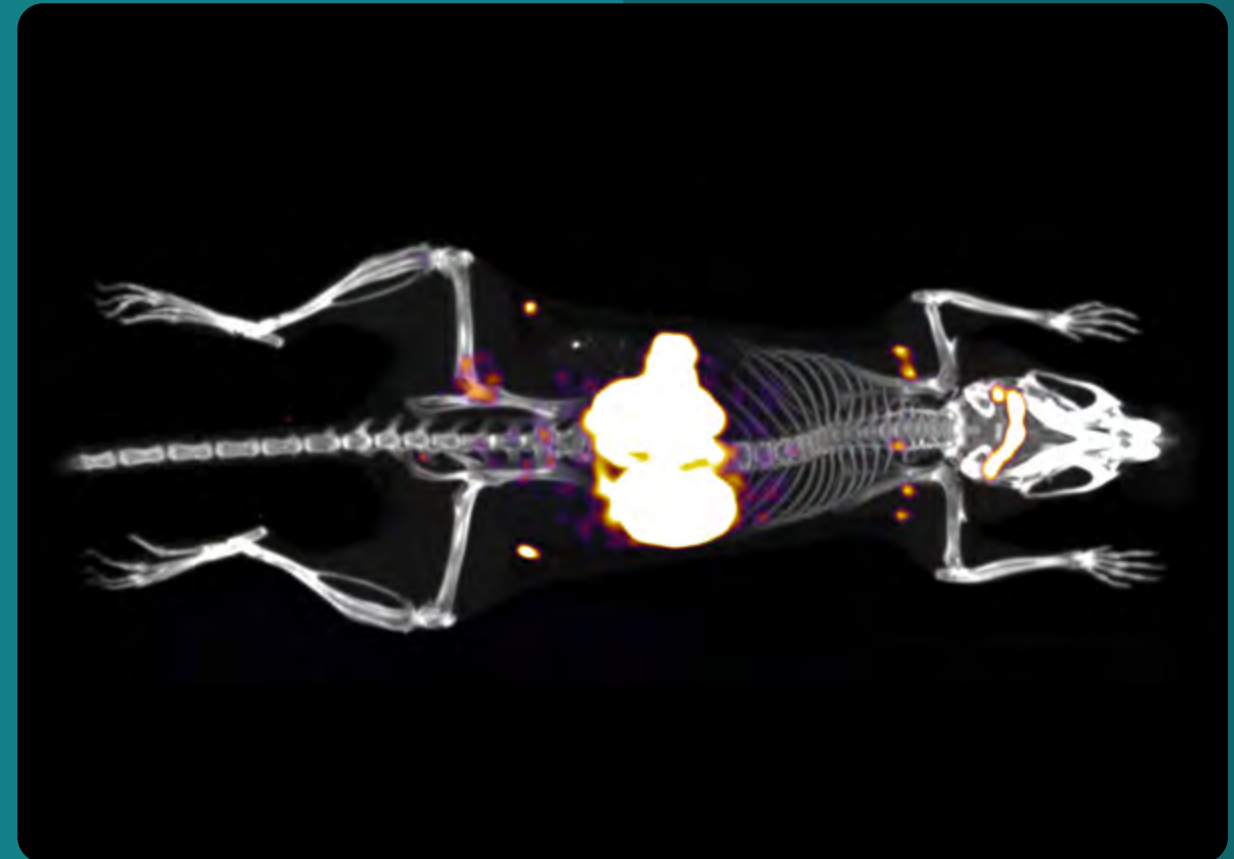
Top image: Tumor microvessel density (top row) and microvessel architecture (bottom row) using VesselVue microbubble contrast agent. Bottom image: 2D & 3D tumor representations of traditional B-mode (left) and Acoustic Angiography showing microvessels in and around the tumor. Imaged using VesselVue microbubble contrast agent and the Vega system

Radioimaging nuclides

Do you have the right radionuclide for your research? We provide radionuclides for many imaging modalities, including PET, SPECT, and Cerenkov Light Imaging.

- Zirconium-89
- Chromium-51
- Phosphorus-32

Radioimaging nuclides



| 89-Zirconium labeled peptide imaged using PET. Courtesy: Richard Tavaré, UCLA



In vivo imaging systems

Gain greater understanding of disease and therapeutic efficacy using our wide range of *in vivo* imaging systems. Our systems are available in single- and multiple-imaging modalities.



*IVIS® Spectrum 2 Series
2D & 3D Optical Systems*



*IVIS Lumina Series III
2D Optical Systems*



*IVIS Lumina S5 & X5
2D Optical Systems*



Quantum™ GX3 microCT



Vega® Ultrasound



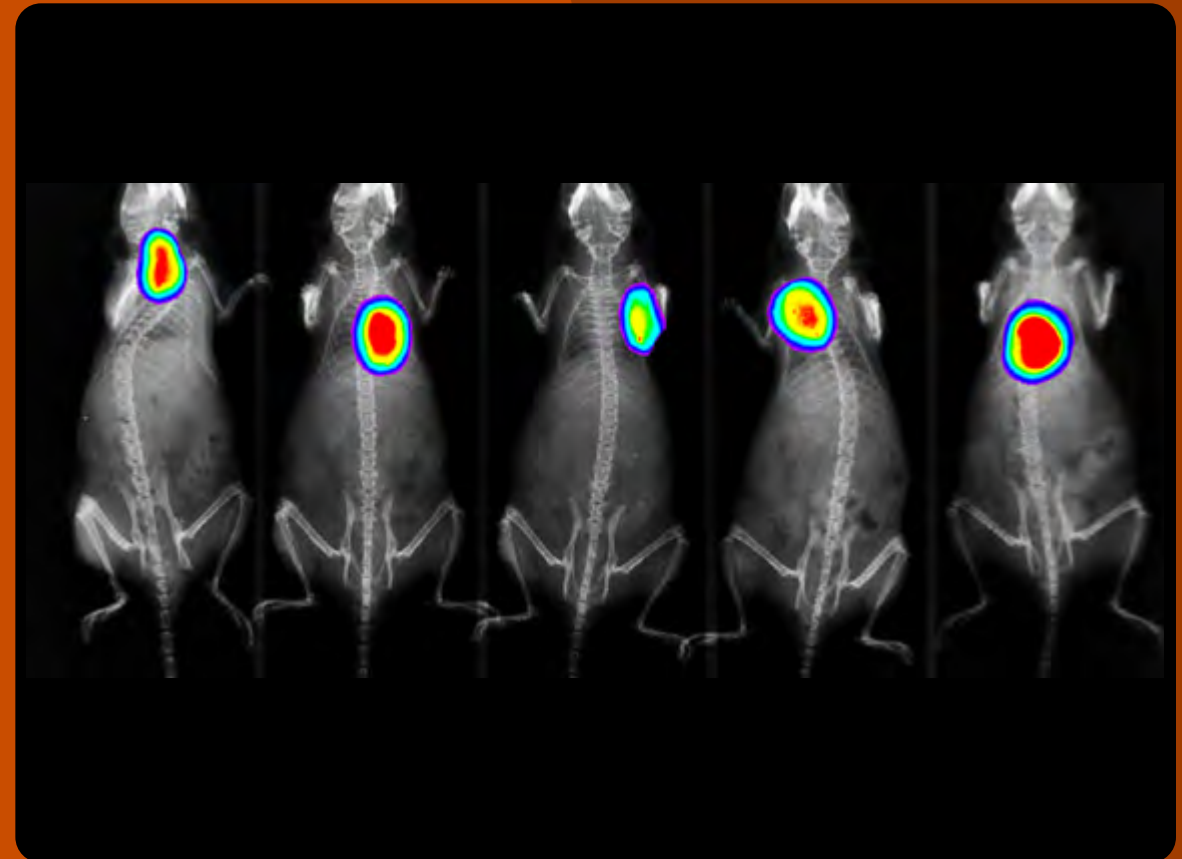
IN VIVO IMAGING SYSTEMS

Optical imaging

With thousands of peer-reviewed publications, our optical imaging platform is the gold standard for imaging.

- IVIS® Lumina Series III 2D optical imaging with optional integrated X-ray
- IVIS Lumina S5 and X5 2D optical imaging with optional integrated high-resolution X-ray
- IVIS Spectrum 2 Series for 2D and 3D optical imaging with optional integrated CT

Optical imaging systems



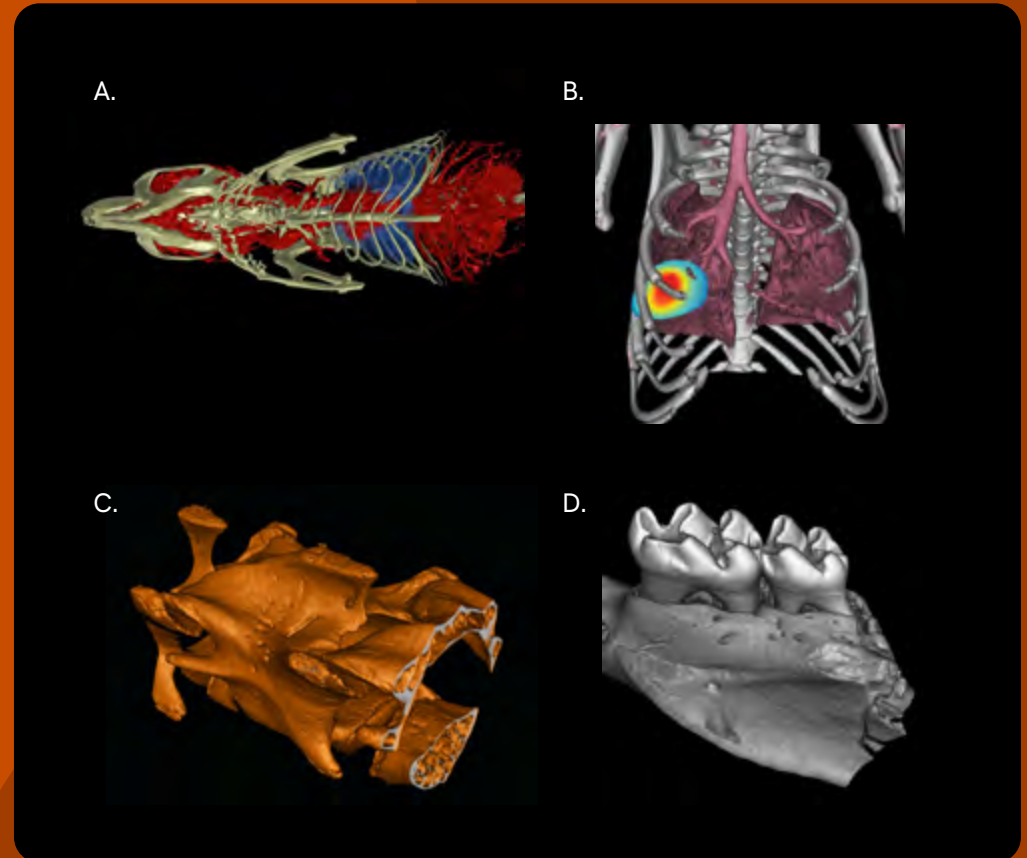
| Mice injected with IVISense 4T1 bioluminescent tumor cell line and imaged on the IVIS Lumina X5 2D optical system

MicroCT imaging

Micro-computed tomography (microCT) provides anatomical and functional imaging in 3D. Our low-dose Quantum GX3 microCT system is ideal for longitudinal studies and enables:

- Superior spatial resolution down to 5 microns
- Wide FOV from 8 mm – 86 mm
- Image-based retrospective cardiac and respiratory gating in mice, rats, and ferrets
- Enhanced fluoroscopy
- Multiple scanning modes

MicroCT imaging systems



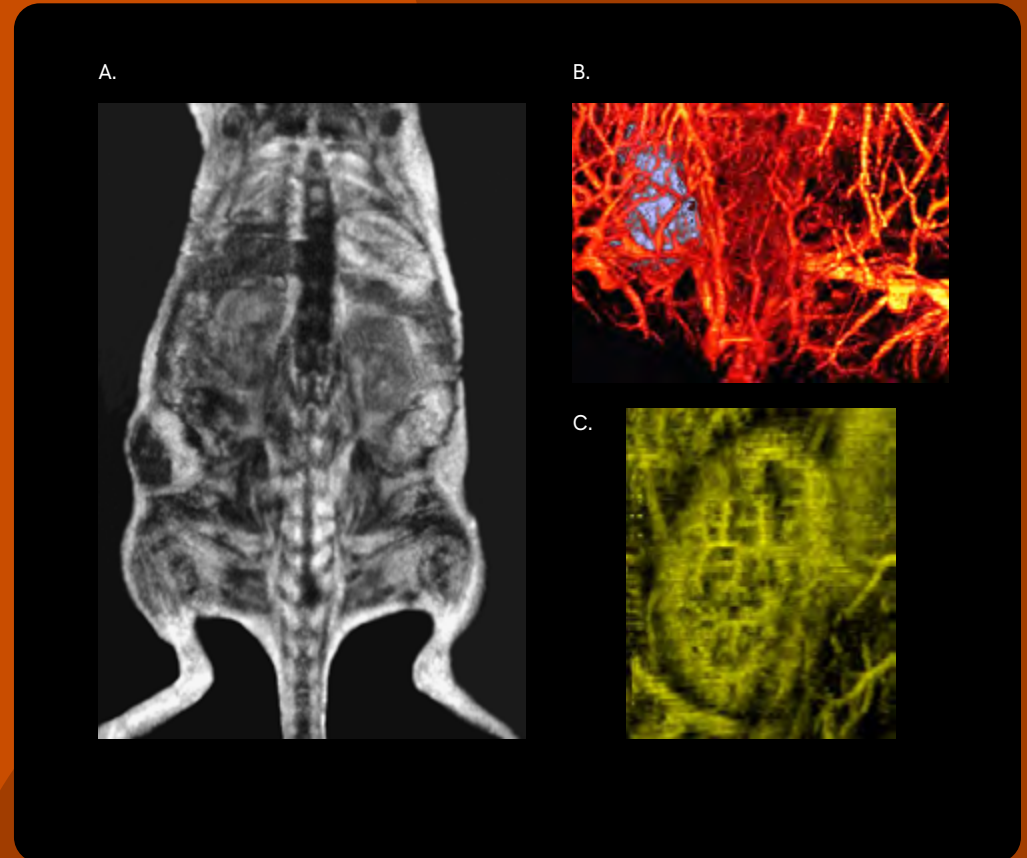
A: Heart, lung, and vasculature imaged on the Quantum microCT system.
 B: Example of co-registering data from the Quantum microCT, which provides 3D lung anatomy and function, and IVIS Spectrum optical imaging showing viable lung cancer using 3D bioluminescence imaging.
 C: Mouse spine imaged using the Quantum GX3 microCT system
 D: Mouse jaw imaged using the Quantum GX3 microCT system

Ultrasound imaging

The Vega® ultrasound system enables you to quickly and accurately measure tumor volume, visualize microvasculature, quantify tissue stiffness, and more for evaluating potential drug candidates, deepening your understanding of dynamic disease processes.

- Automated, hands-free, high-throughput system
- Scan times of less than 1 minute
- Whole-body field of view
- Multiple 3D imaging modes: Standard B- and M-modes, elastography, cardiac imaging, and acoustic angiography

Ultrasound imaging systems



A. Mouse widefield imaging.
 B. Tumor vascularity using Acoustic Angiography contrast enhanced ultrasound mode on the Vega® system and VesselVue® microbubble contrast agents.
 C. Kidney vascularity using VesselVue microbubble contrast agents.



IN VIVO IMAGING SYSTEMS

Find the right system(s) for your research

We offer a wide range of imaging systems. Use this table to help guide you in selecting the right instrument(s) for your disease research of interest.



	IVIS Spectrum2	IVIS SpectrumCT2	IVIS Lumina LT	IVIS Lumina XRMS	IVIS Lumina III	IVIS Lumina S5	IVIS Lumina X5	Quantum GX3	IVIS Spectrum 2 + Quantum GX3	Vega
2D BLI	▪	▪	▪	▪	▪	▪	▪		▪	
2D FLI	▪	▪	▪	▪	▪	▪	▪		▪	
2D X-Ray				▪			▪			
3D BLI	▪	▪							▪	
3D FLI	▪	▪							▪	
CT		▪						▪	▪	
Ultrasound										▪
Capacity	Up to 10 mice*	Up to 10 mice*	Up to 5 mice	Up to 3 mice	Up to 5 mice	Up to 10 mice	Up to 10 mice	1 mouse	1 mouse	Up to 3 mice**

BLI = bioluminescence imaging FLI = fluorescence imaging CT = computed tomography

* Using optional manifold ** 3 mice sequential imaging

Find the right system(s) for your research



High-performance imaging software

Analyze even the most complex imaging data with ease. Our software features intuitive workflows that streamline data analysis to expedite turnaround from acquisition to presentation.

- Living Image® designed for the IVIS platform
- SonoEQ for use with the Vega ultrasound system
- Analyze 14.0 advanced visualization software for use with the Quantum GX3



Living Image software

Living Image advanced software designed for the IVIS platform simplifies even the most complex image acquisition and analysis of bioluminescent and fluorescent probes *in vivo*.

- Imaging Wizard to streamline acquisition setup
- Longitudinal imaging analysis tools
- Comprehensive set of tools for 2D or 3D data analysis

Living Image software



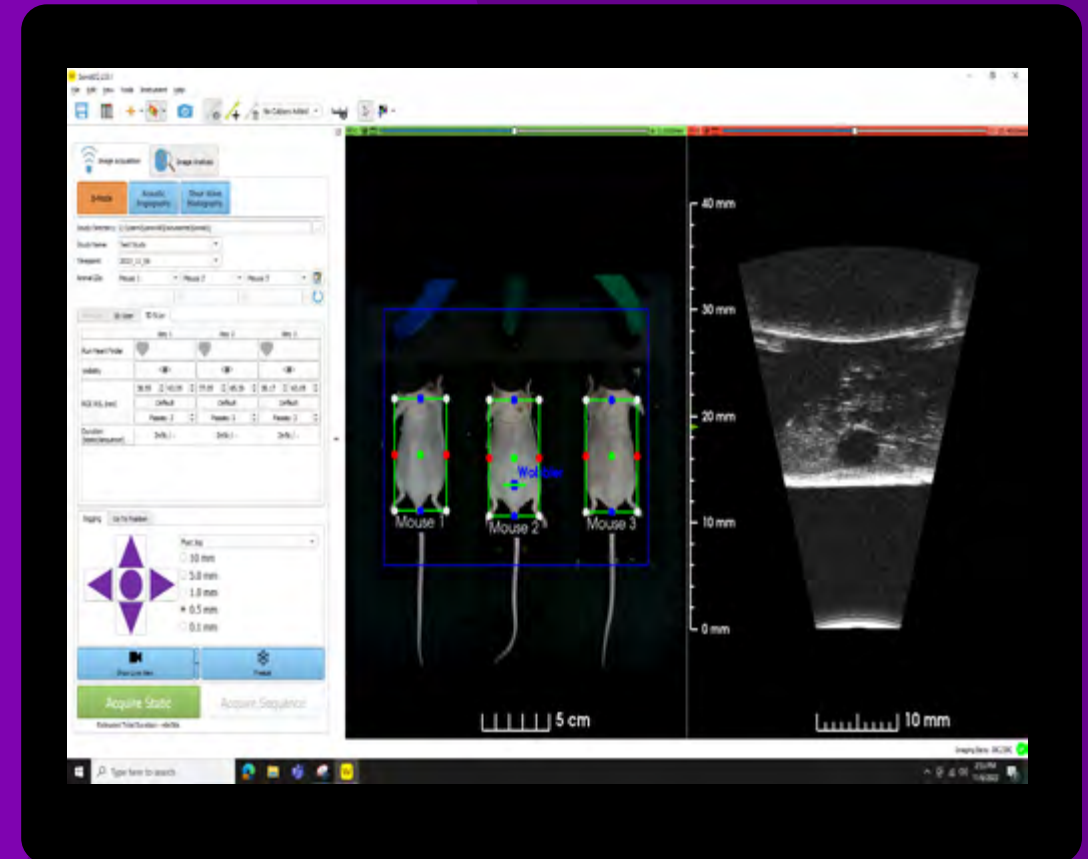


IN VIVO IMAGING SOFTWARE

SonoEQ software

Designed for the Vega ultrasound system, SonoEQ™ software enables rapid and easy data analysis. Built on 3D Slicer, an open-source platform for image processing and 3D visualization, SonoEQ is user-friendly with a highly intuitive user interface and fast learning curve.

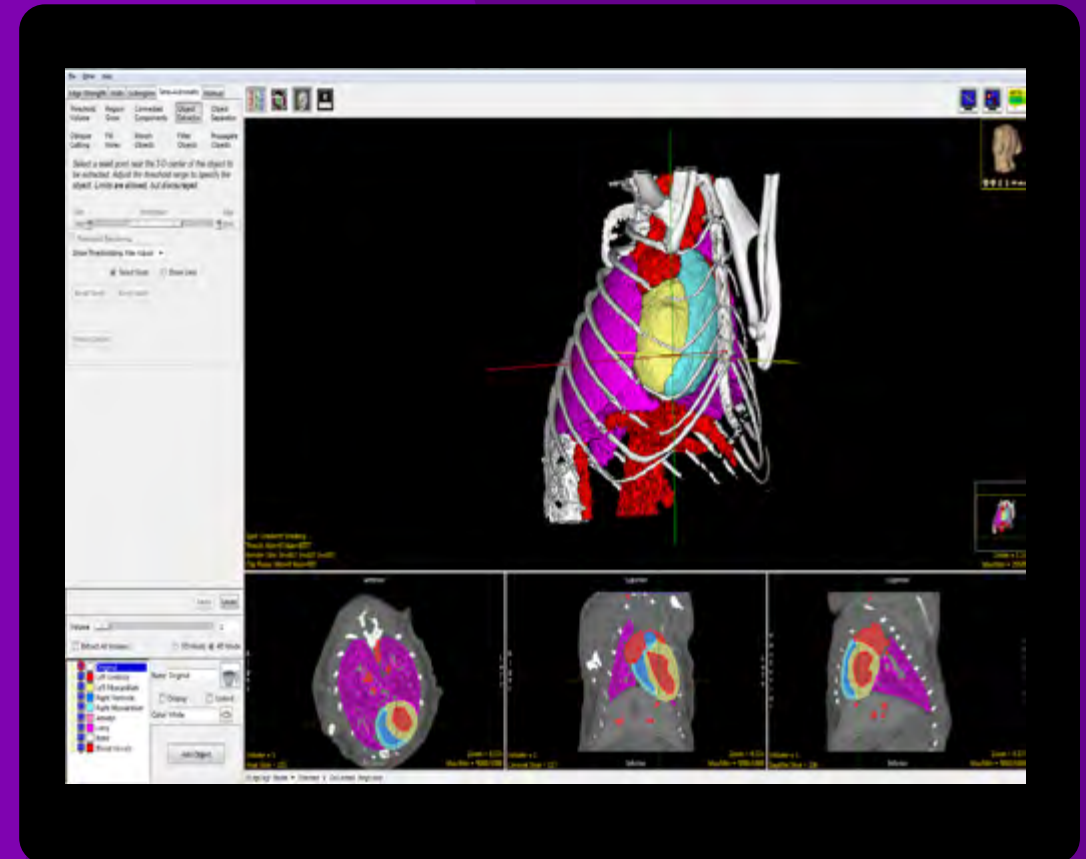
SonoEQ software



Analzye 14.0 imaging software

Take your Quantum GX3 microCT data to the next level with Analzye 14.0. The software features integrated modules that provide access to complementary tools for fully interactive multi-dimensional display, processing, segmentation, registration and measurement.

As an add-on to Analzye 14.0, the Bone Micro Analysis (BMA) module is a powerful tool designed to evaluate and measure microCT data from *in vivo* and *ex vivo* bone tissue.



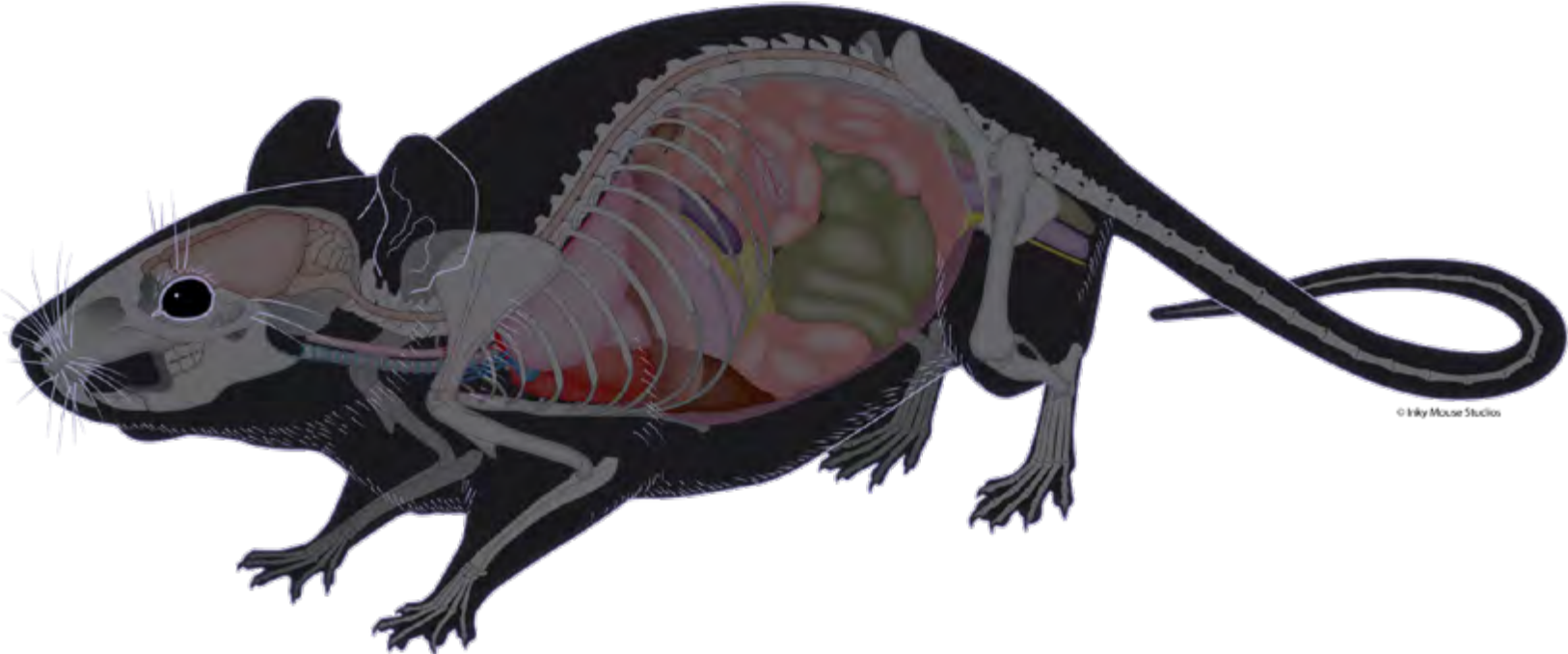
Analzye 14.0 imaging software

Service and application support

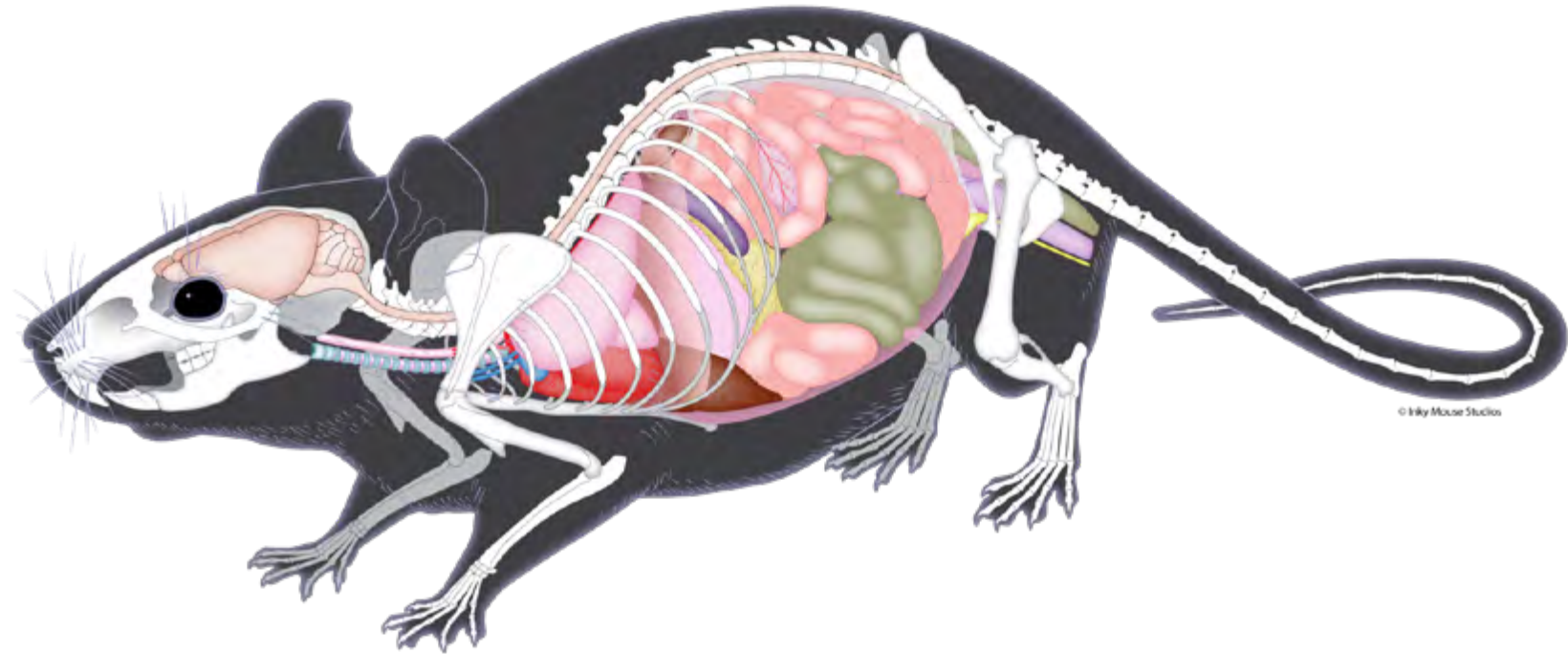
The more you know, the better research decisions you can make. With our expert application and service support, we ensure that you keep your instruments running and your research moving forward.

- Scientific expertise across a wide range of application areas
- Hands-on training through IVIS University
- Laboratory service support





© Inky Mouse Studios



Featured

Fluorescent agents

IVISense Vascular
IVISense Tomato Lectin

Luminescent reagents

IVISbrite tumor Cell Lines
IVISbrite Lentiviral Particles
IVISbrite D-Luciferin K+ Salt

Contrast agents

VesselVue microbubble

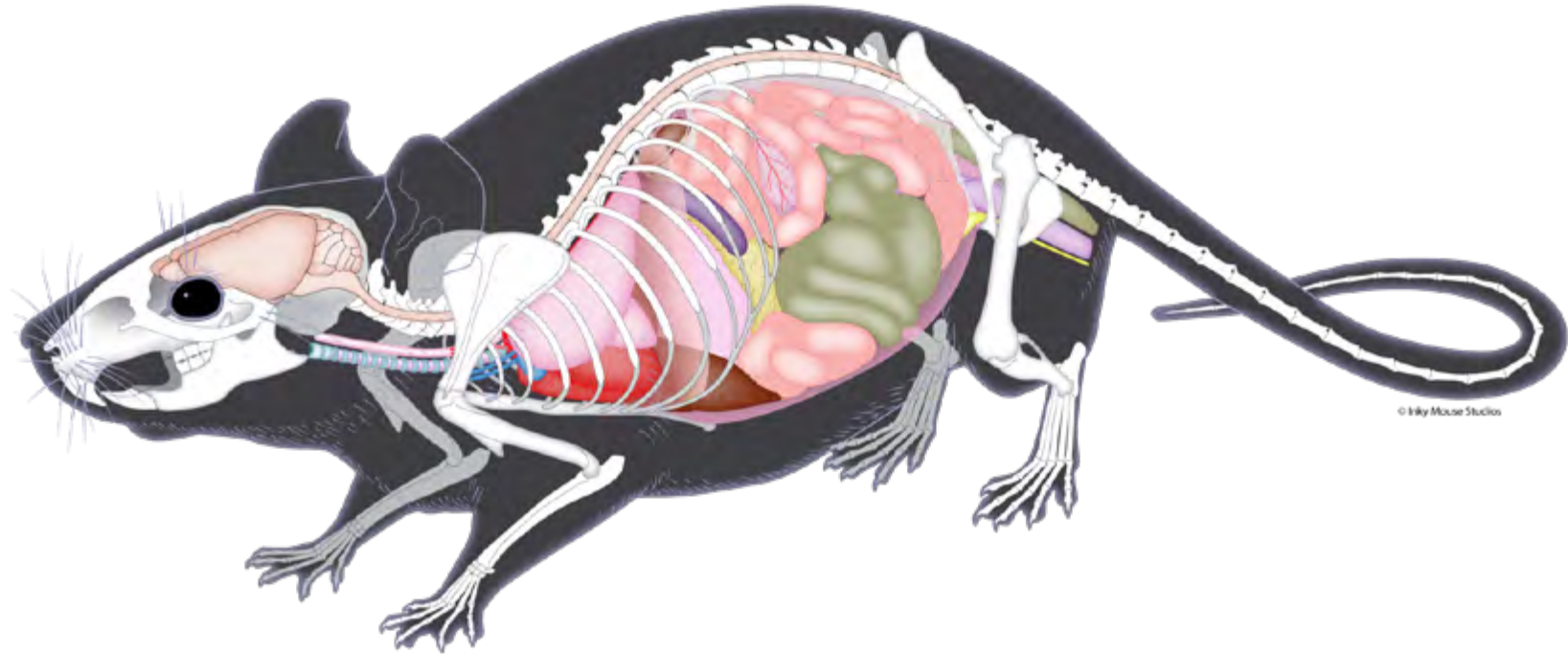
Radioimaging nuclides

Zirconium-89

Instruments

IVIS® Imaging Platform
Vega Ultrasound

revvity



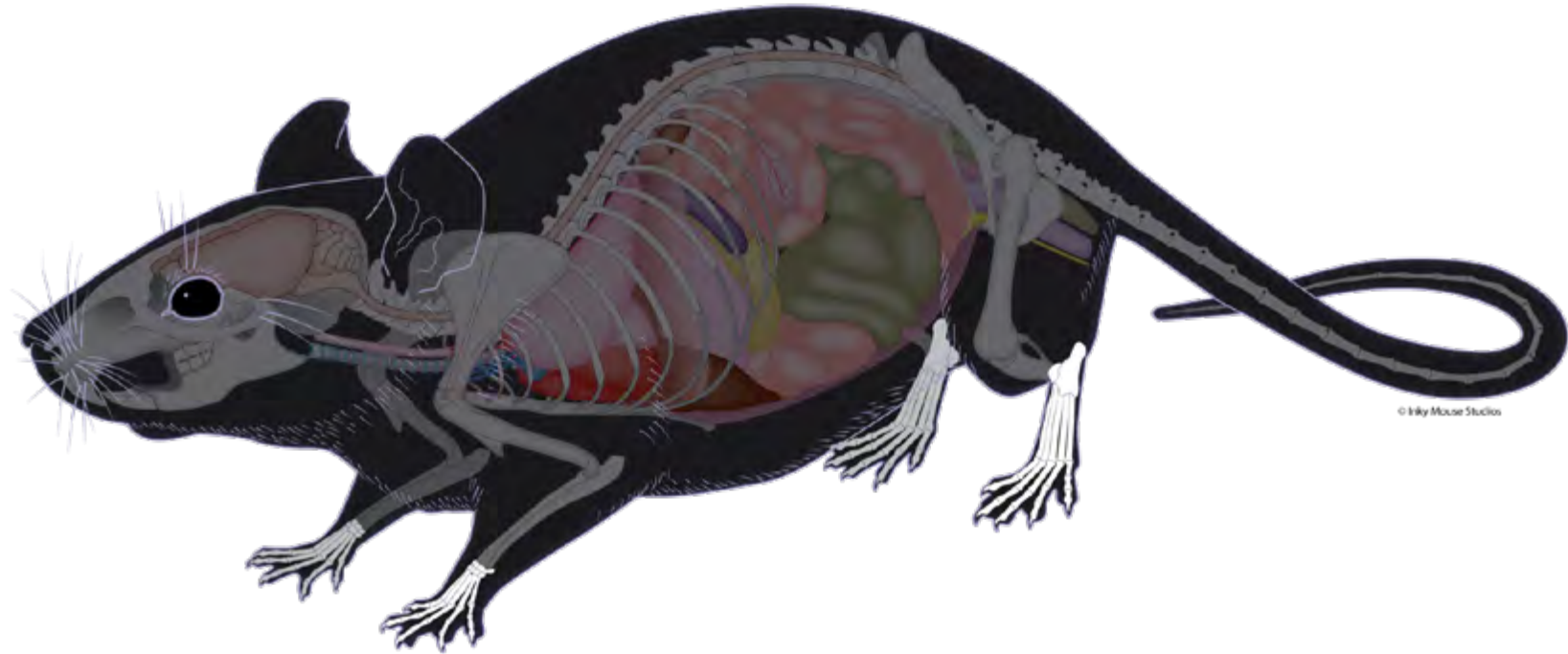
Featured

Fluorescent agents

IVISense Annexin V

Instruments

IVIS® Imaging Platform



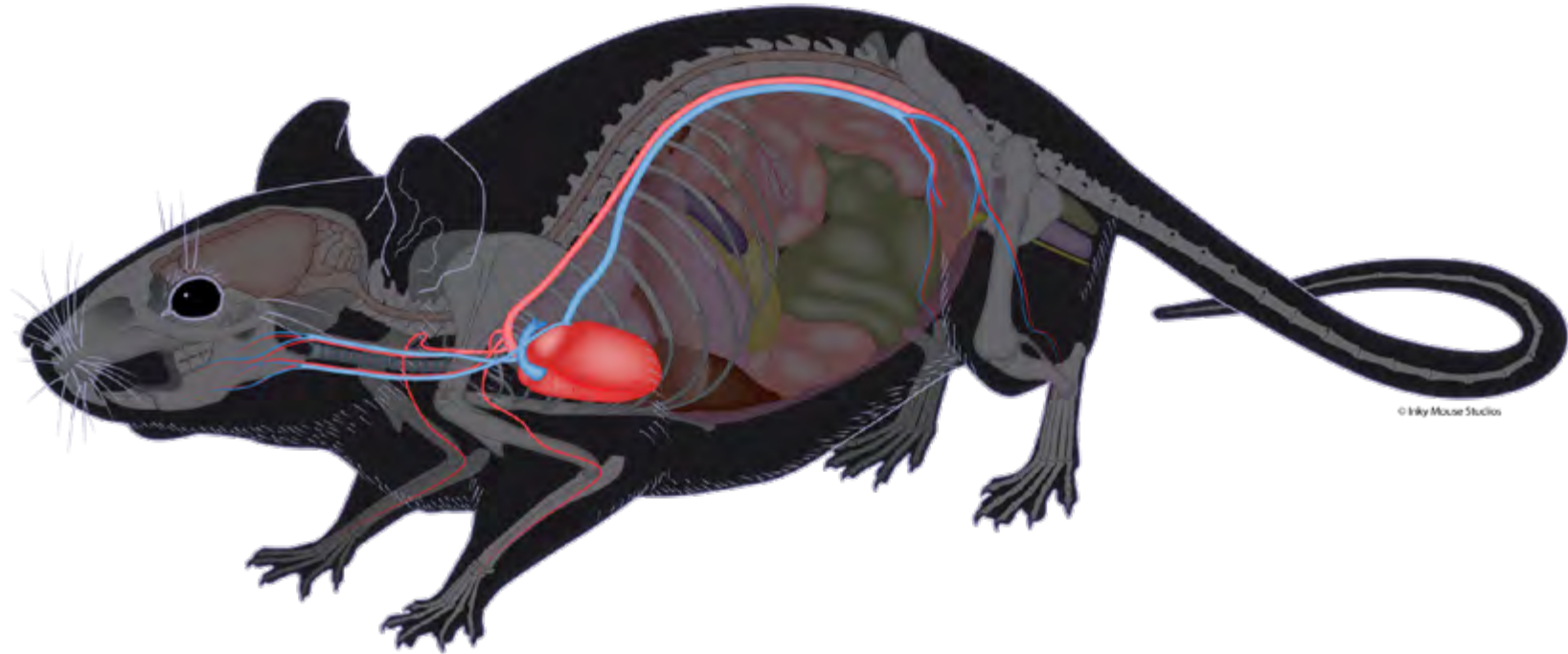
Featured

Fluorescent agents

IVISense Cat B FAST
IVISense Pan Cathepsin
IVISense MMP
IVISense Osteo

Instruments

IVIS® Imaging Platform
Quantum GX3 microCT



Featured

Fluorescent agents

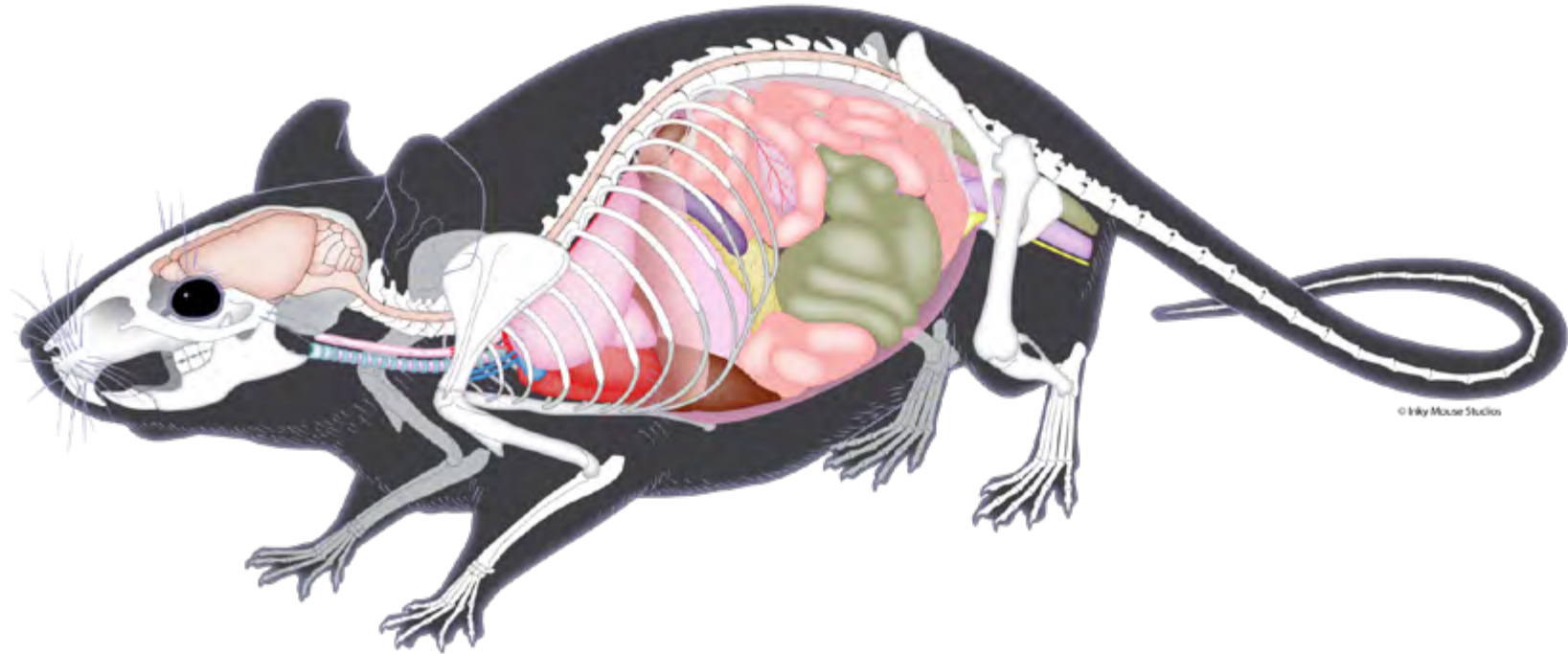
IVISense Pan Cathepsin
IVISense Integrin Receptor
IVISense Cat B FAST

Contrast agents

VesselVue Microbubble

Instruments

IVIS® Imaging Platform
Quantum GX3 microCT
Vega Ultrasound



Featured

Fluorescent agents

IVISense Cell Labeling Dyes
IVISense Fluorescent Dyes

Luminescent reagents

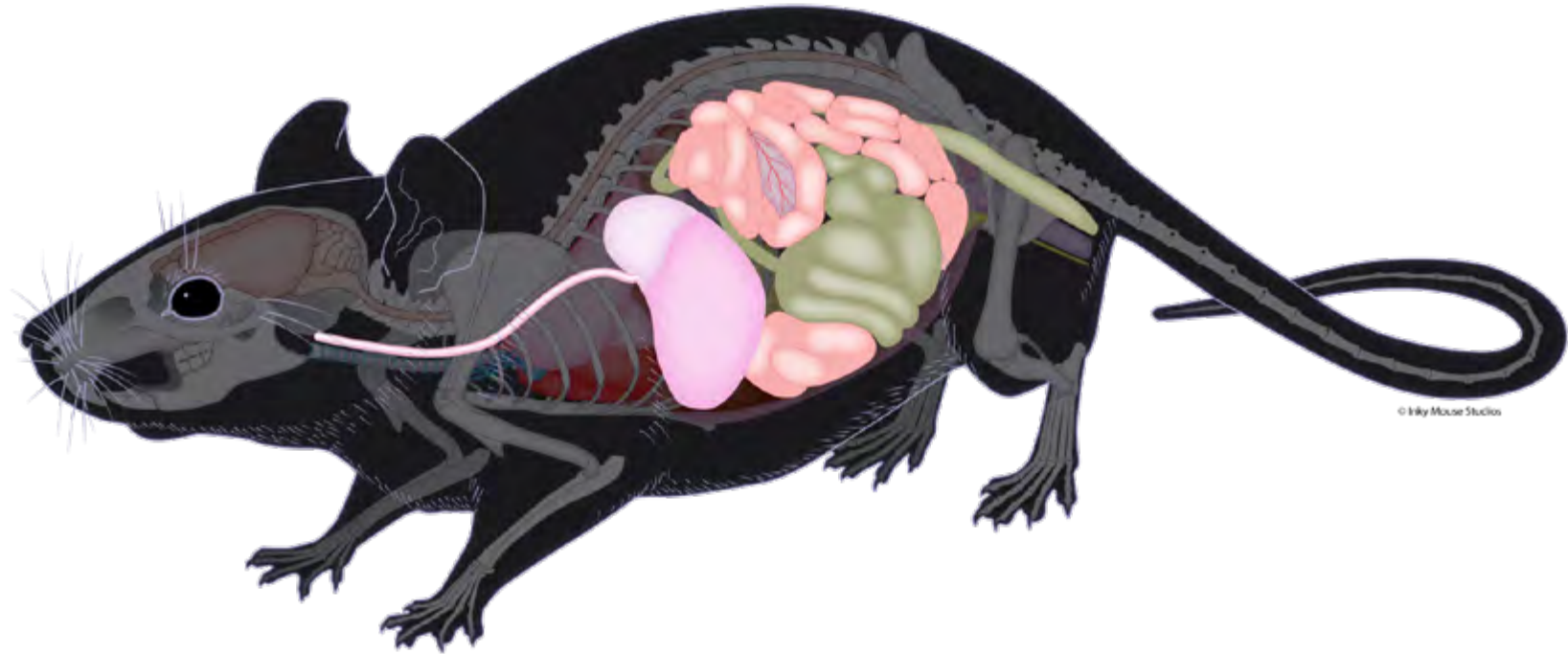
VISbrite Lentiviral Particles
VISbrite D-Luciferin K+ Salt
VISbrite D-Luciferin in RediJect Solution

Radioimaging nuclides

Zirconium-89

Instruments

IVIS® Imaging Platform



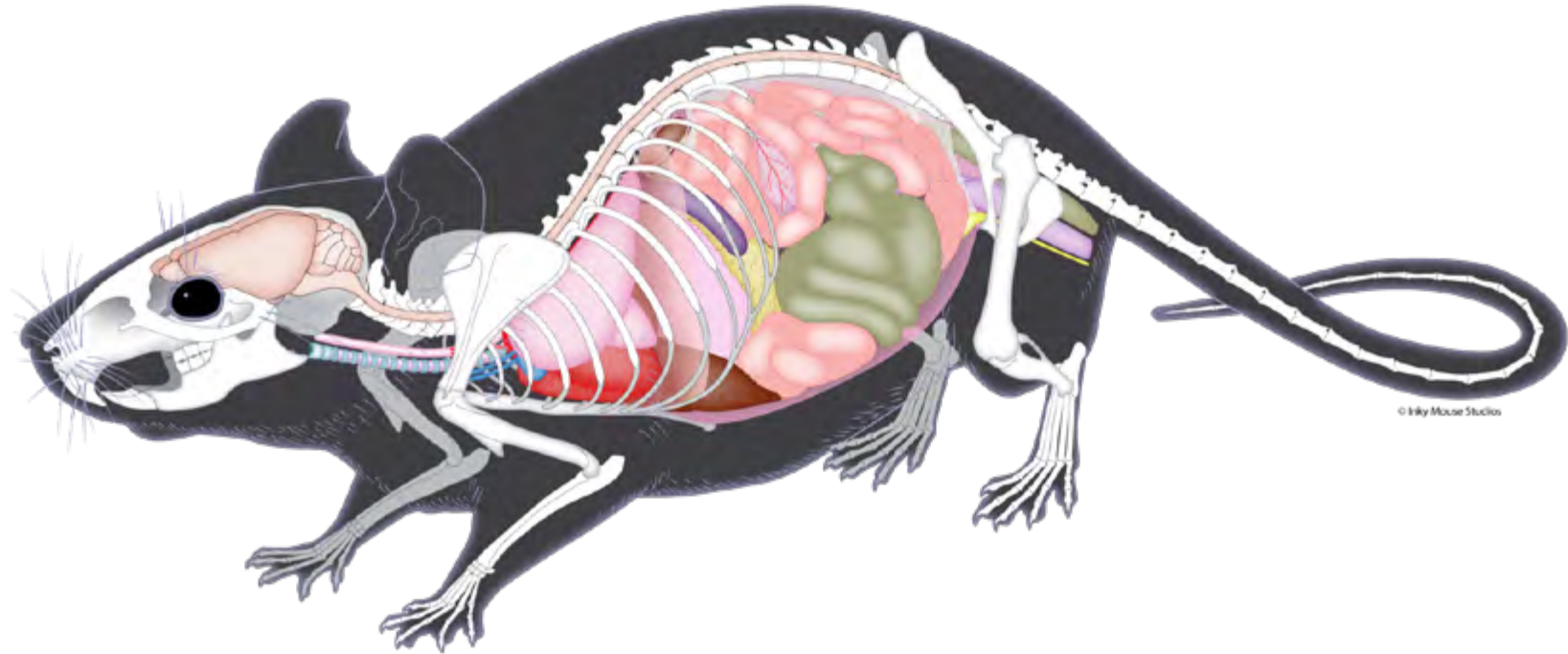
Featured

Fluorescent agents

IVISense Gastro
IVISense Vascular
IVISense Pan
Cathepsin
IVISense MMP

Instruments

IVIS® Imaging Platform
Quantum GX3 microCT



Featured

Fluorescent agents

IVISense MMP
IVISense Neutrophil Elastase FAST
IVISens Pan Cathepsin

Luminescent reagents

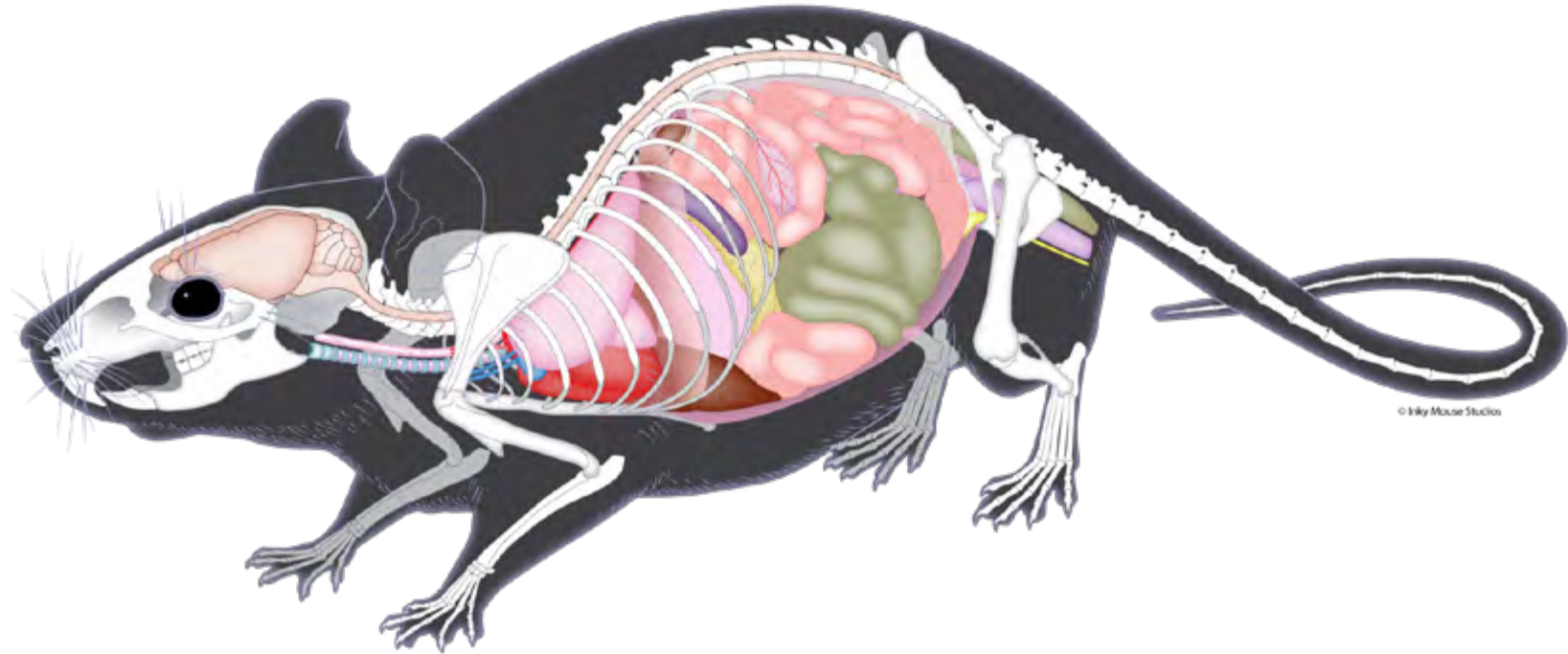
IVISbrite™ MPO 425 RediJect™
Chemiluminescent Probe

Radioimaging nuclides

Zirconium-89

Instruments

IVIS® Imaging Platform



Featured

Fluorescent agents

IVISense RediJect Bacterial 750 Probe

Luminescent reagents

IVISbrite Bacterial Strains

Instruments

IVIS® Imaging Platform



Featured

Fluorescent agents

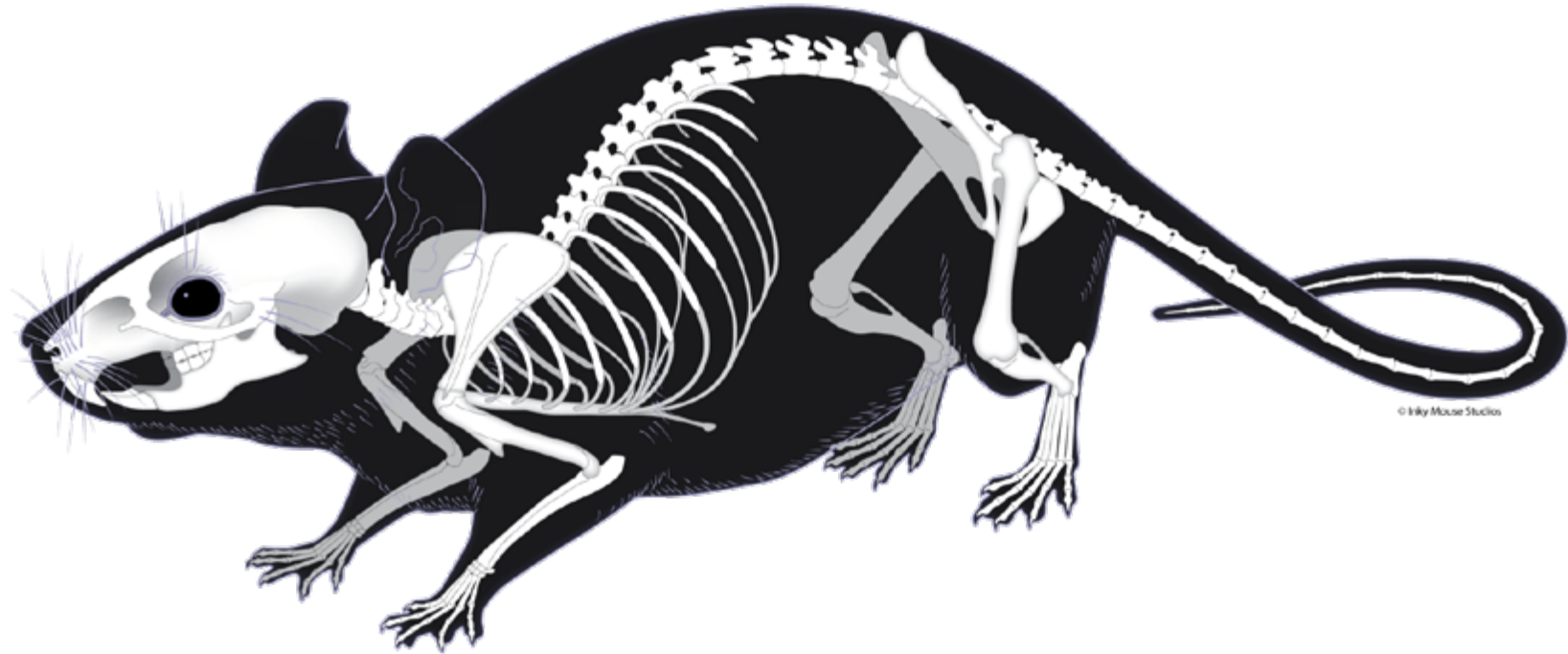
IVISense Cat B FAST
IVISense Vascular

Luminescent reagents

*IVISbrite Oncology Cell Lines
Labeled with Luciferase*
GL261Red F-luc
U-87 MG Red F-luc

Instruments

IVIS® Imaging Platform



Featured

Fluorescent agents

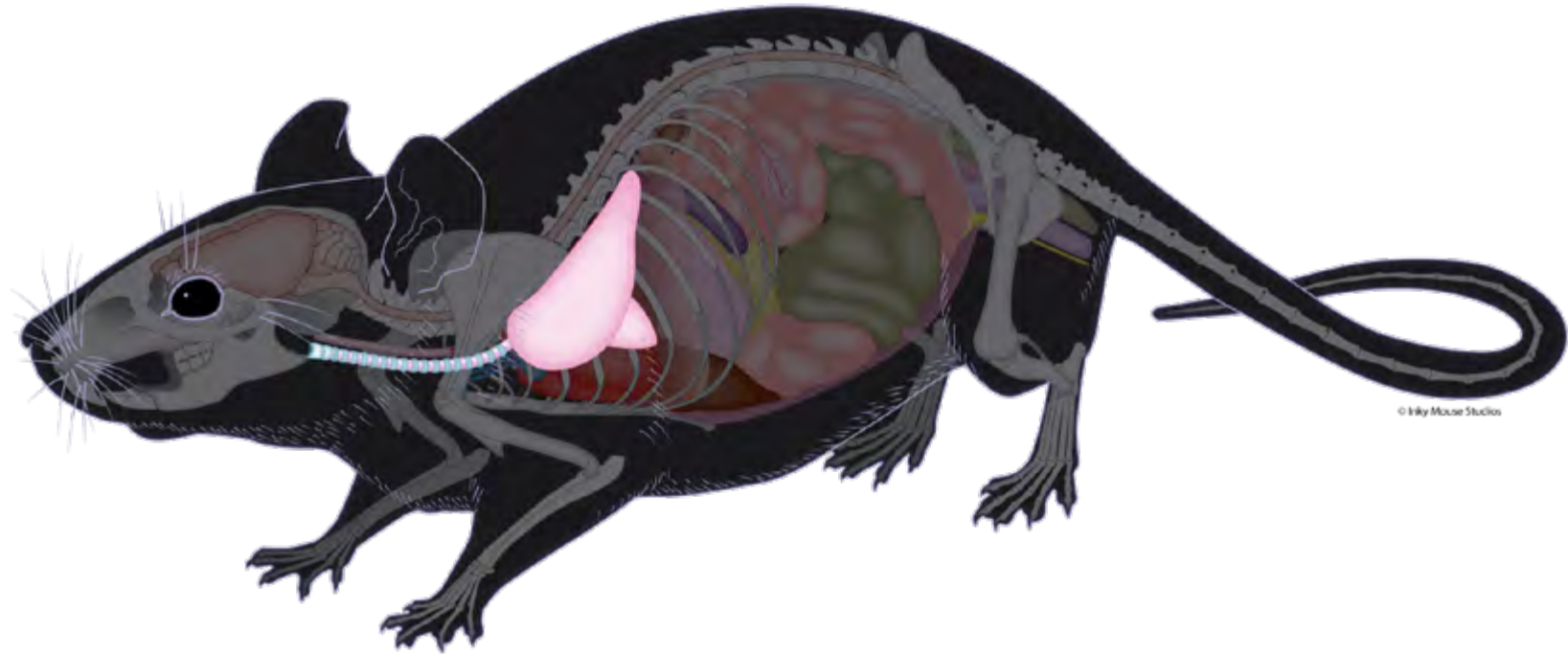
IVISense Osteo

IVISense Cat K FAST

Instruments

IVIS® Imaging Platform

Quantum GX3 microCT



Featured

Fluorescent agents

IVISense Neutrophil Elastase FAST
IVISense Pan Cathepsin
IVISense MMP

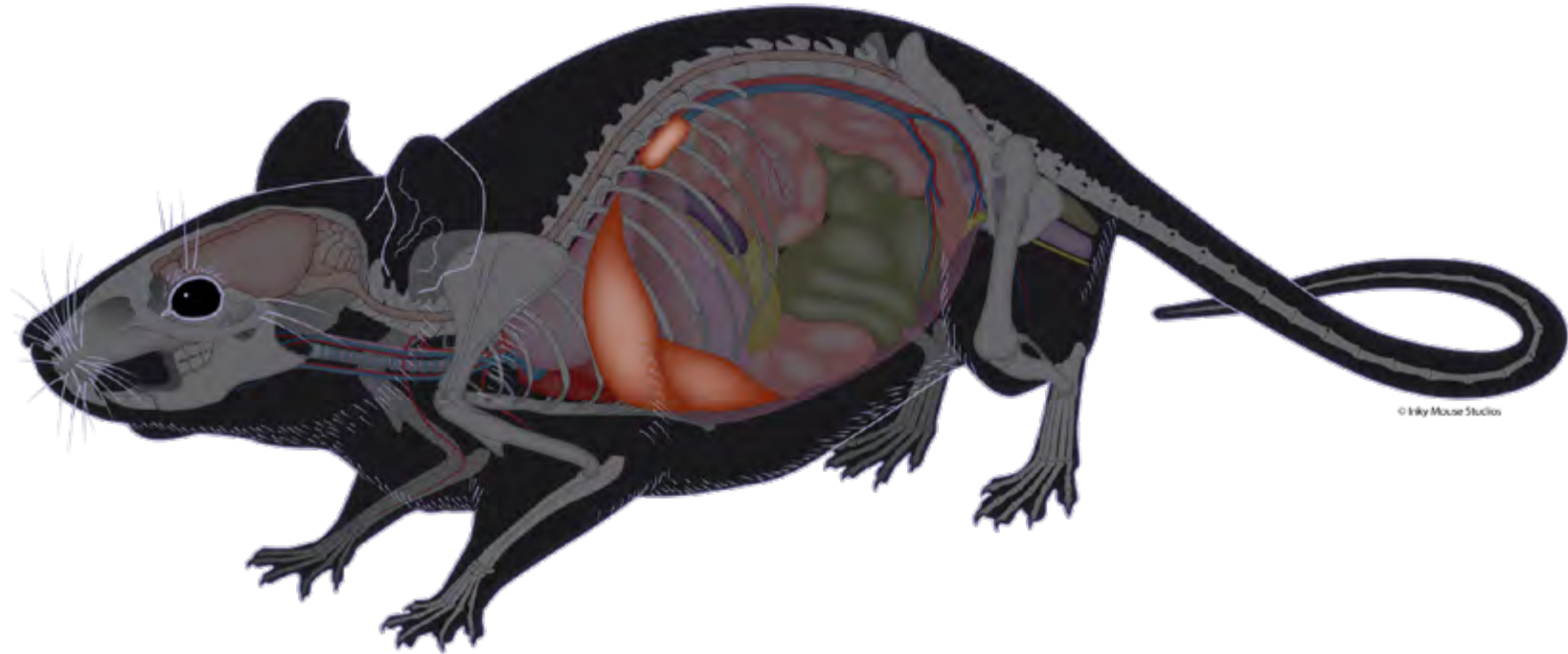
Luminescent reagents

*IVISbrite Oncology Cell Lines
Labeled with Luciferase*

- A549 Red F-luc
- NCI-H460 Red F-luc
- LL/2 Red F-luc

Instruments

IVIS® Imaging Platform
Quantum GX3 microCT



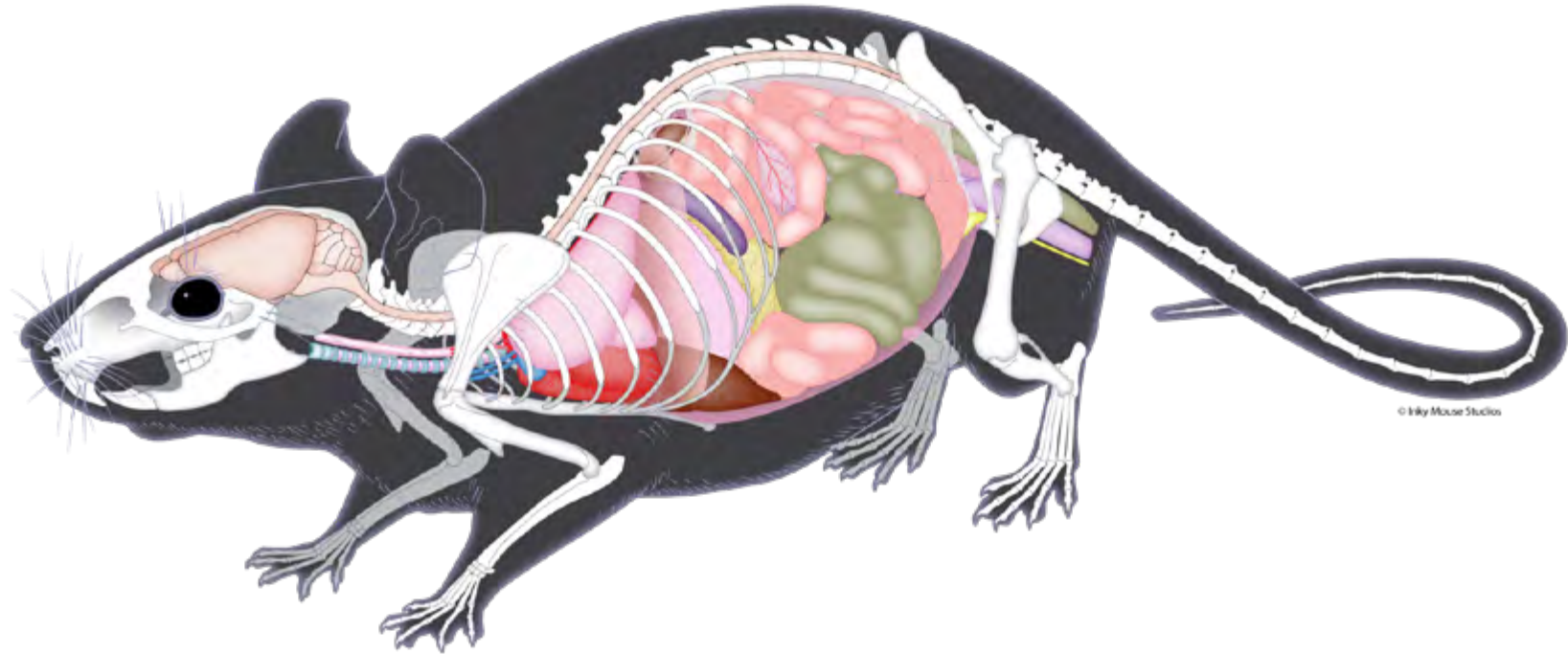
Featured

Fluorescent agents

IVISense GFR
IVISense MMP
IVISense Annexin-V
IVISense Transferrin Receptor
IVISense Gastrointestinal

Instruments

IVIS® Imaging Platform
Quantum GX3 microCT



Featured

Fluorescent agents

IVISense Hypoxia CA IX
IVISense Vascular

Luminescent reagents

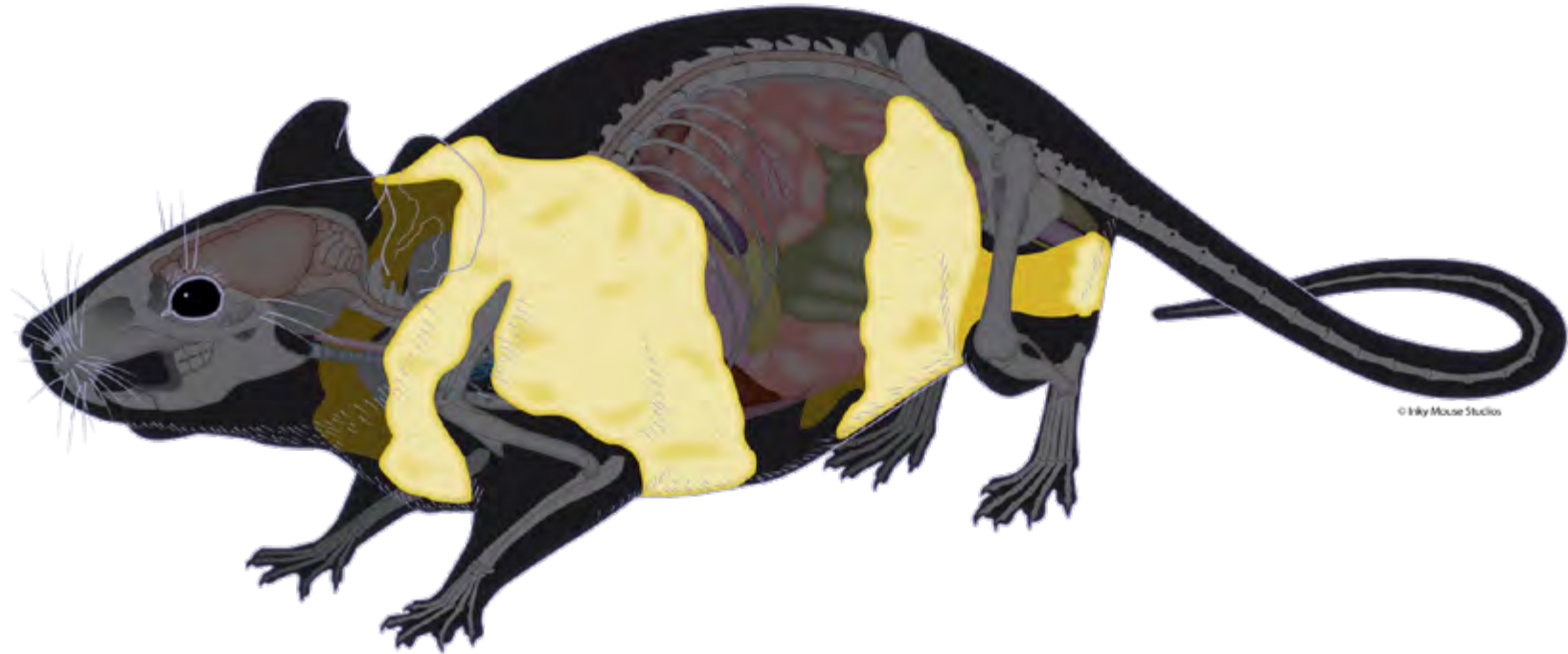
IVISbrite Tumor Cell Lines Labeled with Luciferase

- HT-29 Red F-luc
- HeLa Red F-luc

IVISbrite Lentiviral Particles
IVISbrite D-Luciferin K+ Salt
IVISbrite D-Luciferin RediJect

Instruments

IVIS® Imaging Platform



Featured

Fluorescent agents

IVISense Integrin Receptor
IVISense Bombesin Receptor
IVISense Pan Cathepsin
IVISense MMP

Luminescent reagents

IVISbrite Tumor Cell Lines Labeled with Luciferase

- HT-29-Red F-luc
- HeLa-Red F-luc

IVISbrite Lentiviral Particles
IVISbrite D-Luciferin K+ Salt
IVISbrite D-Luciferin RediJect

Contrast agents

VesselVue
Microbubble

Radioimaging nuclides

Zirconium-89

Instruments

IVIS® Imaging Platform
Vega® Ultrasound
Quantum GX3 microCT*

*May require contrast agent

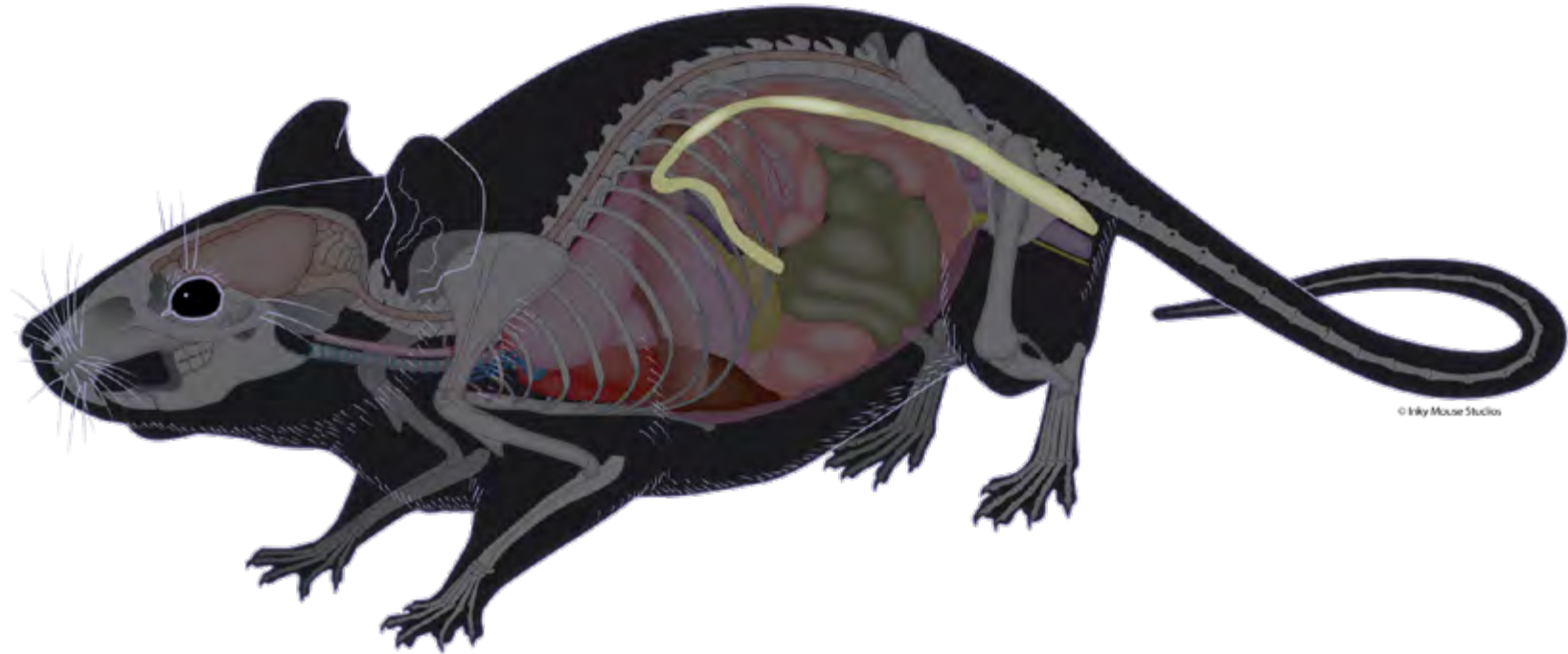


Modality ¹	Imaging Reagents	Imaging Data Capability		Research Applications		
		Anatomical	Functional	2D Imaging	3D Imaging	
Bioluminescence (up to 2 reporters at once)	<ul style="list-style-type: none"> • IVISbrite™ LNCaP Red F-luc tumor cell line • IVISbrite PC3 Red F-luc tumor cell line • IVISbrite Lentiviral Particles • IVISbrite D-Luciferin Potassium Salt bioluminescent substrate 	N/A	+++++	<ul style="list-style-type: none"> • High-throughput screening • Tracking tumor burden • Monitoring therapy 	<ul style="list-style-type: none"> • Cell tracking • Protein expression 	<ul style="list-style-type: none"> • Metastatic tumor growth • Monitor intraprostatic tumors • Quantify number of cells <i>in vivo</i>
Fluorescence (up to 6 probes at once)	<ul style="list-style-type: none"> • IVISense™ Pan Cathepsin • IVISense Folate Receptor • IVISense Bombesin Receptor 	N/A	+++++	<ul style="list-style-type: none"> • Probe/therapeutic tracking • Systemic changes (toxicity, inflammation, apoptosis, etc.) 	<ul style="list-style-type: none"> • Simultaneous multiprobe imaging 	<ul style="list-style-type: none"> • Precision organ/tumor targeting • Metastatic lesion targeting • Quantify moles of probe <i>in vivo</i>
Computed Tomography²	Optional	+++++	N/A	<ul style="list-style-type: none"> • 2D slice extraction from 3D image 		<ul style="list-style-type: none"> • Anatomical reference of xenograft • Bone & lung metastasis
Ultrasound³	Optional	+++++	+++	<ul style="list-style-type: none"> • 2D slice extraction from 3D image 		<ul style="list-style-type: none"> • Anatomical reference • Angiogenic tracking • Cardio-function • Prostate volume vs. tumor volume

Note 1: All take seconds-minutes to acquire
 Note 2: Precise anatomical reference without probe
 100-150 μm *in vivo* resolution
 10-15 μm *ex vivo* resolution
 Note 3: Precise anatomical reference without probe
 100 μm *in vivo* resolution

*May require contrast agent





Featured

Fluorescent agents

IVISense Pan Cathepsin
IVISense MMP
IVISense Transferrin Receptor
IVISense Bombesin Receptor

Luminescent reagents

IVISbrite Tumor Cell Lines Labeled with Luciferase

- Colo205 Red F-luc
- HCT116 Red F-luc
- HT29 Red F-luc

IVISbrite Lentiviral Particles
IVISbrite D-Luciferin K+ Salt
IVISbrite D-Luciferin RediJect

Contrast agents

VesselVue
Microbubble

Radioimaging nuclides

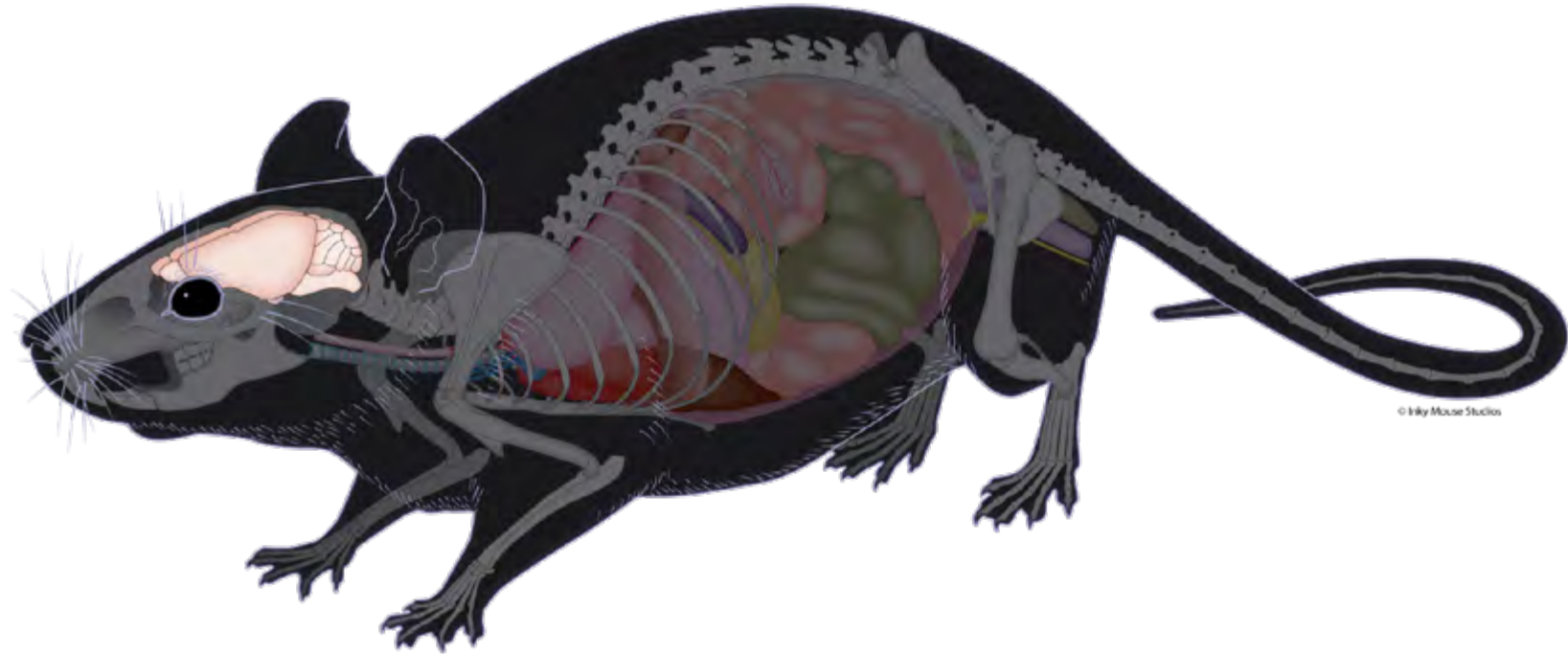
Zirconium-89

Instruments

IVIS® Imaging Platform
Vega® Ultrasound
Quantum GX3 microCT*

*May require contrast agent





Featured

Fluorescent agents

IVISense Pan Cathepsin
IVISense Integrin Receptor

Luminescent reagents

IVISbrite Tumor Cell Lines Labeled with Luciferase

- GL261 Red F-luc
- U87 MG Red F-luc

IVISbrite Lentiviral Particles
IVISbrite D-Luciferin K+ Salt
IVISbrite D-Luciferin RediJect

Contrast agents

VesselVue
Microbubble

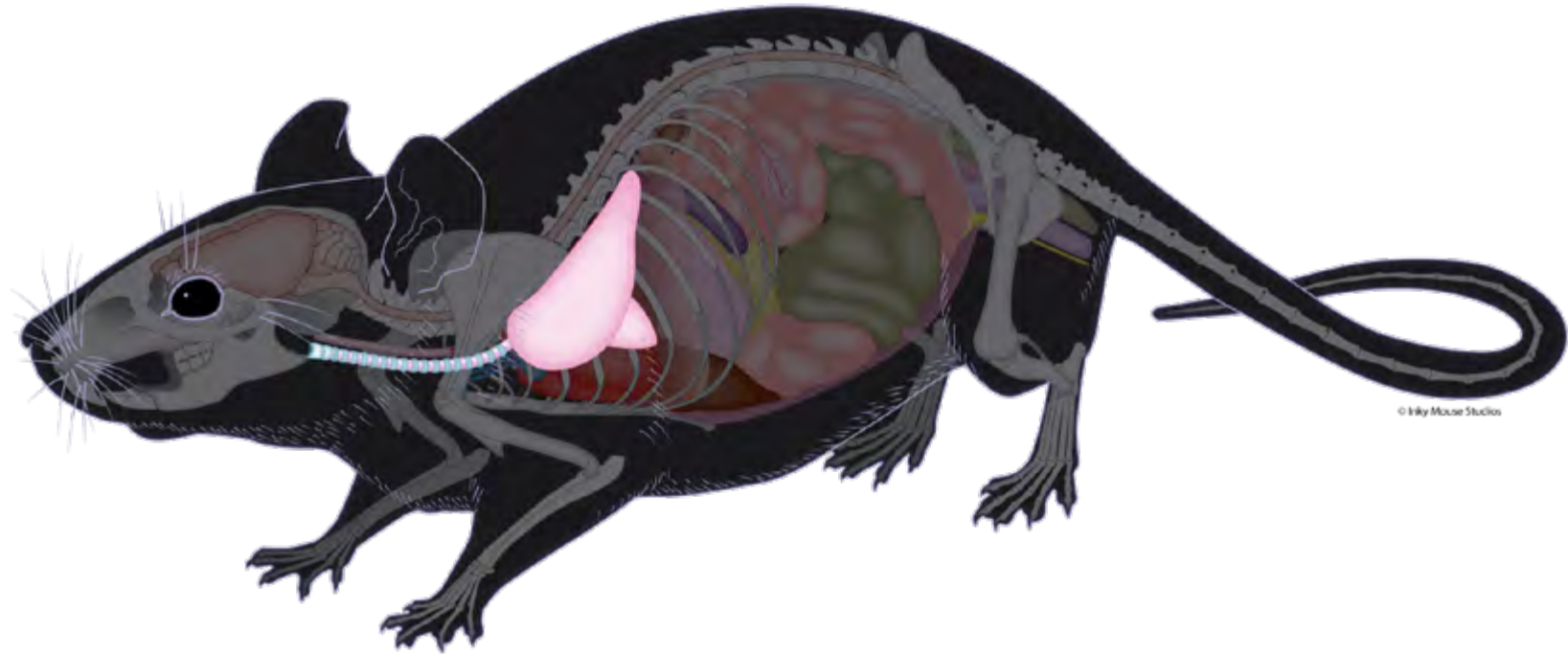
Radioimaging nuclides

Zirconium-89

Instruments

IVIS® Imaging Platform
Vega® Ultrasound
Quantum GX3 microCT*

*May require contrast agent



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Featured

Fluorescent agents

IVISense Pan
Cathepsin
IVISense Vascular
IVISense MMP

Luminescent reagents

IVISbrite Tumor Cell Lines Labeled with Luciferase

- A549 Red F-luc
- NCI-H460 Red F-luc
- LL/2 Red F-luc

IVISbrite Lentiviral Particles
IVISbrite D-Luciferin K+ Salt
IVISbrite D-Luciferin RediJect

Contrast agents

VesselVue
Microbubble

Radioimaging nuclides

Zirconium-89

Instruments

IVIS® Imaging Platform
Vega® Ultrasound
Quantum GX3 microCT*

*May require contrast agent



CASE STUDY

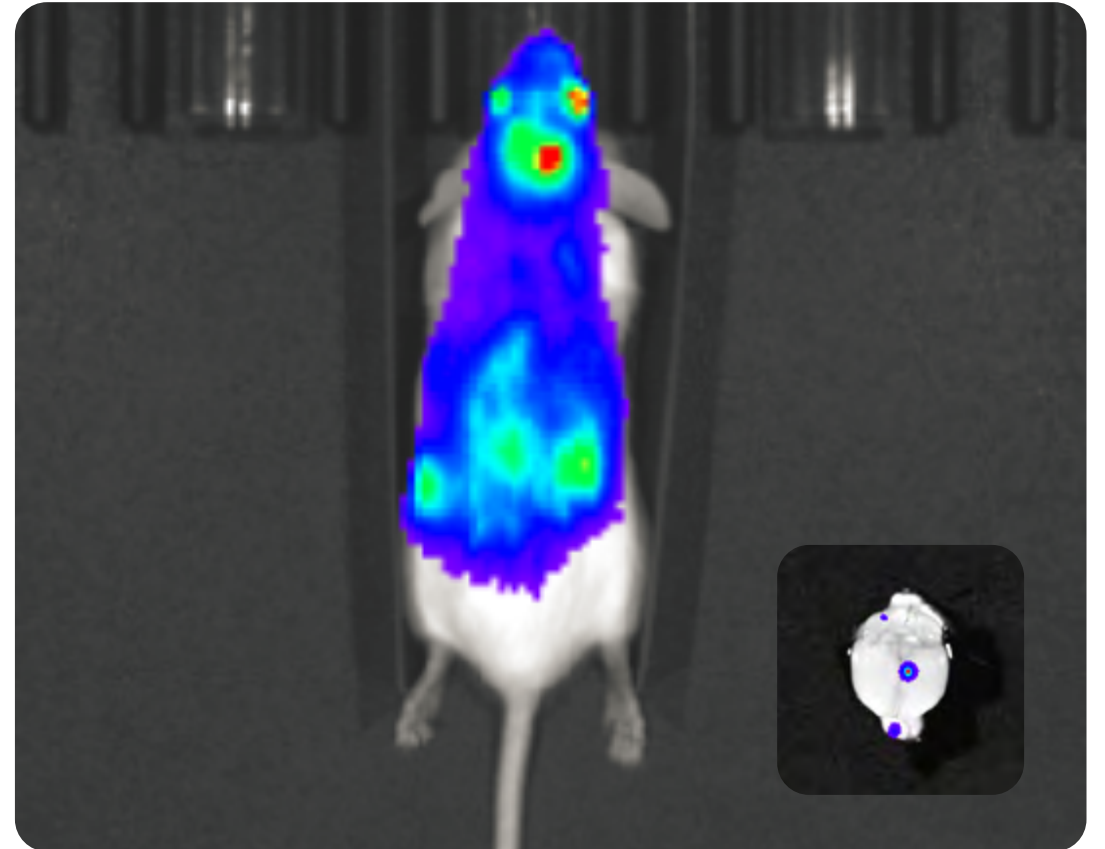
Oncology



Jen Koblinski, PhD

*Assistant Professor of Pathology
Massey Cancer Center,
Virginia Commonwealth University*

Dr. Koblinski has had a long interest in the relationship between tumor cells and their specific microenvironments during the metastatic cascade, with a specific interest in the brain. Her research focuses on elucidating the role of syndecans, heparan sulfate proteoglycans, in facilitating breast cancer metastasis to the brain. With the IVIS Spectrum imaging system, Dr. Koblinski is able to track and quantify brain metastases *in vivo* and *ex vivo*, gaining insights into the mechanisms that facilitate breast cancer brain metastasis.



CASE STUDY

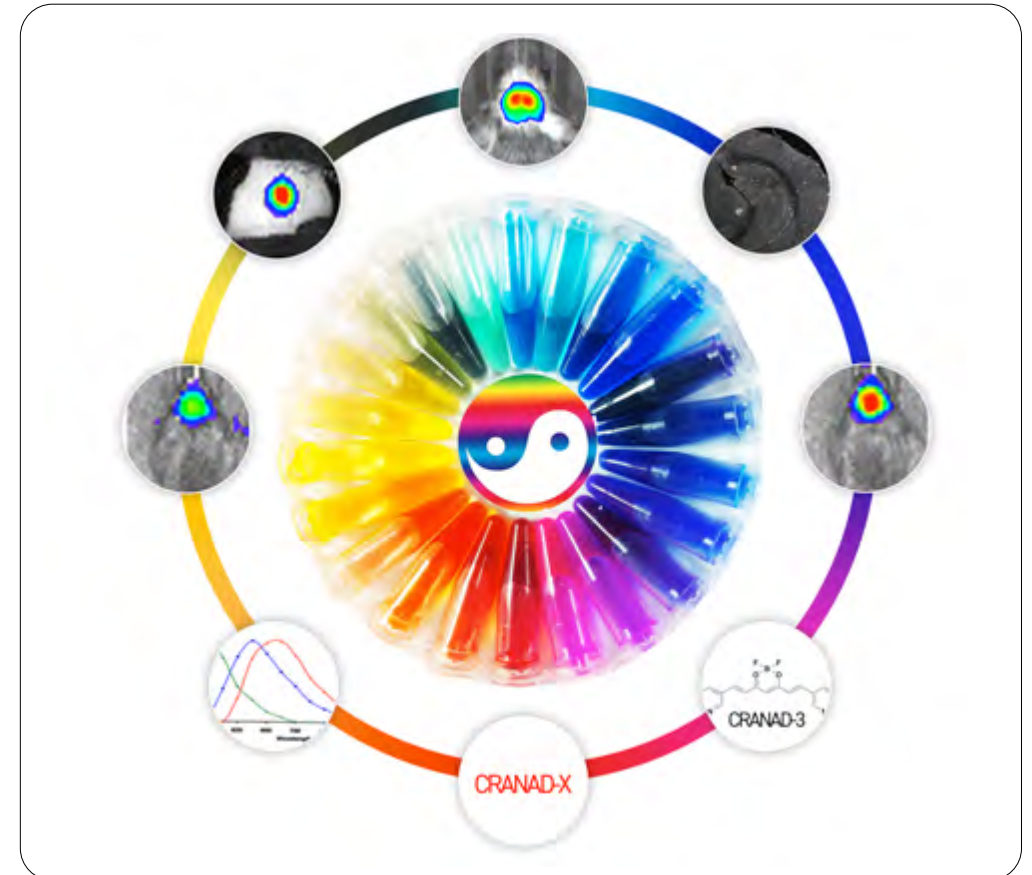
Alzheimer's Disease



Chongzhao Ran, PhD

*Assistant Professor of Radiology
Martinos Imaging Center, Massachusetts
General Hospital, Harvard Medical School*

Dr. Ran's research has been focused on developing probes for systemic molecular imaging of Alzheimer's disease. In the past years, Dr. Ran's group has invented curcumin-based fluorescence probe library, CRANAD-X, for imaging various amyloid beta (A β) species and oxidative stress (H₂O₂ and ROS). With the IVIS Spectrum imaging system, Dr. Ran's group demonstrated that NIRF brain imaging with CRANAD-X could be used to detect soluble and insoluble A β s of AD mouse models. Recently his group showed that NIRF ocular imaging (NIRFOI) could detect and monitor A β s in the eyes of AD mice. NIRFOI has the potential for clinical applications in the future.



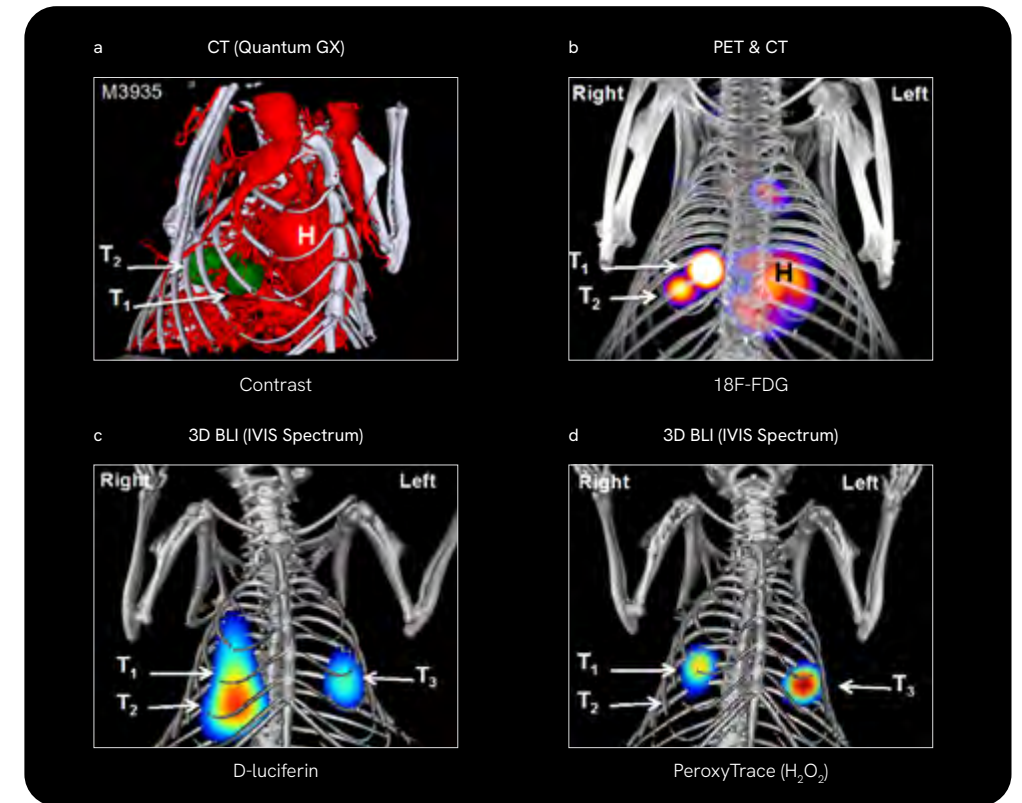
CASE STUDY

Multimodality imaging



Dr. David Shackelford, PhD
Associate Professor
UCLA David Geffen School of Medicine

Dr. Shackelford's research focuses on understanding key genetic, molecular, and metabolic events that drive lung tumor development and progression. His focus is on using complementary multimodality imaging approaches on genetically engineered mouse models (GEMMs) of lung cancer in order to functionally map key metabolic events that shape tumorigenesis. His approach combines 3D bioluminescent imaging using the IVIS Spectrum with positron emission tomography (PET) imaging using the G8 PET/CT scanner. By coupling the use of caged luciferins with 18F-labeled radiotracers, Dr. Shackelford has begun to non-invasively profile key metabolic events that dictate how lung tumors form and evolve from early to advanced stages of the disease.



Multimodality imaging of genetically engineered mouse models (GEMMs) of lung cancer. **(a)** Computed tomography (CT) imaging with contrast in a GEMM of lung cancer. T = tumor. H = heart. **(b)** 18F-FDG positron emission tomography (PET) and CT imaging of the same mouse from (A). **(c)** 3D bioluminescent imaging (BLI) of the same mouse using D-luciferin. **(d)** 3D bioluminescent imaging (BLI) of the same mouse using a caged luciferin, PeroxyTrace, to measure intra-tumoral peroxide levels in tumors.

All PET/CT and BLI images courtesy of Dr. David Shackelford, UCLA David Geffen School of Medicine, Los Angeles CA, USA, used with permission.



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940 Winter Street
Waltham, MA 02451 USA
www.revivity.com

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