High resolution, high speed, high performance microCT.

The **Quantum™ GX3** system represents the latest advances in microCT imaging, with superior image resolution, high speed, low-dose, and the flexibility you require.

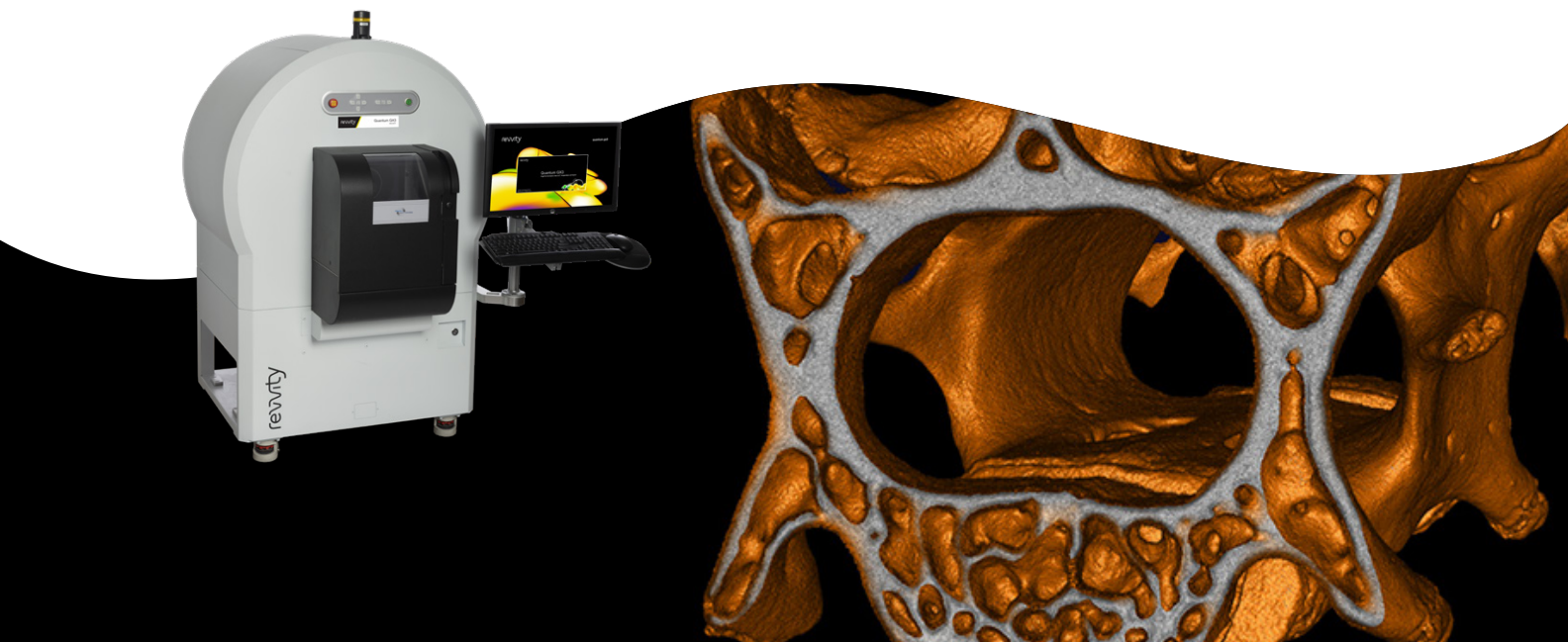
With the combination of higher resolution, increased field of view (FOV) range, and enhanced image-based respiratory and cardiac gating, the Quantum GX3 low-dose microCT system enables researchers to gain a better understanding of healthy and diseased tissue in a broad range of areas including bone, respiratory, cardiovascular, liver/kidney, brain, and oncology research.

With 5 FOVs ranging from 8 mm, ideal for *ex vivo* biological samples, to *in vivo* imaging of small animals, to the largest FOV of 86 mm ideal for imaging the lungs of larger animals in a single scan, the Quantum GX3 enables the versatility needed to answer your biological questions.

Highlights

- Superior spatial resolution (5 µm); pixel size of 2.86 µm
- High speed scanning (3.9 sec)
- 5 field of views (8 mm to 86 mm)
- Ex vivo biological samples and *in vivo* image capability of mice to small rabbits
- Enhanced image-based 2-phase respiratory and cardiac gating
- Low dose imaging for longitudinal studies
- Continuous and step scanning modes
- Easy co-registration of anatomical data with functional readouts from IVIS 3D optical system
- Active ring reduction for improved image quality

Quantum GX3
microCT



Visualize anatomical structures in greater detail

High spatial resolution

The Quantum GX3 microCT system offers exceptionally high spatial resolution down to 5 µm and pixel size of 2.86 µm (at 8 mm field of view) enabling high image quality of *ex vivo* samples including fine anatomical structures of small bones.

- Spatial resolution = 5 µm
- Smallest pixel size = 2.86 µm

Enhanced X-ray

With improved x-ray source (20 – 100 kV, 20 W), the Quantum GX3 enables imaging of a wide range of samples from less dense soft tissue to increased x-ray penetration into very dense objects such as bone offering enhanced single-to-noise resulting in superior image quality.

More ways image quality has been improved

In addition to standard beam hardening correction, the Quantum GX3 system incorporates proprietary integrated Active Ring Reduction (ARR) hardware that automatically removes ring artifacts for increased image quality. When coupled with the 'step' scanning mode for motion artifact reduction as well as image-based gating technology, the Quantum GX3 enables the highest image quality and resolution for optimal image analysis.

- Image-based respiratory and cardiac gating - for filtering out motion artifacts from lungs and heart
- Active Ring Reduction – automatically removes ring artifacts
- Step scanning mode – 'step-and-shoot' for motion artifact reduction
- Improved fluoroscopy – for better visualization of anatomical structures and vasculature in real-time

Figure 1. Cortical (top) and trabecular (bottom) imaging of mouse knee

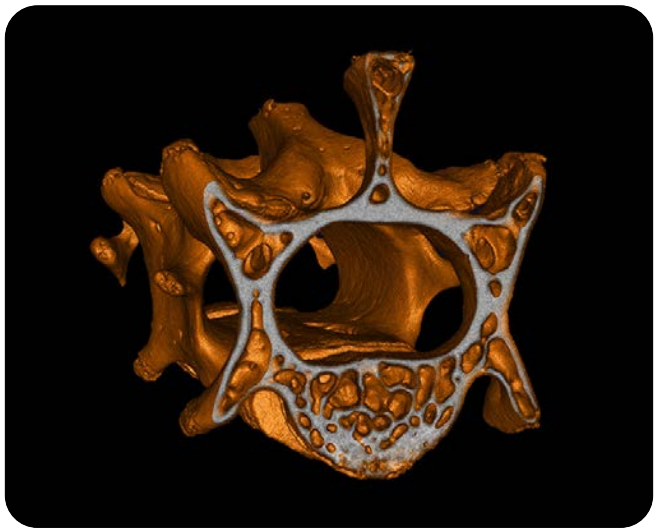


Figure 2. Cross section of mouse vertebrae

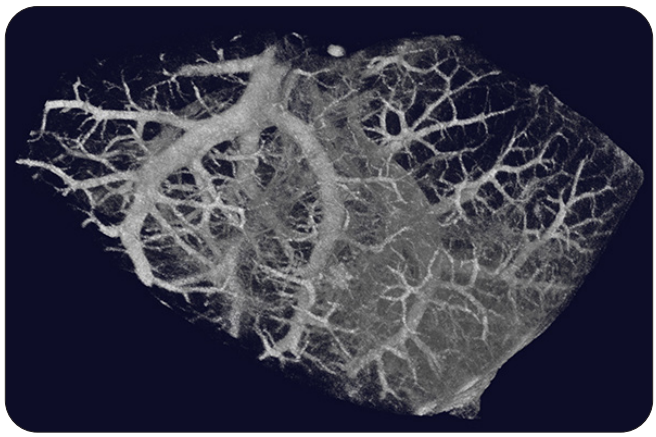


Figure 3. *Ex vivo* imaging of mouse lung

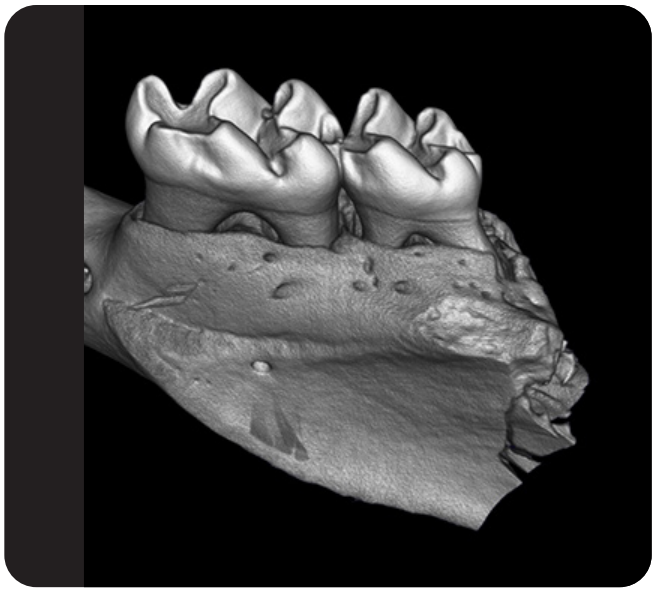


Figure 4. Mouse jaw

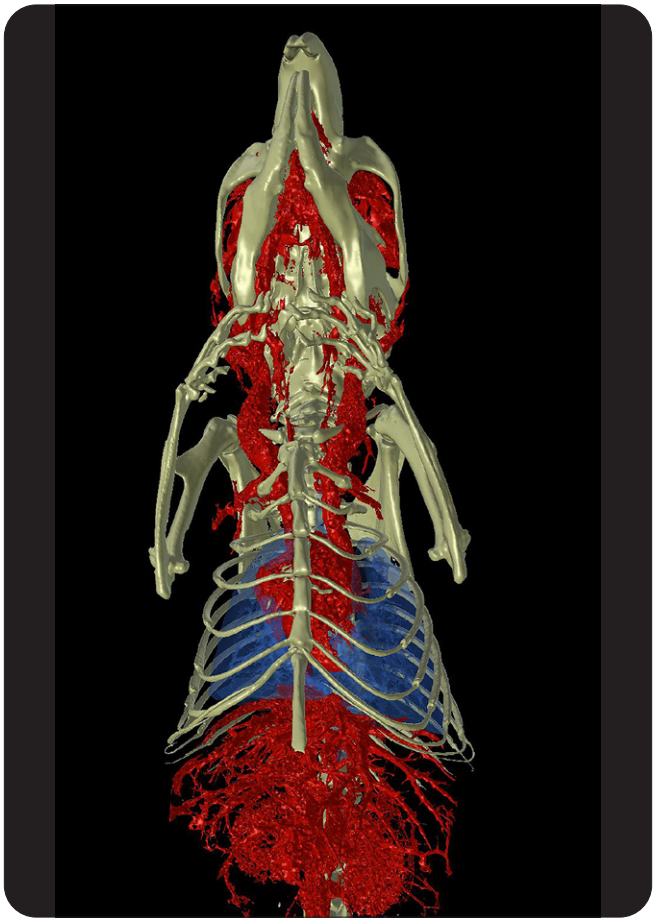


Figure 5. Mouse body image showing skeleton, lungs, and vasculature

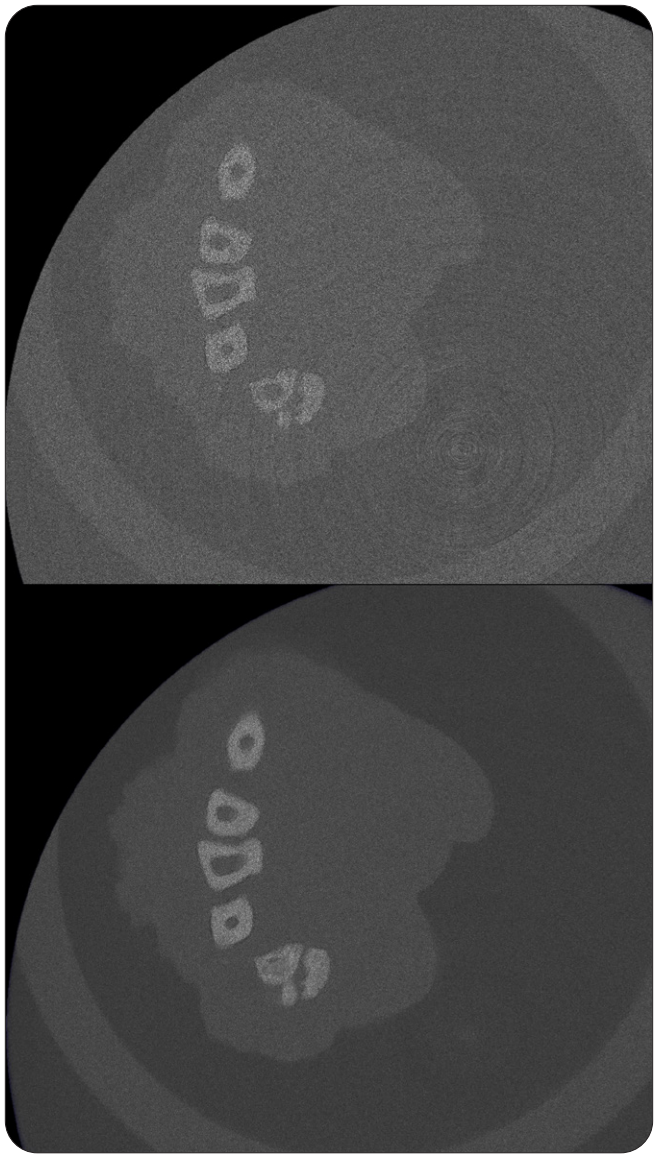


Figure 6. Active ring reduction comparison. (Top) before ARR and (bottom) after implementation of ARR

Wide range of field of view (FOV)

The Quantum GX3 enables *in vivo* imaging of multiple species from mice to small rabbits giving researchers the flexibility of using the animal model most relevant to their study as well as *ex vivo* biological samples.

- 5 FOVs: 8, 18, 36, 72, and 86 mm
- Bore size of 163 mm
- Large scannable range of 240 mm
- *Ex vivo* specimen holder designed for use with 8 mm FOV
- Animal beds to accommodate multiple species

Table 1. Example of sample types vs. FOV

FOV	Examples of samples/subjects
8 mm	Ideal for *ex vivo* biological samples
18 mm	Ideal for imaging zebrafish and other small specimens
36 mm	Standard mouse imaging
72 mm	Rats and rabbits
86 mm	Imaging lungs of larger animals in a single scan

Figure 7. 8 mm FOV specimen holder

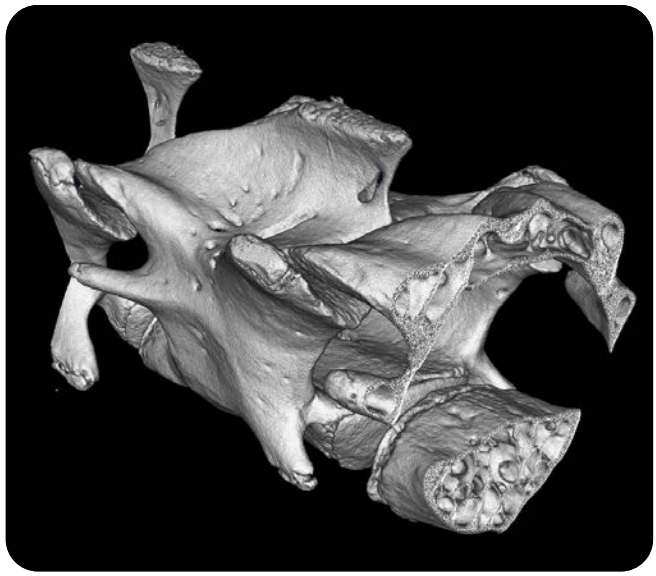


Figure 8. *Ex vivo* image of mouse vertebrae

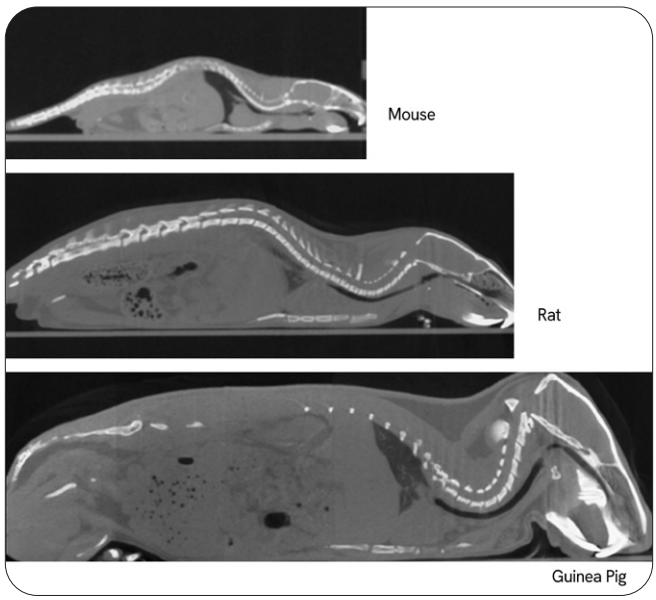


Figure 9. Adjustable FOV, large bore size, and large scannable range for imaging a wide range of species and biological samples

Two-phase retrospective cardiac and respiratory gating in mice, rats, and ferrets

Accurate microCT reconstructions often require reducing motion artifacts due to cardiac and respiratory motion. Using a retrospective two-phase image-based gating technique, the Quantum GX3 enables superior cardiac and lung function measurements for a range of species, including mice, rats, and ferrets.

The Quantum GX3 utilizes proprietary algorithms within the software to retrospectively gate the microCT data, reducing heart and diaphragm motion artifacts. This is achieved by drawing a region of interest (ROI) over the diaphragm and/or apex of the heart. The software algorithms reprocess the data, using projections captured during specific stages in the respiratory or cardiac cycle providing optimal data from your studies.

This workflow is ideal for *in vivo* heart and lung imaging or other applications where motion artifacts compromise image quality and quantitative accuracy.

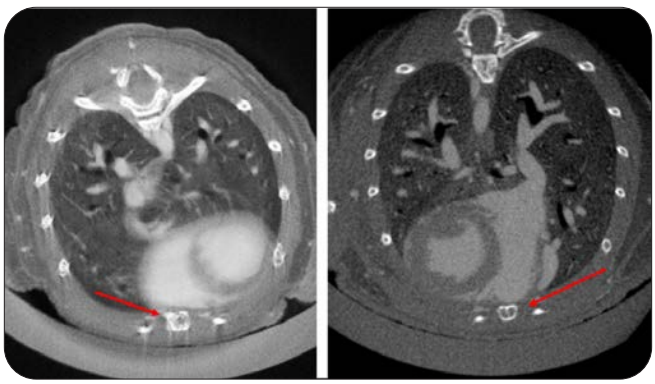


Figure 10. Image-based gating of a mouse lung; ungated (left) and gated (right). The red arrows point to the sternum showing enhanced image quality after gating due to removal of motion artifacts

High speed/low dose imaging

The Quantum GX3 is a fast microCT system with scan times of 3.9 seconds in the high-speed mode. With a reconstruction time of 6 seconds, a 3D image can be acquired and reconstructed with the Quantum GX3 in seconds.

With the Quantum GX3, follow and characterize disease progression throughout the entire longitudinal study using microCT at every imaging point. The 3.9 second scan time is designed to simultaneously provide good image quality and low x-ray dose that enable longitudinal assessment of disease models.

Fast imaging and smooth workflows also enable the throughput required to scan cohorts of animals quickly and draw sound conclusions from experimental data.

Continuous and Step Scanning Modes

With the Quantum GX3, researchers have the choice of choosing either continuous scanning mode for high throughput fast image acquisition or step scanning mode for higher resolution imaging.

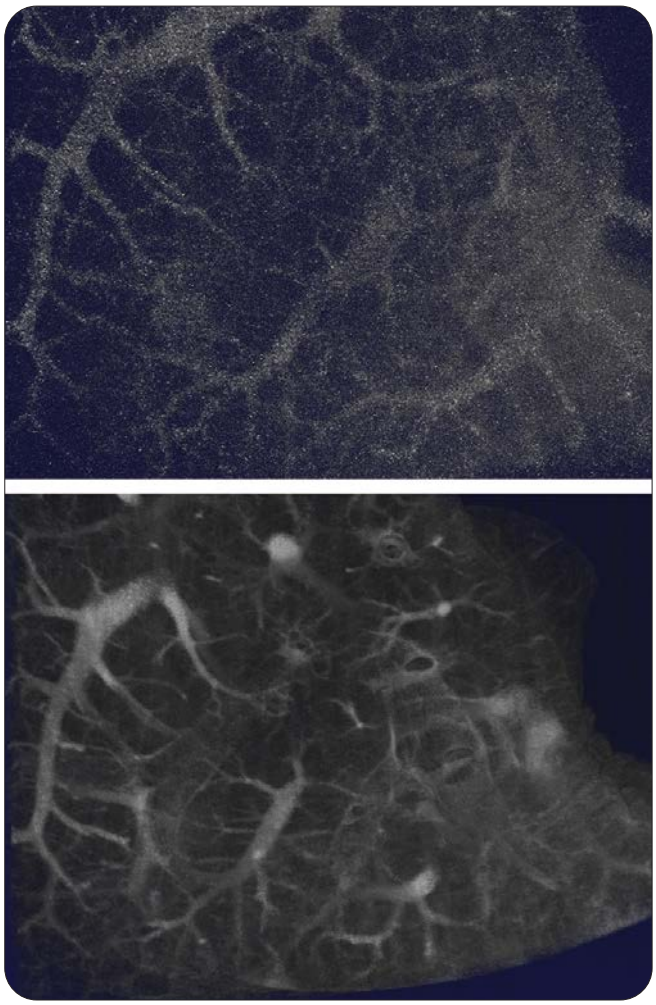


Figure 11. *Ex vivo* comparison of lung specimen at 8 mm FOV using continuous scanning mode (top) and step scanning mode (bottom)

Automatic filter sensing

Physical filters are often placed in front of the x-ray source to eliminate low energy x-ray photons that add to dose but not to image quality. The Quantum GX3 has 6 filter options and incorporates automatic sensing where the software verifies the correct filter is in place prior to scanning.

Table 2. Featuring automatic sensing the Quantum GX3 comes with 6 changeable filters for optimization of imaging protocols

Filter (material thickness)	Example applications
Al 0.5 mm	Low contrast sample (e.g., *in vitro* brain)
Al 1.0 mm	Soft tissue scanning (e.g., fat analysis)
Al 0.5 mm + Cu 0.06 mm	Standard CT scanning
Cu 0.1 mm	Dense samples at high voltages
Cu 0.2 mm	Metal containing samples (e.g., Dental implant)
Cu 1.0 mm	Flat panel detector protection when x-ray generator warm-up

Co-registration with optical imaging

The ability to combine microCT data with other modalities can provide more comprehensive insights into functional and anatomical features of diseased and healthy biology.

The Quantum GX3 enables seamless co-registration of microCT data that can be easily combined with readouts from Revvity's IVIS® 3D optical system using the mouse imaging shuttle (MIS). The shuttle easily snaps into holders on both platforms, maintains subject positioning for each of the scans, and the software uses fiducial markers that automatically co-registers data in just a few clicks.

Additionally, readouts from the Quantum GX3 can also be exported in DICOM format and opened in a number of different analysis software programs used by other modalities.

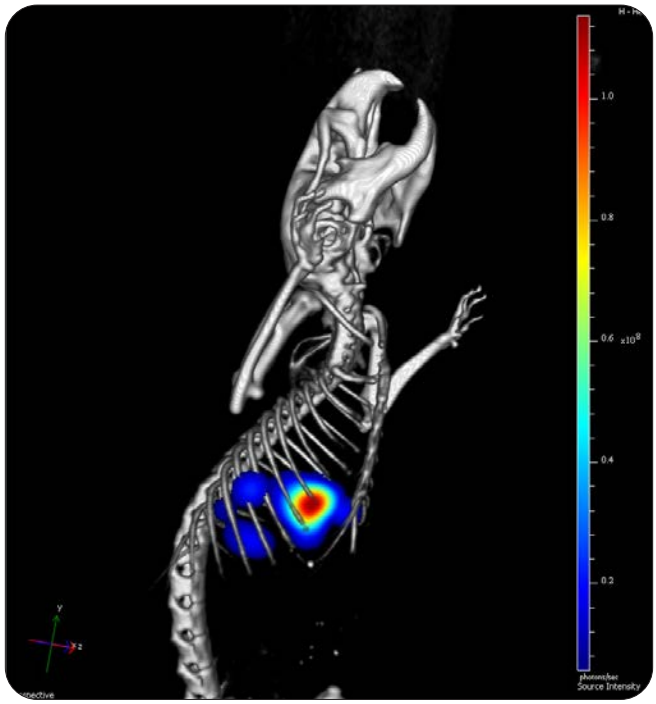


Figure 12. Co-registration of Quantum GX3 microCT with IVIS Spectrum optical system of IVISense™ tumor cell line implanted in mouse lung

Quick and seamless analysis

Essential for routine imaging experiments, data capture and analysis on the Quantum GX3 is intuitive and easy to use for quick adoption. Reconstructions are automatically created within seconds of scanning. Basic analysis tools allow you to visualize tissue densities, make quantitative measurements, and export for further analysis.

Software Highlights:

- Easy-to-use software for acquisition and viewing of microCT data
- Analysis tools measure distances and regions of interest (ROIs) areas
- Viewer displays crisp 3D renderings of thresholded objects
- Image database provides hierarchical organization for study scans
- Job scan feature allows for automated sequential imaging or stitching of single images into a larger panoramic
- Sub-volume reconstruction feature enables higher-resolution imaging
- Easy co-registration with IVIS 3D optical imaging data
- Export data in the industry standard DICOM format for additional analysis in a variety of software programs

Compliment your MicroCT Data with Analyze 14.0

Take your data to the next level with Analyze 14.0 software for advanced imaging visualization, manipulation, and measurements including advanced bone analysis, body composition, fat volume, and more.

Highlights of Analyze 14.0 software:

- Quickly segment precise anatomical regions
- Measure lengths, volumes, and intensities for in-depth statistical analysis of data
- Easily filter images for optimized visualization
- Co-register your microCT data with other modalities
- Display and save images as high-resolution stills or 3D videos
- Perform spatial and intensity transformations, mathematical processing, and data reorientation
- Bone microarchitecture analysis (BMA) (add-on)

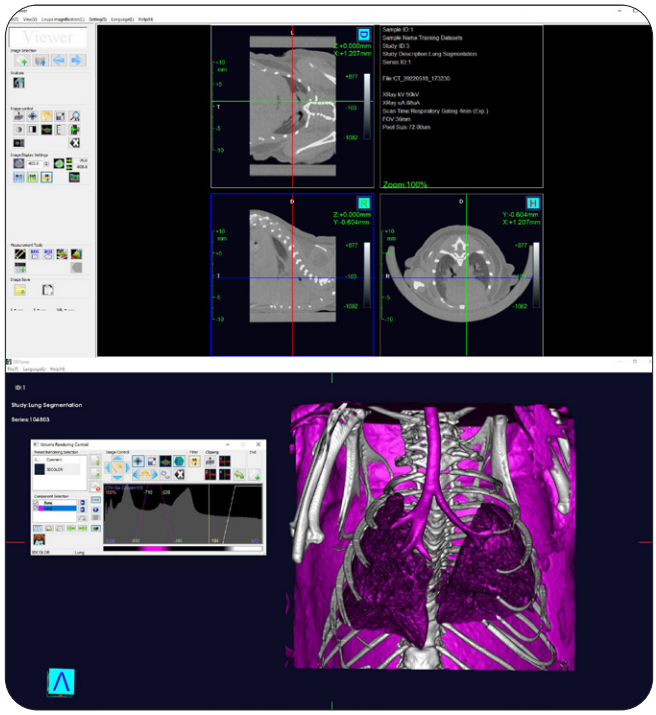


Figure 13. Easy to use software for visualization and analysis. Screenshot of the Viewer software showing 2D cross-sections (top) and 3D rendering (bottom) of a mouse lung at end-expiration

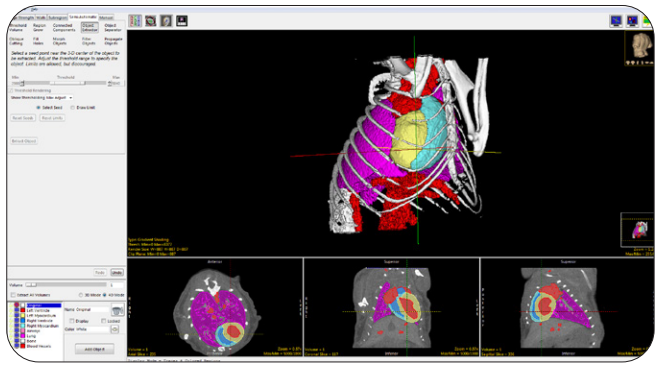


Figure 14. Analyze 14 segment module showing sophisticated interactive tools for fast and precise definition of organs and regions

Optional accessories

RAS-4 Rodent Anesthesia System
Part No. CLS146737

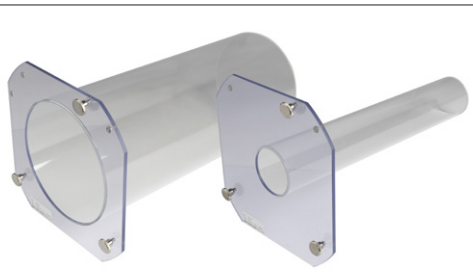
MIS Mouse Imaging Shuttle
Part No. 127744

8 mm FOV Specimen holder

Small rodent animal bed
Part No. CLS144597

Large rodent animal bed
Part No. CLS144596

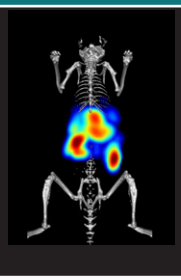
Rabbit animal bed
Part No. CLS137991



Bore covers; 70 and 170 ∅

System components	Specifications
Spatial resolution	5 µm
Pixel size	2.86 µm (@ 8 mm FOV)
X-ray voltage	20-100 kV
X-ray tube current	200 uA
X-ray tube maximum output	20 W
Detector	CMOS flat panel detector, 14-bit, 2944 x 2352 px, high energy range up to 160 kV
Bore size	163 mm
5 field of views	8, 18, 36, 72, and 86 mm
Scannable range	240 mm
Filters	6 changeable filters, with automatic sensing: Al (0.5, 1.0 mm) | Cu (0.1, 0.2, 1.0 mm) | Al 0.5 mm + Cu 0.06 mm
Minimum scan times	3.9 sec (fastest)
Reconstruction time	6 sec (fastest)
Respiratory and cardiac gating	Image-based, 2-phase retrospective gating in mice, rats and ferrets
Continuous and step scanning modes	Continuous mode for high throughput and step scanning for high resolution imaging
System dimensions	1536 x 980 x 963 mm (H x W x D)
System weight	530 kg
Computer (Minimum specifications)	Windows 11 Pro, 256 GB RAM, NVIDIA T400 4GB, NVIDIA TRX A4000 16 GB (For reconstruction), 1.0 TB M.2 NVMe SSD, 4.0 TB M.2 NVMe SSD, 12 TB HDD (SATA 7200 rpm), 27″ Screen

In vivo imaging solutions

OPTICAL			MICRO-CT	ULTRASOUND	REAGENTS
					
IVIS™ Lumina Series III ▪ 2D optical imaging ▪ Imaging up to 5 mice using optional expansion lens ▪ Optional integrated x-ray	**IVIS Lumina 5 Series** ▪ 2D optical imaging ▪ Imaging of up to 10 mice using optional manifold ▪ Optional integrated high-resolution x-ray ▪ Optional Smart accessories to streamline imaging workflow ▪ MVI-2 for automated 360 degree imaging	**IVIS Spectrum 2 Series** ▪ 2D and 3D optical imaging ▪ Imaging of up to 10 mice using optional manifold ▪ Fully automated, one-click co-registration with IVIS SpectrumCT ▪ Seamlessly co-register 3D optical and hi-res, microCT data ▪ Two powerful modes of fluorescence excitation - epi- and trans-illumination	**Quantum™ GX3** ▪ High spatial resolution ▪ Low dose microCT for longitudinal imaging ▪ Step and continuous imaging modes ▪ Cardiac and respiratory gating	**Vega™** ▪ Automated, hands-free ▪ High-throughput 3 mice imaging ▪ Scan times in < 1 minute ▪ Whole body field of view ▪ Multiple 3D imaging modes ▪ Elastography (tissue stiffness) ▪ B-mode (soft tissue imaging) ▪ 4D B-mode/M-mode (cardiac imaging) ▪ Acoustic angiography (microvessel networks)	**IVISbrite™** ▪ Bioluminescent substrates, cells, and lentiviral particles **IVISense™** ▪ Fluorescent probes, labels, and dyes **VesselVue™** ▪ Microbubble contrast agents for vascular ultrasound imaging

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