

Pre-clinical *in vivo* imaging

Key Benefits

- Market trusted technology offering the fullest suite of leading imaging technologies, reagents and support
- Exquisite sensitivity in bioluminescence
- Full fluorescence tunability through the NIR spectrum
- Compute Pure Spectrum spectral unmixing for ultimate fluorescence sensitivity
- Expandable system tailored to your workflow

Integrating Gold Standard Bioluminescence and Fluorescence *In Vivo* Technologies

The IVIS® Lumina Series III from PerkinElmer provides an expandable, sensitive imaging system that is easy to use for both fluorescent and bioluminescent imaging *in vivo*. The Lumina Series III platform offers a full spectrum of wavelengths to perform almost any *in vivo* optical application with a tunability of 20 nm. The system includes a highly sensitive CCD camera, light-tight imaging chamber and complete automation and analysis capabilities. As the leading optical imaging platform for *in vivo* analysis, IVIS systems include a range of practical accessories developed through experience in research laboratories worldwide.

Leading Bioluminescence and Multispectral Fluorescence Technologies in One

The Lumina Series III platform brings together years of leading optical imaging technologies into one easy to use and exquisitely sensitive bench-top system and is capable of imaging both full spectrum fluorescence and bioluminescence. The system is equipped with 26 filters that can be used to image reporters that emit from green to near-infrared. Superior spectral unmixing can be achieved by Lumina III's high resolution short cut off filters. Absolute calibration coupled with our Living Image® software affords you consistent and reproducible results independent of magnification and/or filter selection. This allows you to compare results from one IVIS system to another, either within your organization or around the world. All Lumina III series instruments now incorporate PerkinElmer's patented Compute Pure Spectrum (CPS) algorithm for spectral library generation software tools to ensure accurate autofluorescence removal, unmixing and fluorophore quantitation.

Exquisite Sensitivity

The Series III provides the highest degree of sensitivity of any optical imaging system on the market representing the gold standard for non-invasive small animal optical imaging sensitivity. This degree of sensitivity is achieved through the combination of optimized luciferase reporters, agents and unique platform technologies including an Ultra Cooled CCD USB Camera to -90 °C, low readout noise, dark current and exceptionally high quantum efficiency throughout the NIR spectrum.

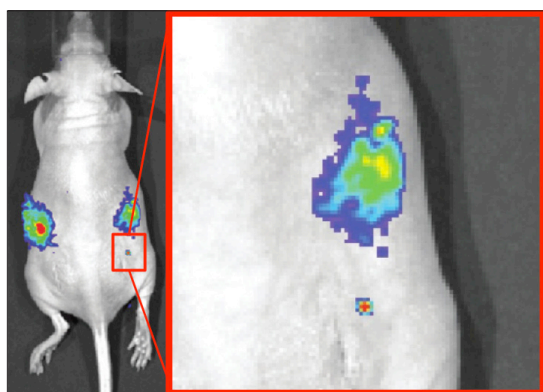


Figure 1. Single cell imaging of a 4T1-luc2 cell in vivo. Bioware Ultra cell lines used in conjunction with IVIS Imaging Systems allows researchers to measure and monitor tumor growth and metastasis, non-invasively, using a small number of cells before tumors are palpable.

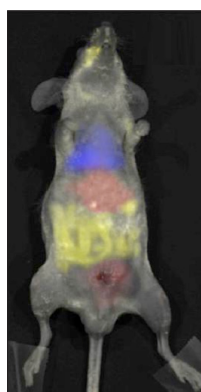


Figure 2. Spectral un-mixing of four separate spectral paths to identify the lungs (800 nm), liver (680 nm), gut (660 nm) and auto-fluorescence.

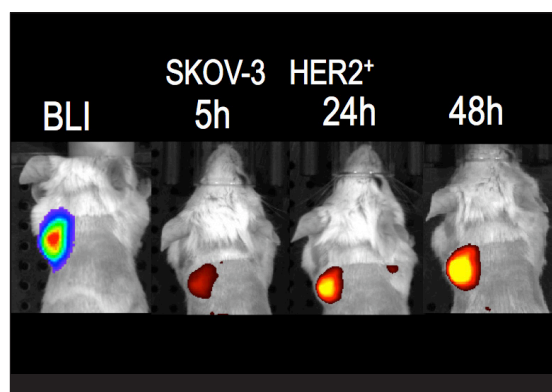


Figure 3. Imaging studies were performed using SKOV-3 tumor-bearing female Scid/Beige mice injected i.v. with 40 mg of Her2Sense 645 and imaged at 5, 24, and 48 hours post injection.

An adjustable field of view from 5 – 12.5 cm and an optional 24 cm lens allows imaging of up to 5 mice or 2 medium size rats or zoom lens capability increasing the resolution to 35 μ m at a field of view of 2.5 cm. The Lumina Series III can also accommodate petri dishes or micro-titer plates for *in vitro* imaging. The system includes premium animal handling features such as a heated stage, gas anesthesia connections and ECG monitoring.

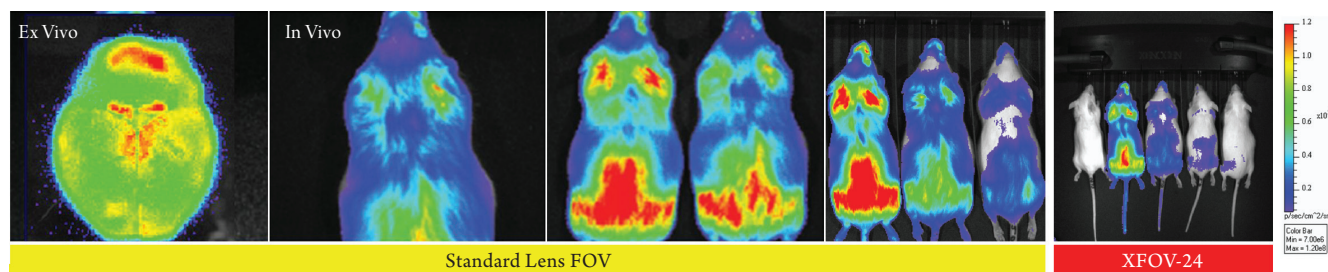


Figure 4. The IVIS Lumina Series III Imaging System provides 5 fields of view.

IVIS Lumina Series III Optional Accessories

Expand your Lumina Series III instrument with features when you need them.



IVIS Lumina Series III Software

Living Image software is an advanced tool designed specifically for the IVIS Imaging system platform and contains features to help design image acquisition and analysis. The software's new design creates an intuitive, seamless workflow for researchers of all skill levels. New features include: wizard based guidance for advanced imaging protocols, advanced spectral unmixing tools and new color templates

Living Image also supports Dynamic Contrast Enhancement (DyCE™), a new approach to optically based biodistribution analysis and anatomical identification of organs using clearance properties of luminescent, radioisotopic or fluorescent probes. The DyCE technique acquires a series of dynamic images following a bolus injection of an optical agent. The location of major internal organs is derived by proprietary algorithms and displayed in minutes. The DyCE software module includes the Multi-View platform and software that extends the functionality of Living Image and available for all IVIS systems.

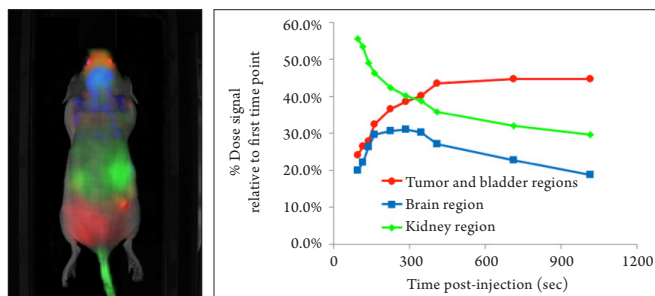


Figure 5. A mouse bearing a subcutaneous 4T1-luc2 tumor in its right flank was injected with 315 µCi of ¹⁸F-FDG intravenously. The animal was imaged dynamically starting 55 seconds post-injection to capture the distribution of ¹⁸F-FDG in the mouse body via Cerenkov light from positron emission.

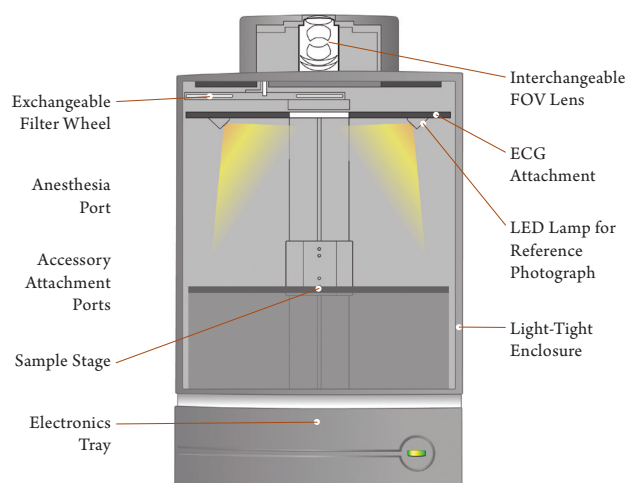
Inside the IVIS Lumina Series III

CCD Camera

- The IVIS Lumina Series III CCD camera is 13 x 13 mm square, with 1024 x 1024 pixels 13 micron in width, yields higher imaging resolution
- Back-thinned, back-illuminated grade 1 CCD provides high quantum efficiency over the entire visible to near-infrared spectrum
- 16-bit digitizer delivers broad dynamic range
- The CCD is thermoelectrically (Peltier) cooled to -90 °C ensuring low dark current and low noise

Imaging Chamber

- Light-tight imaging chamber
- High light collection lens, f/0.95 – f/16
- Optional 24 cm FOV lens attachment
- 8-position emission filter wheels – 7 filters
- 20-position excitation filter wheels – 19 filters
- LED lamps for photographic images
- Heated stage to maintain optimum body temperature



- Motor controlled stage, filter wheel, lens position, and f-stop
- Optional integrated ECG monitoring system

Integrated Gas Anesthesia

- Gas anesthesia ports and 3 position manifold within imaging chamber allow anesthesia to be maintained during imaging sessions

The IVIS Lumina Series III platform offers a selection of instruments tailored to your *in vivo* imaging needs

Features	IVIS Lumina	IVIS Lumina K	IVIS Lumina XR	IVIS Lumina LT
Bioluminescence	✓	✓	✓	✓
Radioisotopic Cerenkov Imaging	✓	✓	✓	✓
Fluorescence	✓	✓	✓	✓
Compute Pure Spectrum Spectral Unmixing	✓	✓	✓	
Real-Time Fast Kinetic Imaging (10 ms)		✓		
Integrated X-Ray			✓	
DyCE Imaging (Optional Upgrade)	✓	✓	✓	✓
Extended NIR Range 150W Tungsten EKE	✓	✓	✓	✓
Absolute Calibration to NIST® Standards	✓	✓	✓	✓

IVIS Lumina XR Series III Imaging System

Imaging System Components:	Specifications
Camera Sensor	Back-thinned, back-illuminated, cooled Grade 1 CCD
CCD Size	1.3 x 1.3 cm
Imaging Pixels	1024 x 1024
Quantum Efficiency	>85% at 500 – 700 nm, >30% at 400 – 900 nm
Pixel Size	13 microns
Minimum Detectable Radiance	100 photons/s/sr/cm ²
Minimum Field of View (FOV)	5 x 5 cm
Maximum Field of View (FOV)	12.5 x 12.5 cm (optional 24 x 24 cm)
Minimum Image Pixel Resolution	50 microns
Read Noise	< 3 electrons for bin = 1, 2, 4; < 5 electrons for bin = 8, 16
Dark Current (Typical)	< 120 electrons/s/cm ² ; or 2 x 10 ⁻⁴ electrons/s/pixel
Minimum Detectable Radiance	100 photons/s/sr/cm ²
Lens	f/.95 – f/16, 50 mm
Illumination Source	Extended NIR Range 150W Tungsten EKE
Fluorescence Capability	Standard
Excitation Fluorescence Filters	19
Emission Fluorescence Filters	7
CCD Operating Temperature	-90 °C
Imaging System Space Requirement	48 x 71 x 104 cm (W x D x H)
Imaging Chamber Interior Dimension	43 x 38 x 43 cm (W x D x H)
Power Requirements	6A at 120V
Stage Temperature	20 – 40 °C
Computer (Minimum Specifications)	Quad Core 2.8 GHz, 4 GB RAM, 16X DVD+/-RW, 250 GB HD, 24" flat screen monitor
Living Image Software	1 acquisition copy and 4 analysis copies of Living Image software

For more information, please visit our website at www.perkinelmer.com/invivo

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