IVIS Spectrum at DLAR Imaging Core

DLAR Imaging Core houses the [IVIS® Spectrum] advanced preclinical optical imaging system that enables non-invasive monitoring of cell trafficking, tumor growth and gene expression that enables generating visual and quantitative data for publications and grant submissions.

It enables:

- √ Non-invasive longitudinal studies
- √ High sensitivity for small signals
- √ Relatively quick imaging

Image capture

Back thinned, back illuminated grade 1 CCD Camera and Lens provides high quantum efficiency scanning over the entire visible to near-infrared spectrum. The system features 10 narrow band excitation filters: 415 nm – 760 nm and 18 narrow band emission filters: 490 nm – 850 nm. Lens provides high resolution - down to 20 microns at FOV of 4 cm.

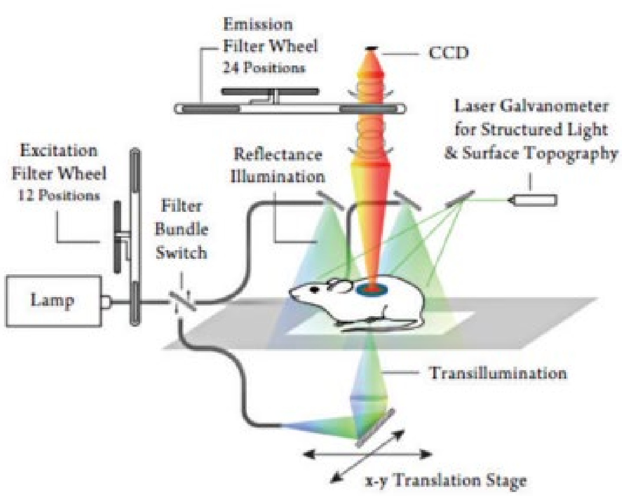
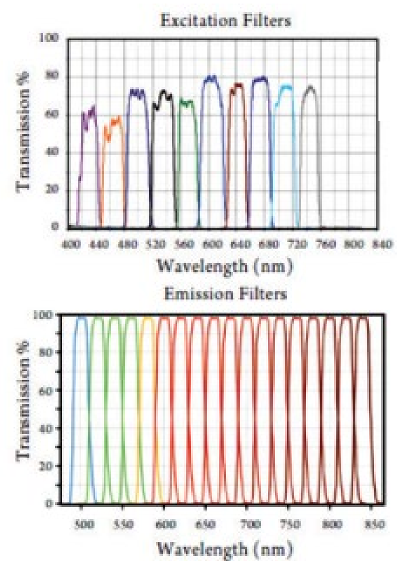


Image obtained from Revvity/formerly Perkin Elmer



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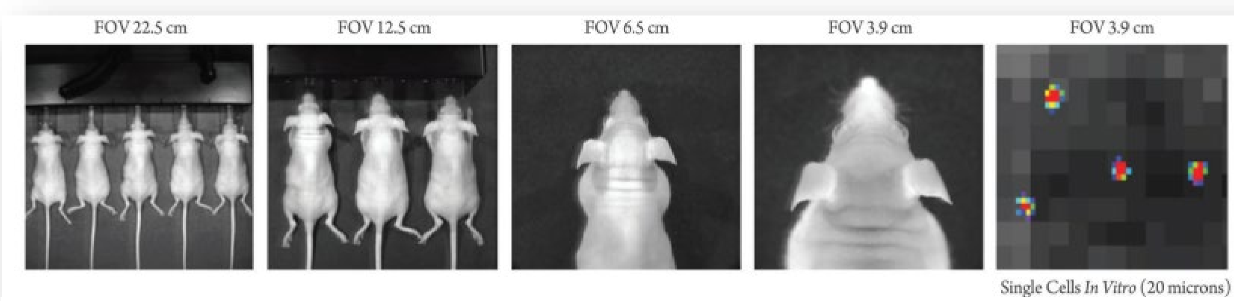


From 20 microns to localize single cells to five whole mice, the IVIS Spectrum gives you the automated flexibility, throughput and resolution required to quantitate functional developments in whole animals down to a single cell. Image obtained from Revvity/formerly Perkin Elmer

Bioluminescence imaging- best in class in vivo sensitivity

Image multiple bioluminescent reporters like firefly luciferase, Renilla luciferase and bacterial luciferase *in vivo* at depth rapidly and quantitatively. The ultra-sensitive camera optics allows the detection of as few as five cells. Revvity offers Luciferin Luciferase Cell Lines Lentivirus Particles.

Fluorescence imaging – versatility in fluorescence

The IVIS Spectrum can image and quantify all commonly used fluorophores, including fluorescent proteins, dyes and conjugates. Revvity offers the broadest portfolio of fluorescent agents and dyes for *in vivo* applications. The IVIS Spectrum is the most sensitive system to visualize these fluorescent agents in various in vivo applications.

Multispectral Imaging with Advanced Spectral Unmixing Algorithms

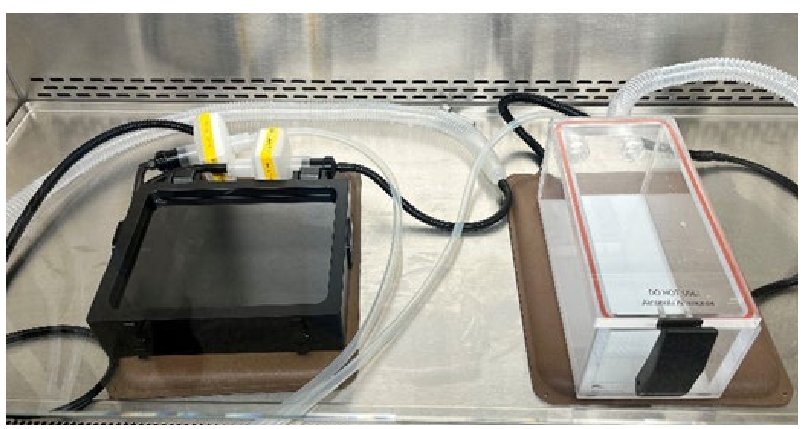
Advanced spectral-unmixing algorithms and a broad range of high spectral resolution filter sets minimize autofluorescence and provide the opportunity to image a wide variety of targeted and activatable fluorescent probes and reporters.

Absolute localization in optical imaging – 3D analysis

3D diffuse tomography utilizes structured light data with bioluminescence or fluorescence images to reconstruct three dimensional representations of light emitting reporters and compute signal strength.

Determine geometry and quantify the depth and intensity and of fluorescent sources in 3D space using FLIT (Fluorescent Imaging Tomography) or bioluminescent sources using DLIT (Diffused Luminescent Imaging Tomography).

XIC-3 Animal Isolation Chamber Kit



The chamber is available at DLAR, provides biological isolation of anesthetized mice or small rats before they are imaged in an in vivo imaging system.

It is equipped with HEPA filters allowing imaging of immunodeficient mice and mice infected with ABSL-2 level agents.

Application of IVIS spectrum Imaging System include:

- √ **Cancer biology**: Monitor tumor growth and metastasis using luciferase-tagged cells

- √ **Gene expression studies**: Track reporter gene expression (e.g., luciferase, GFP)
- √ **Infection models:** Visualize progression and clearance of bacterial or viral infections
- √ **Stem cell tracking**: Follow migration and survival of labeled cells post-transplant
- √ **Assessing therapeutic efficacy:** Evaluate drug delivery, targeting, and therapeutic effects
- √ **Immunology**: Study immune cell trafficking and inflammation

Image analysis

Living Image® is Revvity's proprietary software for in vivo optical imaging data acquisition and analysis, designed specifically to work with Revvity's IVIS family of imaging systems (e.g., IVIS Spectrum, IVIS Lumina). It enables researchers to visualize, quantify, and interpret bioluminescent and fluorescent imaging data collected. Offers tools to define regions of interest (ROIs) and extract quantitative signal data.

Living Image (LI) Acquisition/Analysis Package software allows for advanced quantification and analysis of data. Complimentary Living Image licenses are typically provided with IVIS systems upon request, for no additional cost.

List of publications and preprints that have used the IVIS Spectrum imaging system at the DLARIC

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