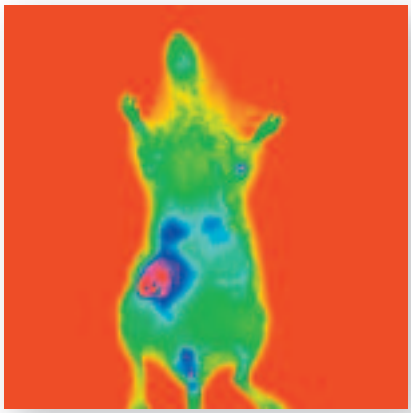
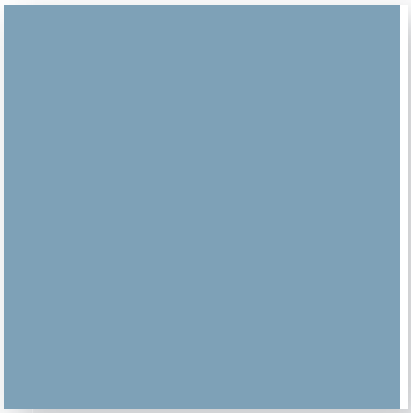
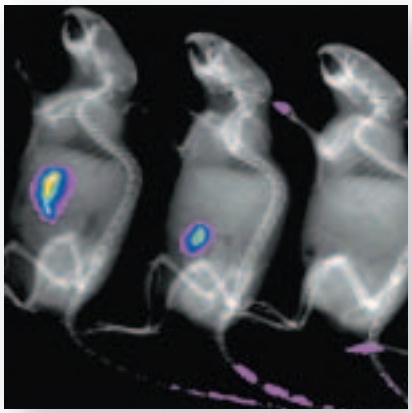
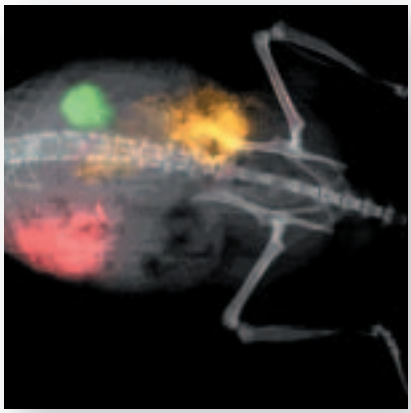
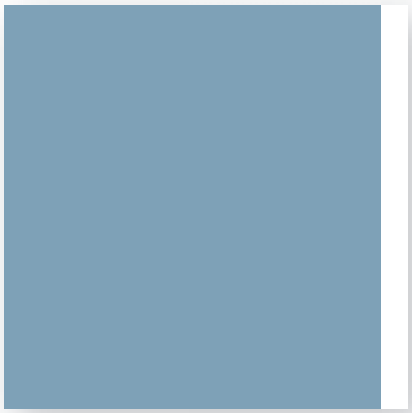
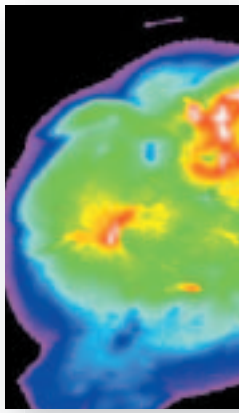
Carestream
Molecular Imaging

Kodak
In-Vivo Imaging Systems

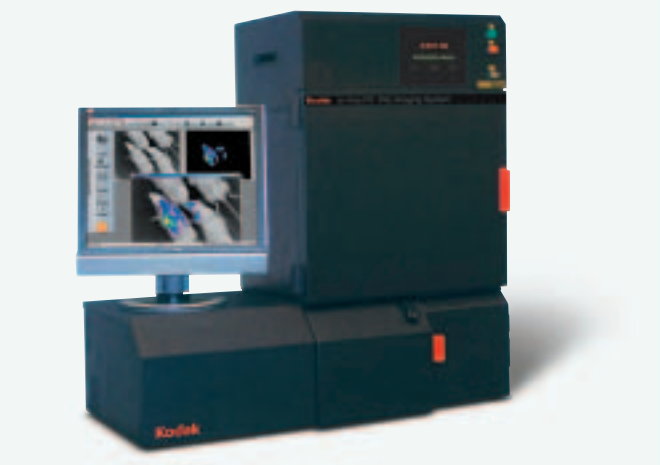
High-sensitivity
optical molecular imaging *and*
high-resolution digital x-ray

In vivo imaging solutions available in several packages

Carestream Molecular Imaging offers a selection of KODAK In-Vivo Imaging Systems so you can choose one that best meets your particular imaging needs. Each combines high-sensitivity optical molecular imaging and high-resolution digital x-ray in a single multimodal system.

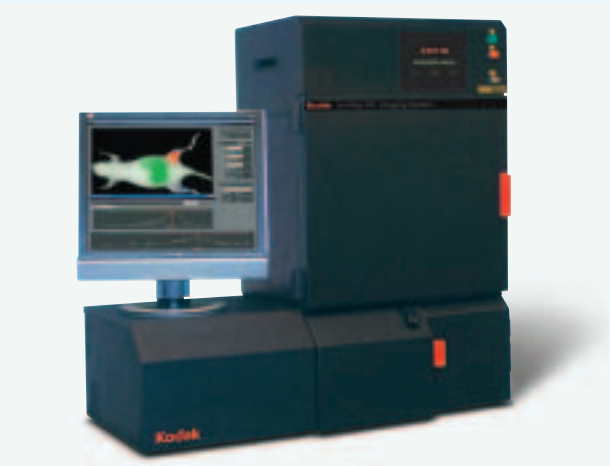
Kodak In-Vivo Imaging Systems F and FX

KODAK In-Vivo Imaging Systems F and FX provide high performance optical molecular imaging of near-IR fluorescent, radioisotopic and luminescent labels in small animals. They feature cooled CCD technology, selectable multi-wavelength illumination, and the In-Vivo FX (pictured here) includes an x-ray module for sensitive, quantitative x-ray imaging enabling precise anatomical localization of biomarkers of interest.



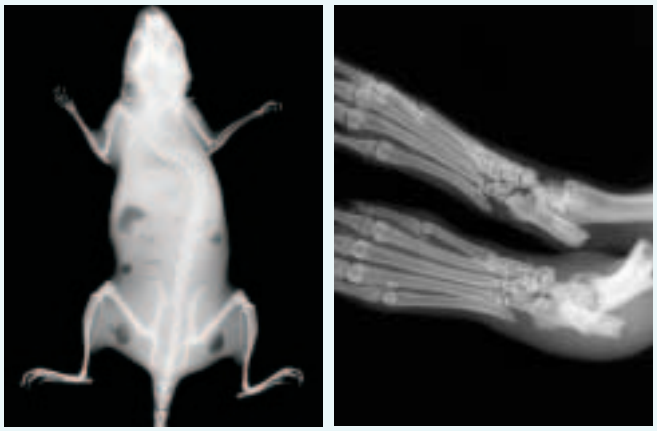
Kodak In-Vivo Imaging Systems F and FX Pro

The NEW KODAK In-Vivo Imaging System FX Pro combines high-sensitivity optical molecular imaging and high–resolution digital x-ray (In-Vivo FX Pro only) to deliver precise anatomical localization of molecular and cellular biomarkers. New full precision automation simplifies complex multimodal imaging protocols and takes sensitivity, throughput, and ease of use to an entirely new level.



Kodak In-Vivo Multispectral Imaging System FX

The KODAK In-Vivo Multispectral Imaging System FX combines multispectral imaging with high-resolution x-ray imaging. The fully automated system's powerful multispectral analysis software identifies and separates multiple fluorchromes which are spatially co-registered on the image. In addition, the system is capable of detecting luminescence and radioisotopic signals.



Kodak Digital X-Ray Specimen Imager 4000 and Digital X-Ray Specimen Imager 4000 Pro

KODAK Digital X-Ray Specimen Imagers are ideal for small animal and other x-ray applications. The cabinet style digital imager features energy ranging from 15-35 kVp and a radiographic phosphor screen, generating digital images with outstanding 25 line pair resolution. The DXS 4000 Pro features automated controls and filters for enhanced workflow.

Kodak
In-Vivo Imaging Systems

Sets the Standard for Multimodal Molecular Imaging

KODAK In-Vivo Imaging Systems combine high-sensitivity optical molecular imaging and high-resolution digital x-ray in a single multimodal system. Whether you're performing multi-wavelength fluorescent, radioisotopic, luminescent, x-ray, or a combination of all of these imaging modalities, there's a KODAK In-Vivo Imaging System to meet your needs.

Unmatched Imaging Versatility

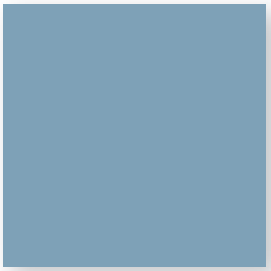
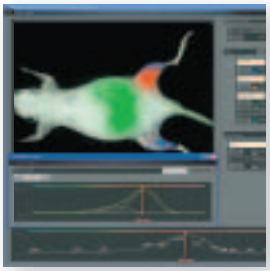
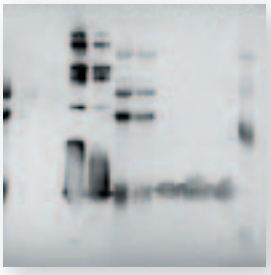
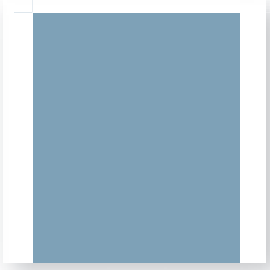
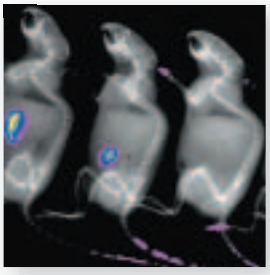
- Quantitative imaging of multi-wavelength fluorescent, luminescent, and radioisotopic labeled biomolecules in combination with x-ray imaging
- Selectable multi-wavelength excitation from 385 to 770 nm allows for quantitative imaging of a wide range of fluorochromes and label multiplexing
- Anatomical localization of molecular biomarkers with precise co-registration of optical molecular images with x-rays
- Longer excitation wavelengths green to near-IR improve the penetration of light into tissue, enabling whole body, optical *in vivo* molecular imaging
- Accommodates *in vitro* assay formats including blots, plates, and gels

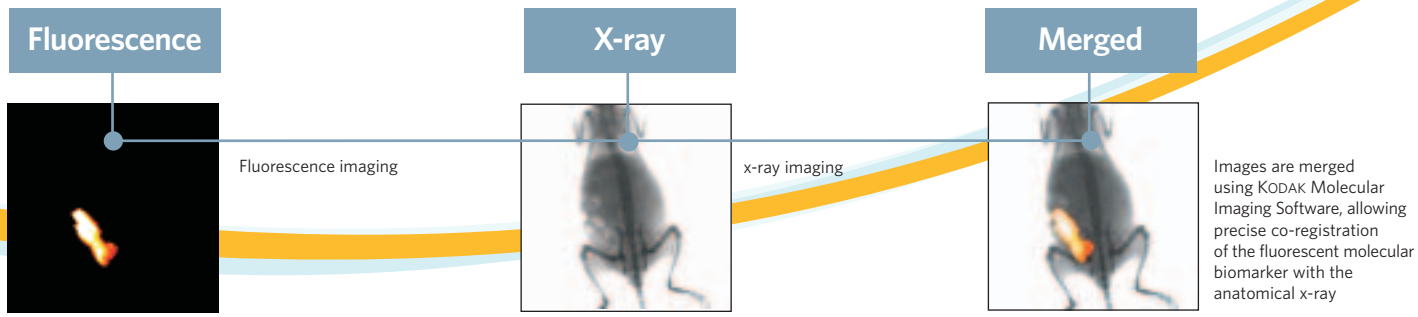
Superior Image Quality

- Advanced camera electronics and cooled CCD technology allow long exposure times and image integration, ideal for luminescent and radioisotopic labels
- Up to 16-pixel symmetrical and asymmetrical X- and/or Y- binning options allow for up to a 256-fold increase in detection sensitivity
- Closed optical path image (COPI) chamber design maximizes sensitivity and resolution by minimizing the distance from the subject to the lens
- Visualize and accurately quantify bright and faint signals across >4.0 orders of magnitude in a single image
- Patented wide angle emission filters eliminate image artifacts to enhance detection sensitivity and image quality

Fast, Convenient Workflow

- Excitation light is optimized to ensure high-quality images and time-saving throughput
- Live preview and parfocal optical design facilitate easy subject positioning and focusing
- Standard, time-lapse, and progressive exposure options execute multiple imaging protocols
- Save your preferred exposure routines for one-click access



High performance

- Enables accurate quantitation of biomolecules of interest in basic research, drug discovery, drug development, and therapeutic monitoring applications utilizing small animals
- Improves understanding of imaging agent's biodistribution through combined use of time-lapse molecular imaging and digital x-ray imaging
- Safe in-lab operation—the In-Vivo FX System complies with federal safety regulations for cabinet x-ray imaging systems

Complete System

- Includes animal management center, ports, and thermal controls to facilitate imaging of small animals
- KODAK Molecular Imaging Software provides accurate quantitative analysis, comparative intensity, geometry and positional data. The software also provides annotation capabilities and powerful database tools.

KODAK In-Vivo Imaging System F

The KODAK In-Vivo Imaging System F provides all the features of the KODAK In-Vivo FX System with the exception of x-ray imaging capabilities.

Pro Series for Automated Control

- KODAK In-Vivo Systems are available in the Pro configuration, providing fully automated controls that enable reproducibility of protocols and increase workflow efficiencies
- Automated computer-controlled configuration minimizes set-up time, maximizing efficiency and throughput of measurements
- The highly accurate automated lens system records the precise *f*-stop, zoom, and focal plane every time, helping to ensure reproducibility and traceability
- Smart digital positioning technology operates 15 excitation (In-Vivo FX Pro only) and four emission filters to deliver precision alignment
- Automated aluminum filters enable control of x-ray wavelengths for optimal x-ray imaging of soft tissue or bone

KODAK In-Vivo Multispectral Imaging System FX

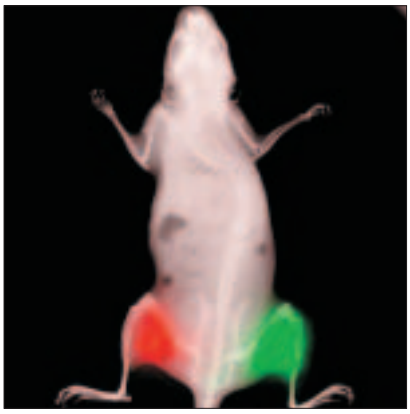
The system's new computer controlled multispectral tuning of excitation light provides enhanced sensitivity allowing for the identification and separation of multiple fluorochromes and the removal of autofluorescence background. The KODAK In-Vivo Multispectral System automatically generates multispectral fluorochrome image "cubes" with spatially co-registered x-ray and white light images for improved localization of biological markers *in vivo*. A wide range of excitation wavelengths, from optical through near-infrared, enable optimum imaging of a wide range of fluorochromes and biomarkers.

- Sophisticated software algorithms remove autofluorescence for improved signal-to-noise and detection
- Powerful software identifies fluorochromes through excitation-based signature by modeling of data and providing unmixing of the fluorochromes
- New image capture control software allows complex imaging protocols to be easily established, stored and repeated
- Automated excitation and emission filter systems with 29 excitation filter positions and four patented wide angle emission filter positions deliver outstanding fluorescent imaging sensitivity and flexibility

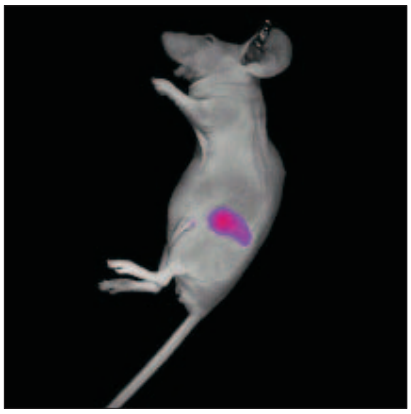
Specifications

		In-Vivo F	In-Vivo F Pro	In-Vivo FX	In-Vivo FX Pro	In-Vivo Multispectral	DXS Imager 4000	DXS Imager 4000 Pro
Camera								
CCD	Monochrome interlined CCD	●	●	●	●	●	●	●
Pixel Density	2048 x 2048 pixels	●	●	●	●	●	●	●
Cooling	-29°C absolute, thermoelectrically cooled	●	●	●	●	●	●	●
Lens	10x zoom, 20-200 mm, f2.8	Manual	Automated	Manual	Automated	Automated	Manual	Automated
Illumination								
Source	150W Halogen (standard), 175W Xenon (optional)	●		●				
	Xenon		●		●	●		
Fluorescence	Selectable multi-wavelength, epi-illumination, Halogen	Manual 6 position filter slider		Manual 6 position filter slider				
	Selectable multi-wavelength, epi-illumination, Xenon	Optional with manual 6 position filter slider	Automated 15 position filter wheel	Optional 6 position filter slider	Automated 15 position filter wheel	Automated 29 position filter wheel		
White Light	Epi-illumination	●	●	●	●	●		
	Transillumination	●	●	●	●	●		
Digital X-Ray								
Energy Range	Approximately 12-35 kVp			●	●	●	●	●
Maximum Current	Approximately 150 uA			●	●	●	●	●
Spot Size	< 50 U			●	●	●	●	●
Target Material	Tungsten			●	●	●	●	●
Window Filtration	Beryllium			●	●	●	●	●
Cone of Illumination	>33 degrees			●	●	●	●	●
Filtration	Aluminum			2 filters	4 automated filters	4 automated filters	2 filters	4 automated filters
Excitation Filters								
Included w/System	18 mm, choice of 4	4 filters		4 filters				
	25 mm (ex390, ex430, ex470, ex510, ex530, ex550, ex590, ex610, ex630, ex670, ex690, ex710, ex730, ex770)		14 filters		14 filters			
	25 mm (ex390, ex410, ex420, ex430, ex440, ex450, ex460, ex470, ex480, ex490, ex500, ex510, ex520, ex530, ex540, ex550, ex560, ex570, ex590, ex600, ex610, ex630, ex650, ex670, ex690, ex710, ex730, ex770)					28 filters		
Available Filters, 18mm	ex385, ex415, ex430, ex465, ex475, ex515, ex535, ex545, ex555, ex610, ex625, ex635, ex710, ex720, ex 730, ex765	●		●				
Available Filters, 25mm	10 nm increments from 390 nm to 770 nm		●		●	●		
Emission Filters								
Included w/System	Wide Angle Interference Filters (ranging 440 nm-830 nm)	choose 4	choose 6	choose 4	choose 6	choose 6		
Standard Accessory	em440WA, em535WA, em570WA, em600WA, em670WA, em700WA, em750WA, em790WA, em830WA	●	●	●	●	●		
Performance Specifications								
Imaging Area	2 x 2 cm to 20 x 20 cm, continuous zoom	●	●	●	●	●	●	●
Resolution	10 micron/pixel	●	●	●	●	●	●	●
Pixel Size	7.4 µm	●	●	●	●	●	●	●
Data Acquisition	16-bit single capture n-bit data acquistion	●	●	●	●	●	●	●
Dark Current Noise	0.003 e-pixels/sec	●	●	●	●	●	●	●
Read Noise	<9-rms (nominal)	●	●	●	●	●	●	●
Dynamic Range	>4.0 orders of magnitude	●	●	●	●	●	●	●
Binning	1x2, 2x2, 1x4, 2x4, 4x4, 1x8, 2x8, 4x8, 8x8, 16x16	●	●	●	●	●	●	●
Exposure Modes	Single Capture: 0.05 sec-100 min (x-ray min 0.185 sec)	●	●	●	●	●	●	●
	Multiple Capture: 0.05 sec-100 min, 32 accumulations max	●	●	●	●	●	●	●
	Progressive Exposure: 0.05 sec-100 min per frame, minimum increment = 0.01 sec	●	●	●	●	●	●	●
	Time Lapse Exposure: 0.05 sec-100 min per exposure, minimum interval = 0.1 sec	●	●	●	●	●	●	●
Animal Management	Animal Management Chambers	●	●	●	●	●	●	●
	Thermal Control Module	●	●	●	●	●		
	Atmospheric Ports	●	●	●	●	●	●	●
System Requirements								
Interface	IEEE 1394 (FIREWIRE)	●	●	●	●	●	●	●
Operating Systems	WINDOWS 2000/XP	●	●	●	●	●	●	●
	MACINTOSH OS X	●	●	●	●	●		
Power Requirements	120 VAC, 7A	●	●	●	●	●	●	●
	230 VAC, 3.5A	●	●	●	●	●	●	●

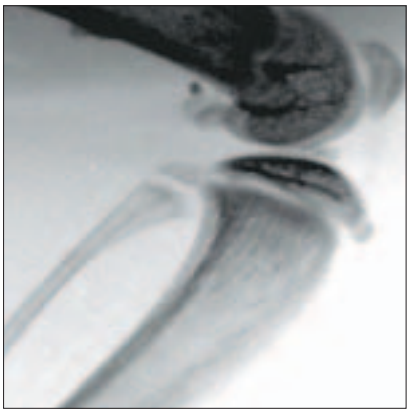
Imaging capabilities include:



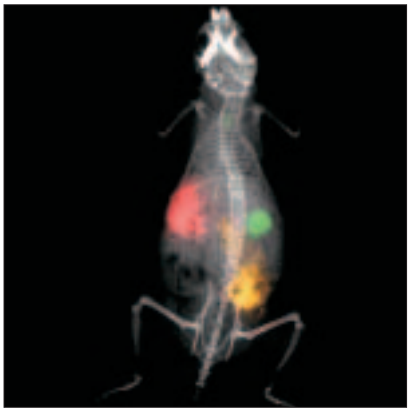
Multispectral (Fluorochrome unmixing)



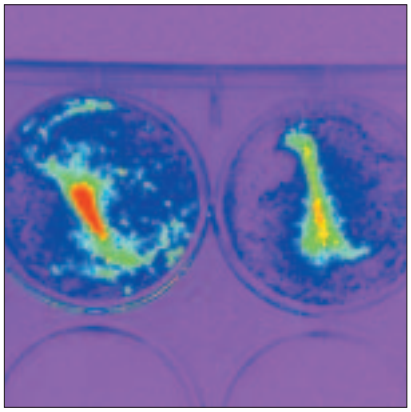
White Light



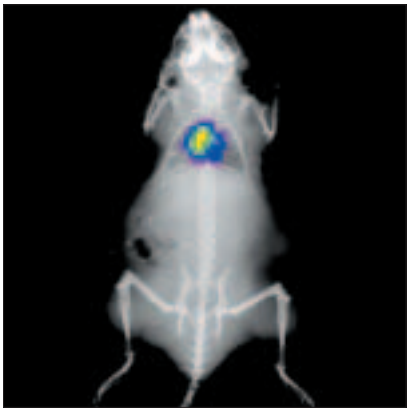
X-Ray



Multi-wavelength Fluorescence 385-770 nm



Luminescence



Radioisotopic

Product Selection Chart

	White Light Imaging	Luminescence	Multi-wavelength Fluorescence 380-780 nm	Multispectral Imaging (Fluorochrome unmixing)	Radioisotopic Imaging	X-Ray Imaging
In-Vivo F Series	✪	✪	✪		✪	
In-Vivo FX Series	✪	✪	✪		✪	✪
In-Vivo Multispectral	✪	✪	✪	✪	✪	✪
Digital X-Ray Specimen Imagers						✪

While KODAK Image Stations and KODAK In-Vivo Systems can be used for *in vivo* and *in vitro* molecular imaging of materials, researchers should be aware that the methods of preparing and viewing the materials for molecular imaging may be subject to various patent rights. All images were captured using KODAK Molecular Imaging System Technology.

Find out more

For more information, to request pricing, an in-lab demo, or to place an order, call 1-877-747-4357, exp. code 7. Outside the U.S.: +1-203-786-5657.

mi.carestreamhealth.com

Kodak
Licensed Product

Carestream Health, Inc.
150 Verona Street
Rochester, NY 14608

Carestream Molecular Imaging

A division of Carestream HEALTH