ϕ-eye

A highly sensitive, benchtop, in vivo optical imaging system for preclinical studies

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Scintica

BIOEMTECH

General

BIOEMTECH's vision is to accelerate preclinical research, towards clinical translation for promising drugs, through high quality services and products.

We are a strong research partner who guides, consults, and supports all preclinical research studies of our collaborators.

- As a manufacturing company of novel breakthrough imaging systems (*eyes*), we offer simplicity, speed, and efficiency on a daily workflow, during the first steps of testing novel compounds.

- As a preclinical CRO, we offer a one-stop-shop at our state-of-the-art Laboratories that covers a full chain of preclinical studies, following a Good Laboratory Practice approach in the daily routine.

BIOEMTECH's ultimate goal is to aid scientists innovate, at every step of their research.

Introduction

BIOEMTECH's ϕ-*eye*TM system is a high-sensitive, low-noise, *in vivo* optical imaging scanner. It enables non-invasive visualization and tracking of fluorescent and bioluminescent probes *in vivo*. ϕ-*eye*TM is suitable for a wide range of applications, including but not limited to oncology. Cutting-edge technology combined with an intuitive, easy-to-use working environment, transforms ϕ-*eye*TM into a unique imaging solution.

ϕ-*eye*TM's footprint of 60 cm × 60 cm x 60 cm and weight of lower than 60 kg, characterize it as a truly desktop device that can turn any place/space into an imaging lab. It comes with a laptop serving for data processing and acquisition while standard licenses of the complete software suite *Visual | eyes* are included.

Technology- Specifications

A. General Information

ϕ-*eye*TM enables non-invasive visualization and tracking of fluorescent and bioluminescent probes in the visible range within a living organism. A wide Field-of-View provides high throughput screening in a wide variety of preclinical studies. High expansion capability of fluorescence filters sets allows the conduction of studies with well-known and newly developed promising probes.

Modality	FLI / BLI
Visible range	400 – 800 nm
Fluorescence filter sets	4 (with high expansion capability)
Number of mice	Up to three (3)
Active FOV	17 cm × 17 cm
White light	White light for superior photographic images

B. Performance

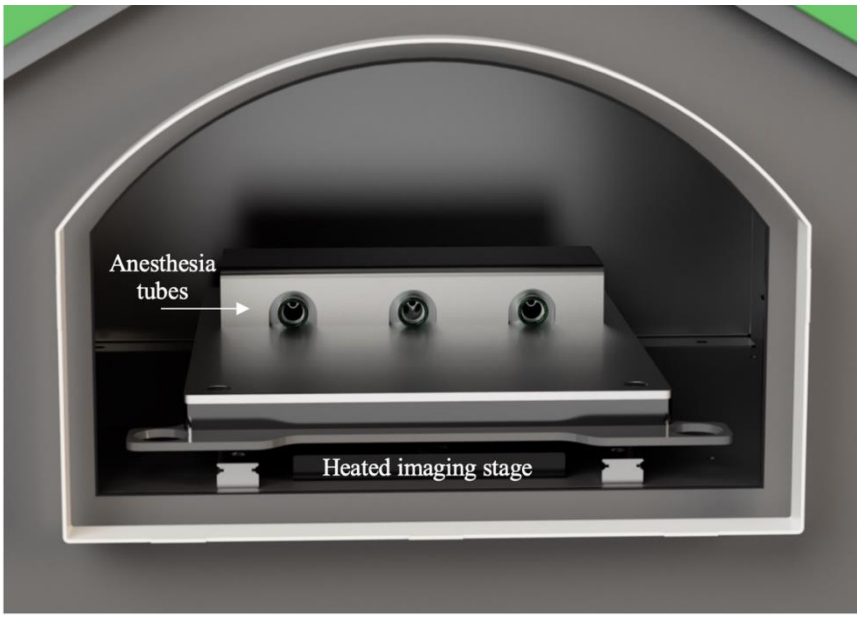
State-of-the-art technology offers superior sensitivity, resolution, wide Field-of-View and fast frame rates. Novel architecture and high-quality components provide superior fluorescence and bioluminescence images in a benchtop configuration. High quantum efficiency in the visible range enables the efficient screening of newly developed drugs *in vivo* using visible absorbing dyes.

Detector	sCMOS
Resolution	6.5-micron pixels, 2048 × 2048
Quantum Efficiency	82% @ 560 nm
Readout noise (electrons)	0.9 (median) / 1.5 (rms)
Dark current (electrons/pixels/s)	0.6
Dynamic range (Typ.)	33000:1
Lens	F/1.8
	>93% transmittance (VIS-NIR)
Fluorescence bandpass filters	>93% transmission
	>OD 6 blocking

C. Animal handling

To preserve animals' welfare and health, ϕ-*eye*TM employs standard inputs for gas anaesthesia - fully compatible with third party systems. Anaesthesia then is provided into the mask of the animals, all throughout the imaging study. In addition, the system infers a heated imaging stage, maintaining in such way the temperature of the animal in the desired level.

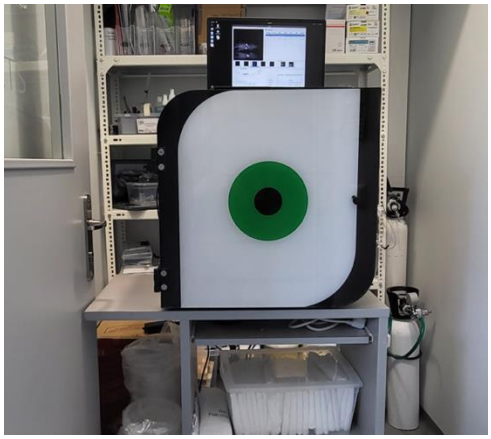
Anaesthesia	Standard inputs for gas anaesthesia; compatible with third party systems
Heating	Heated stage for optimum body temperature
Light-tight imaging chamber	30cm (L) × 30cm (W) × 30cm (H)

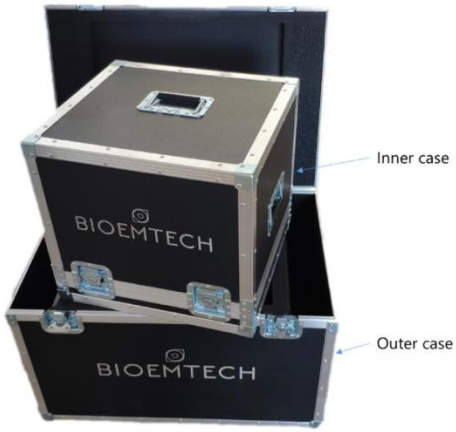


D. Footprint and connectivity

ϕ-*eye*TM's footprint and standard digital interface connectivity can turn any space into an imaging lab. In addition, ϕ-*eye*TM is characterized by simple power requirements and anaesthesia connections, allowing real time imaging and quantification inside a clean room, overcoming limitations, and facilitating scientists get great results under challenging conditions.

Outer dimensions	60cm (L) × 60cm (W) × 60cm (H)
Weight	< 60 kg
AC input range	100-240 VAC
PC Connectivity	USB 3.0 and USB 2.0
Outer shielding	Sheet metal and acrylic



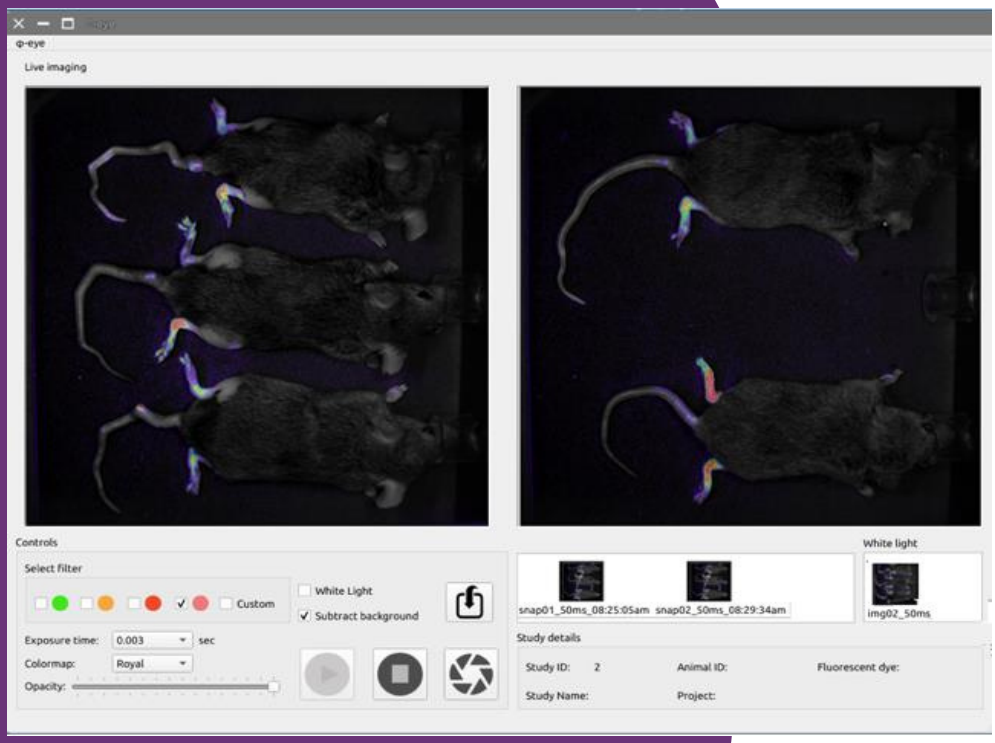


E. Visual | *eyes* Software

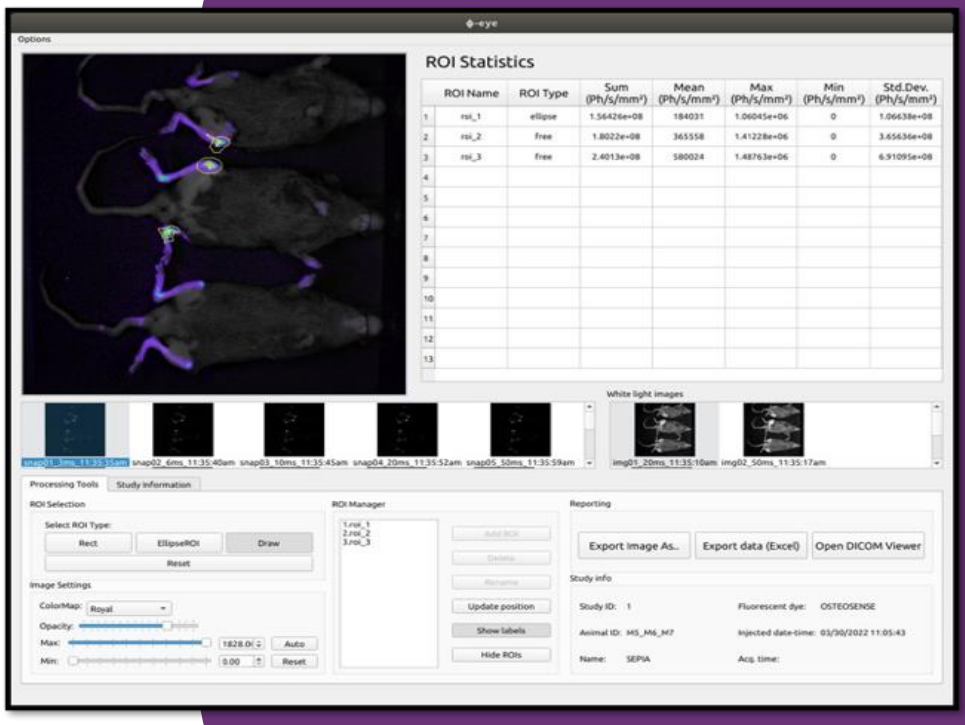
The embedded software, *Visual | eyes* is a complete software suite, serving for image acquisition, system control and analytical post-processing routines. Among other possibilities, users through *Visual | eyes* software, can generate imaging studies using custom and/or pre-defined protocols, obtain quantitative information in user's defined Region of Interests and export images to DICOM format.

Fast acquisition	Simplified procedure in a robust environment
Database	Raw data, DICOM storage, Compatibility with third party software
Dual layer imaging	Superimposition with photographic image for superior anatomical mapping
Imaging protocols	Pre-defined and user's defined imaging protocols
Post processing	Integrated ROI manager for detailed post processing image analysis
License	Standalone licenses for Mac OS & Windows

Live imaging console



Post Processing suite

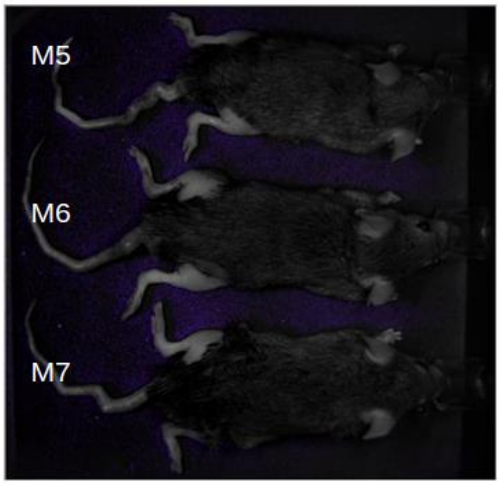


Indicative Studies

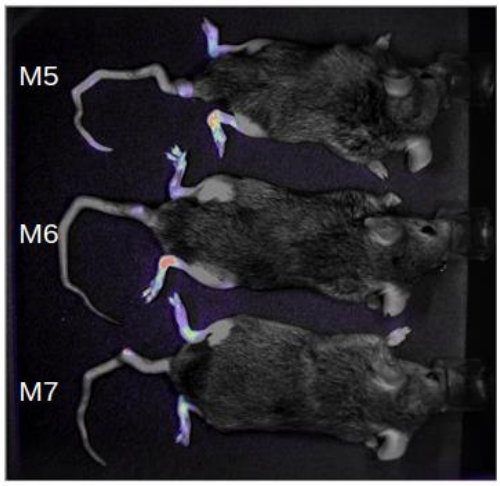
- **Spondyloarthritis model**

Fluorescent dye	Osteosense 680
Mouse model	TgA86 transgenic mouse
Animal depilation	Depilation of fur over hands, legs, and tail with cream, prior to imaging
Administration route	Retro-orbital
Imaging	23 hours post injection

Imaging in prone position

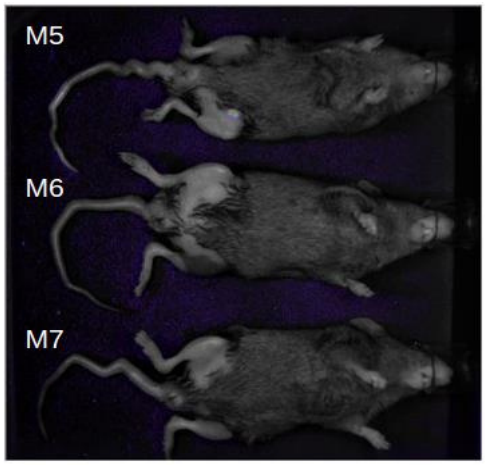


M5_M6_M7 blank scan
Exposure time 0,3sec

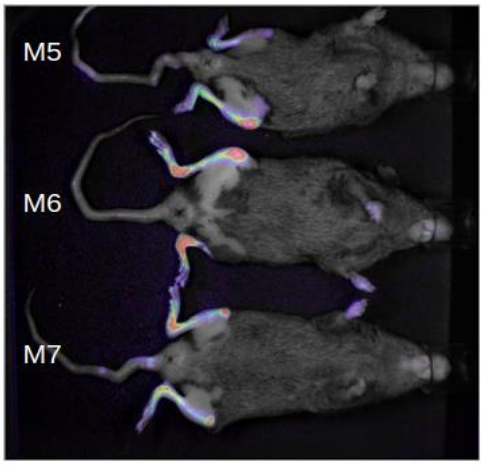


M5_M6_M7 Osteosense 680
Exposure time 0,2sec

Imaging in supine position



M5_M6_M7 blank scan
Exposure time 0,3sec



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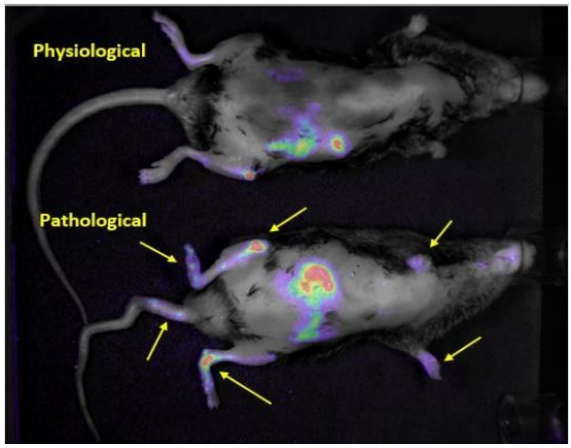
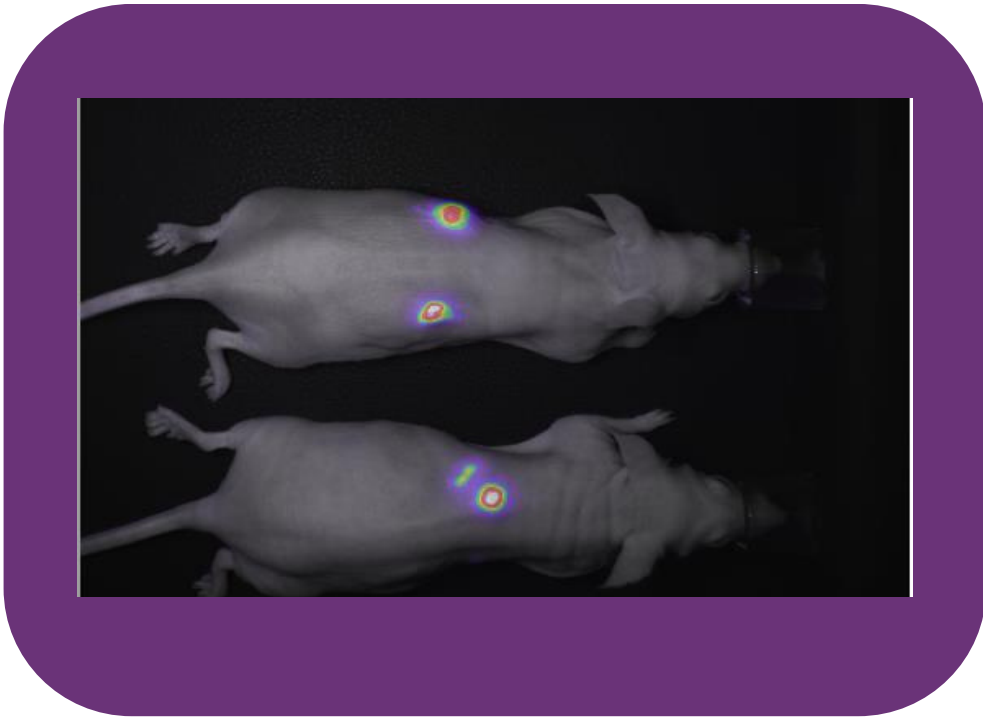


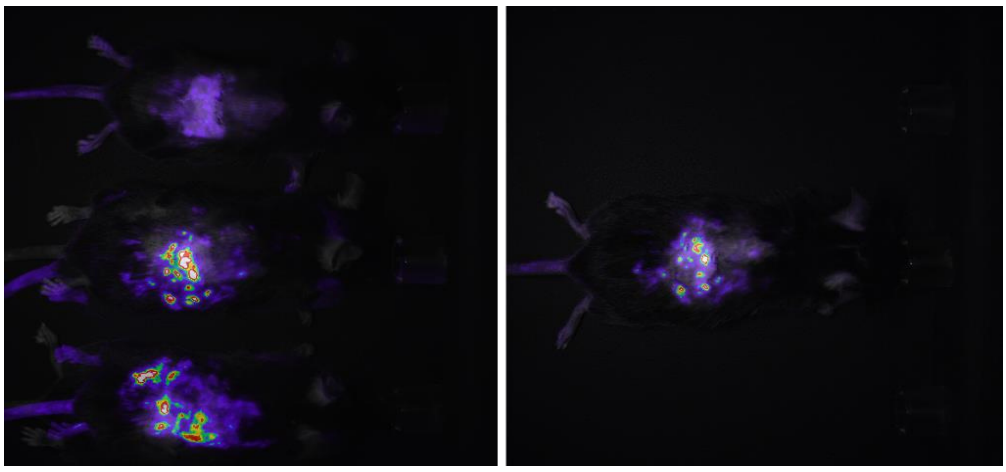
- **Oncology study**

Fluorescent dye	TdTomato
Mouse model	Genetically engineered mouse model (NF1-KO) that spontaneously develop cutaneous neurofibromas
Animal depilation	N/A
Administration route	N/A
Imaging	1-5 weeks



- **Cutaneous Neurofibromas model**

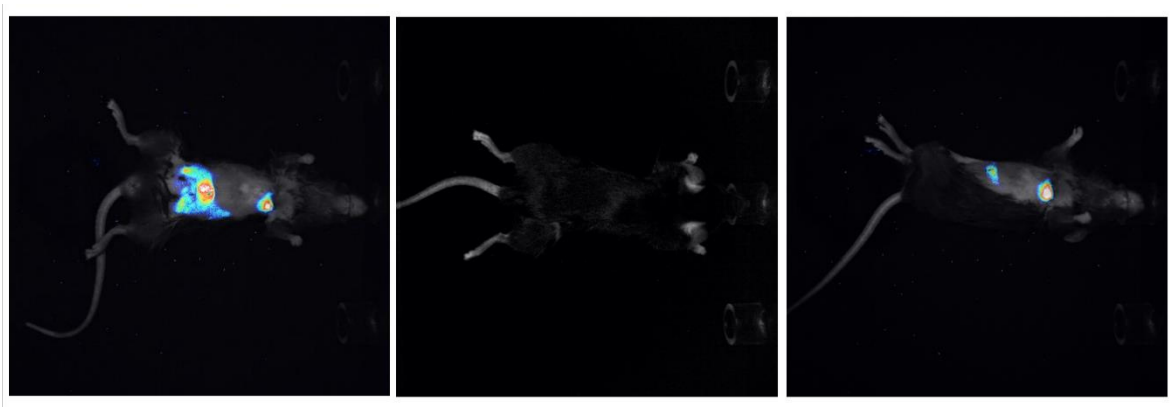
Fluorescent dye	TdTomato
Mouse model	Genetically engineered mouse model (NF1-KO) that spontaneously develop cutaneous neurofibromas
Animal depilation	Depilation of fur over spine with cream, prior to imaging
Administration route	N/A
Imaging	1-5 weeks

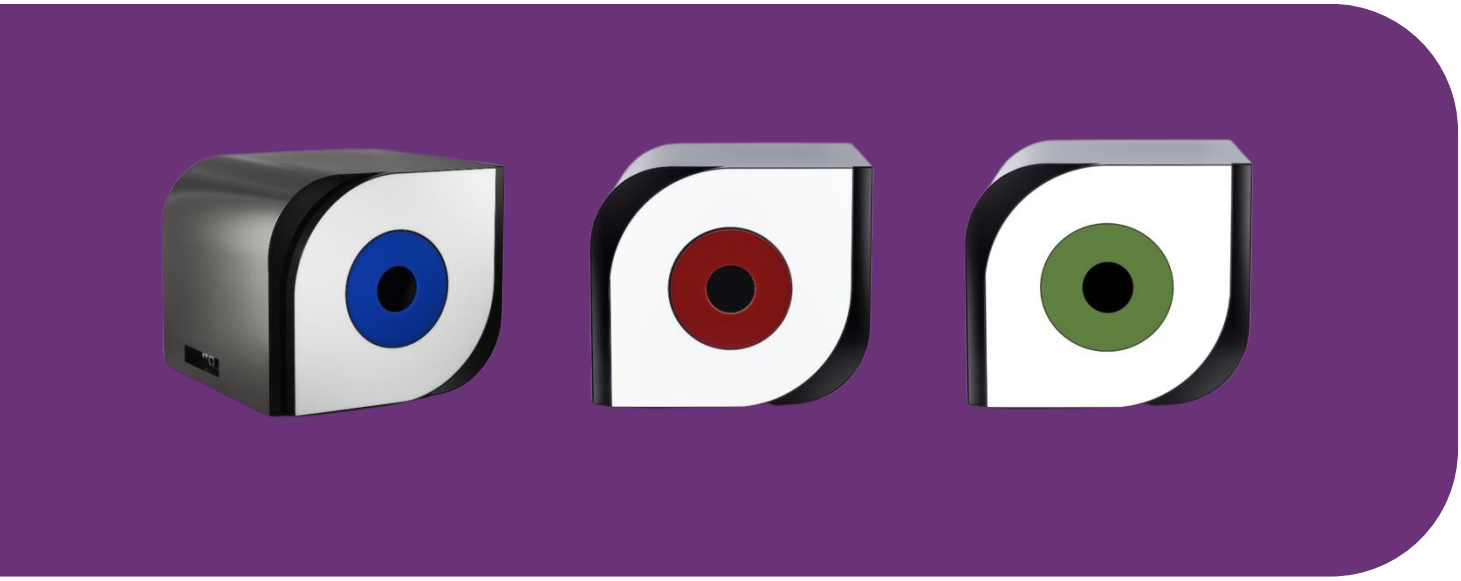


- **Heart imaging after myocardial infarction**

Fluorescent dye	Cy5
Infarction surgery	Thoracotomy and ligation at the level of the left-anterior descending (LAD) coronary artery (CA) approx. 4mm from the left auricle
Animal depilation	Depilation of fur over thorax and abdomen with cream, prior to imaging
Administration route	Intracardiac injection with 20uL (15 uM – Cy5)
Imaging	1 hour post injection

Imaging in supine-prone-right lateral positions





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