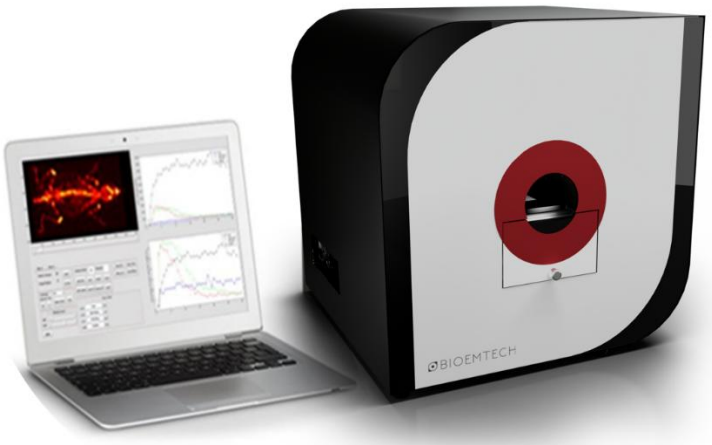
BIOEMTECH

Embracing scientists translate ideas into outcomes



γeye™

A highly sensitive, benchtop, *in vivo* imaging system for all SPECT isotopes

Technical Specifications

General

Our vision is to accelerate preclinical research, towards clinical translation for promising drugs, through our 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 (GLP) approach in the daily routine.

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

BIOEMTECH

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Introduction

BIOEMTECH's γ-eye™ is a novel imaging concept, developed specifically for accelerating the early stages of preclinical research. Suitable for a wide range of SPECT isotopes, γ-eye™ enables real time *in vivo* imaging of mice from time zero post-injection, while also it can provide accurately all temporal and spatial physiological distribution characteristics of the studied compounds. Designed based on the end-user's needs and integrated in an easy-to-use and intuitive environment, γ-eye™ is a unique imaging tool that combines high flexibility, efficiency and accuracy for an extensive range of applications.

With a footprint of just 43 cm × 46 cm x 43 cm and a weight lower than 50 kg, γ-eye™ is a truly desktop device that can turn any space into an imaging lab. γ-eye™ comes with a laptop or mini PC, which serves for data acquisition and processing. Standard licenses of the complete software suite Visual | eyes ™, are included.

Technology – Specifications

A. General Information

γ-eye™ is a novel screening tool that offers the prosecution of fast, efficient and with high precision imaging studies. A wide range of SPECT isotopes as well as other imaginable signals resulting from alpha-emitting radionuclides can be studied in γ-eye™ within seconds, without the cost of time-consuming post-processing routines. γ-eye™ is a complete imaging solution, designed specifically to accelerate all stages of preclinical research.

Modality	SPECT
Anatomical mapping	AI generated X-ray
Active FOV	50 mm × 100 mm
Photodetectors	Silicon PhotoMultipliers (SiPMs)
Scintillators	GAGG:Ce

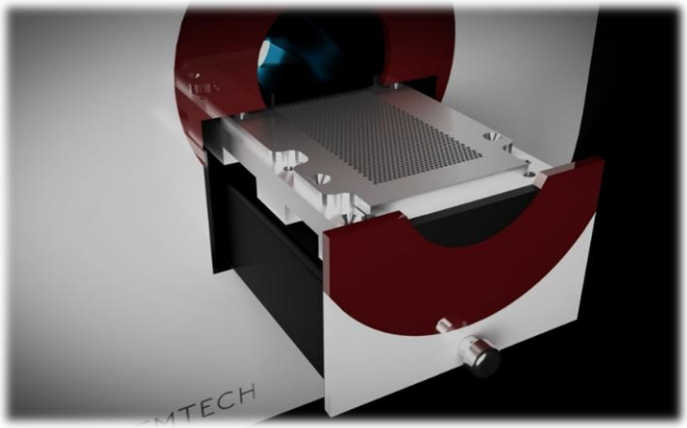
B. Performance

γ-eye™, among other characteristics, infers good spatial resolution of 1.9 mm across the whole Field-Of-View, energy resolution below 14%, while its high sensitivity enables real-time dynamic imaging with timeframes of 10 sec or lower (depending on the injection activity). Characterized by its high flexibility and based on the end user's needs, γ-eye™ can be specifically optimized for certain applications and imaging studies.

Time frames	Down to 1 sec
Sensitivity	Depending on user's collimator
Spatial resolution	<2.0mm @ 0 mm
Energy resolution	~11% @ 208keV
Detectable energy range	35 keV – 440 keV
Dynamic range	0.01 – 200MBq

C. User interchangeable collimators

γ-eye™, is designed to provide maximum flexibility to the user. Based on the type of the study, users can easily exchange collimators, choosing between different types: a **general purpose** (for relatively simple isotopes like Tc99m, Lu177, In111 etc..), a **high-resolution** (for applications where sensitivity must be compromised to achieve better spatial resolution), a **high-sensitivity** (for applications with lower doses, low uptake or long monitoring) and a **high-energy** (designed to provide optimal imaging for alpha emitters). Specific designs can be provided upon request.



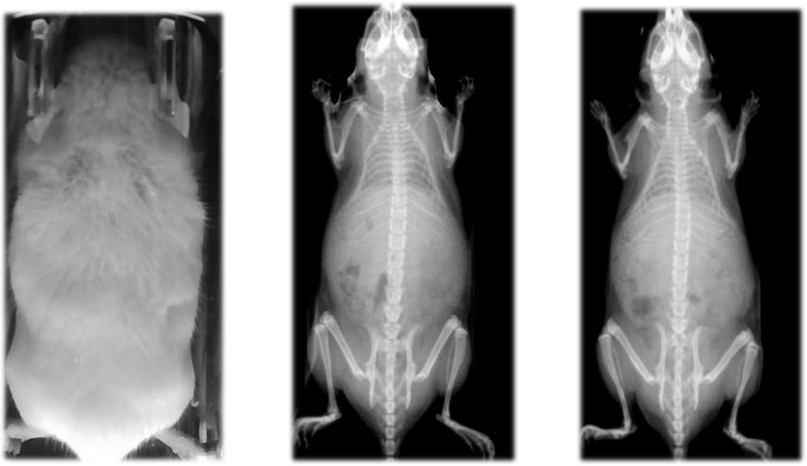
D. Extension to High Throughput

Upon request, the system can come with an expanded Field-Of-View which permits the user to image simultaneously up to 4 mice or 1 rat. The combination of the wide active area of 100 mm × 200 mm and the state-of-the-art detector technology that is integrated, results in a unique imaging solution for real-time *in vivo* screening. All key characteristics of the standard γ-eye™ are preserved, while performance is enhanced.

Modality	SPECT
Anatomical mapping	AI generated X-ray
Active FOV	100 mm × 200 mm
Photodetectors	Silicon PhotoMultipliers (SiPMs)
Scintillators	GAGG:Ce

E. Anatomical Mapping

γ-eye™ integrates an advanced Artificial Intelligence Algorithm designed to synthesize morphological X-ray images by translating standard photographic images of mice. Artificially produced X-ray mouse images can be superimposed with functional radioisotope 2D images to enhance overall anatomical information.

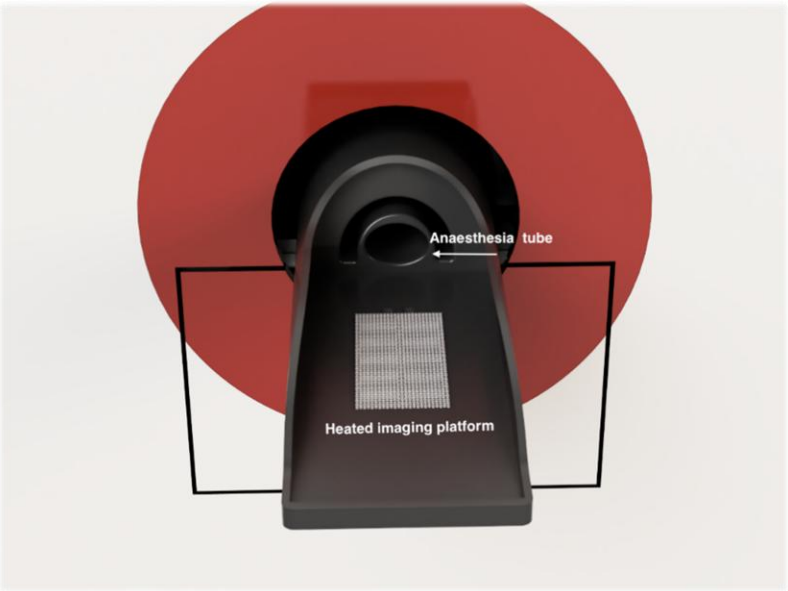


Optical Photo Real X-ray AI generated X-ray

F. Animal Handling

To preserve animals' welfare and health, γ-eye™ employs standard inputs for gas anesthesia, fully compatible with third party systems. Anesthesia then is provided into the mask of the animals, all throughout the imaging study. In addition, the system infers a heated imaging stage, thus maintaining the temperature of the animal at the desired level. Upon request, comprehensive monitoring of vital signs of the animal (temperature, respiration and heart rate) can be provided by *Vital Signs monitoring*, our non-invasive, real-time monitoring platform.

Anesthesia	Standard inputs for gas anesthesia; compatible with third party systems
Heating	Heated stage for optimum body temperature
Vital Signs monitoring	Upon request



G. Footprint and connectivity

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

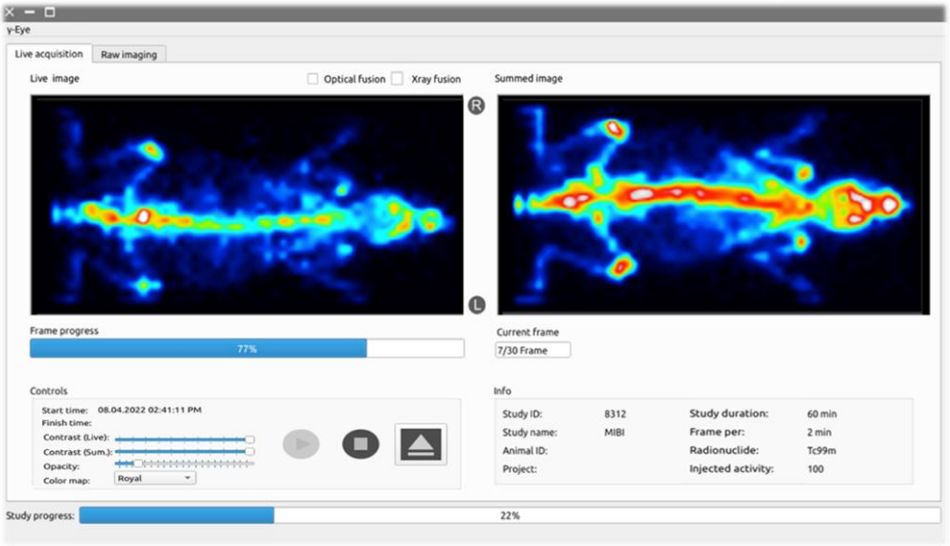
Outer dimensions	43 cm (L) × 46 cm (W) × 43 cm (H)
Weight	<50 kg
AC input range	100 - 240 VAC
PC Connectivity	USB 2.0 Type A and GB Ethernet

H. Visual | eyes™ Software

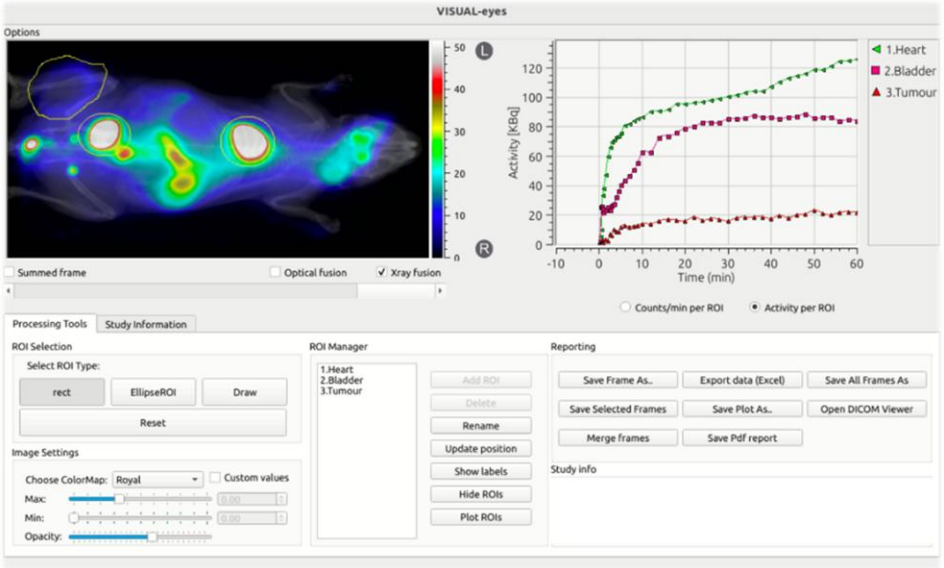
Visual | eyes™ is a complete software suite that serves image acquisition, system control and analytical post-processing routines. Among other possibilities, users through Visual | eyes™ software can generate imaging studies using custom and/or pre-defined protocols, obtain quantitative information in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

Fast acquisition	Simplified procedure in a robust environment
	Real time image visualization during the scan
Database	Raw data - DICOM storage - Compatibility with third party software
Anatomical mapping	Fusion with X-ray images artificially generated based on the mouse structural characteristics
Imaging protocols	Pre-defined and user's defined imaging protocols
Post processing	Integrated ROI manager for detailed post processing image analysis
License	Standard license for Mac and Windows

Live imaging console



Post Processing suite



Indicative Studies

- **Tumor targeting radiotherapy based on ^{212}Pb radiopharmaceutical**

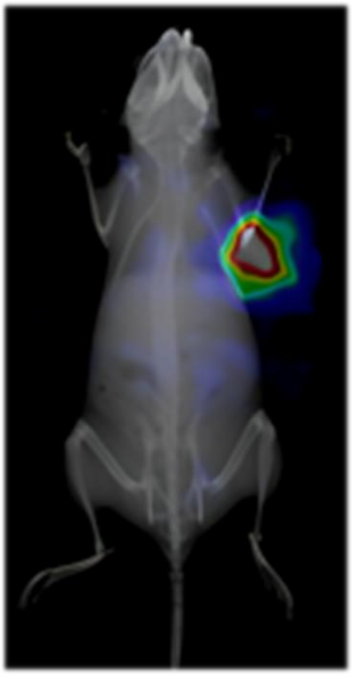


Figure 1. 0.4MBq of ^{212}Pb – 10min imaging time

- **Tumor targeting radiotherapy based on ^{225}Ac radiopharmaceutical**

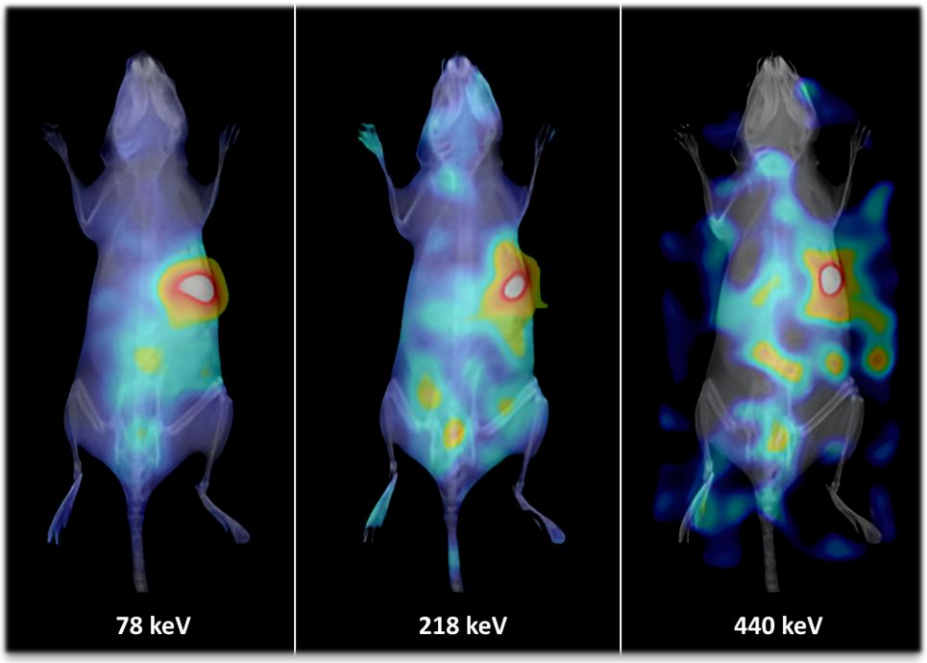


Figure 2. 0.19MBq of ^{225}Ac – 20min imaging time, carried out on 3 characteristic energy peaks

- **Tumor targeting using ^{125}I radiopharmaceutical**

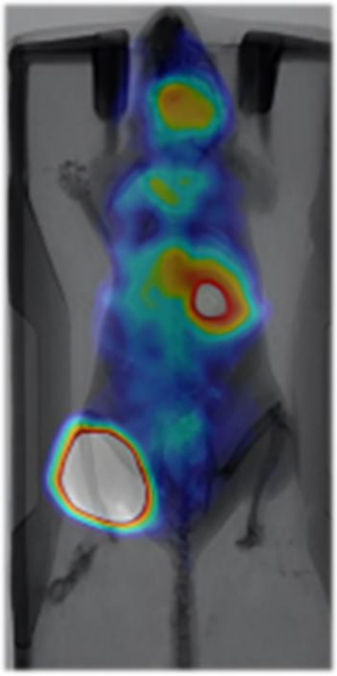


Figure 3. 1.5MBq of ^{125} I – 1h dynamic scan

- **Inflammation imaging using Tc-99mm compound**

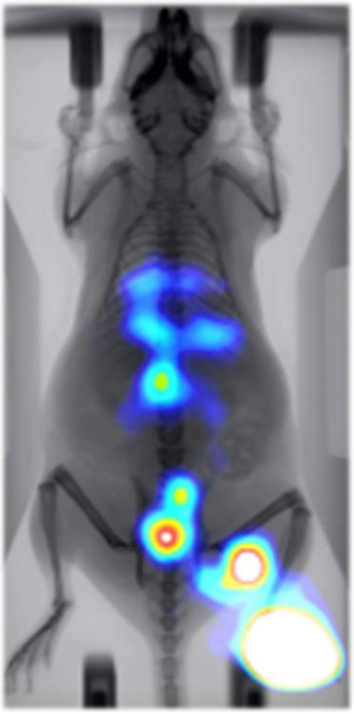


Figure 4. 20uCi of Tc-99m paw injection – 20min imaging time

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