BIOEMTECH

Embracing scientists translate ideas into outcomes

β eye™

A high resolution, benchtop, *in vivo* imaging system for real time PET isotopes screening

Technical Specifications

General

Our 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.

BIOEMTECH

Kleisthenous 271, Gerakas, Athens
info@bioemtech.com • **www.bioemtech.com**

Introduction

BIOEMTECH's β-eye™ is a unique benchtop imaging scanner for real-time *in-vivo* screening of PET isotopes. Equipped with state-of-the-art technology, β-eye™ can depict the temporal and spatial physiological distribution of PET radioisotopes. It also quantifies, competently, the activity of organs and tissues in mice with high precision and for a wide dynamic range of activity. Offering both planar imaging and tomography, it is designed based to the end-user's needs and integrated in an easy-to-use and intuitive environment, β-eye™ is a unique screening tool for fast and efficient whole body mouse imaging.

With a footprint of just 43 cm × 46 cm x 43 cm and a weight lower than 40 kg, β-eye™ is a truly desktop device that can turn any space into an imaging lab. β-eye™ comes with a miniPC, which serves for data acquisition and processing. Standard licenses of the complete software suite Visual | eyes™, are included.

Technology- Specifications

A. General Information

β-eye™ is the first and only PET scanner for real-time, *in vivo* screening of all PET isotopes. Inferring high-end detector technology, small footprint and field of view that provides whole body mouse images, β-eye™ is a complete solution for all laboratories at any research stage.

Modality	PET
Anatomical mapping	AI generated X-ray
Active FOV	50 mm × 100 mm
Photodetectors	Silicon Photomultipliers (SiPMs)
Scintillators	LYSO:Ce

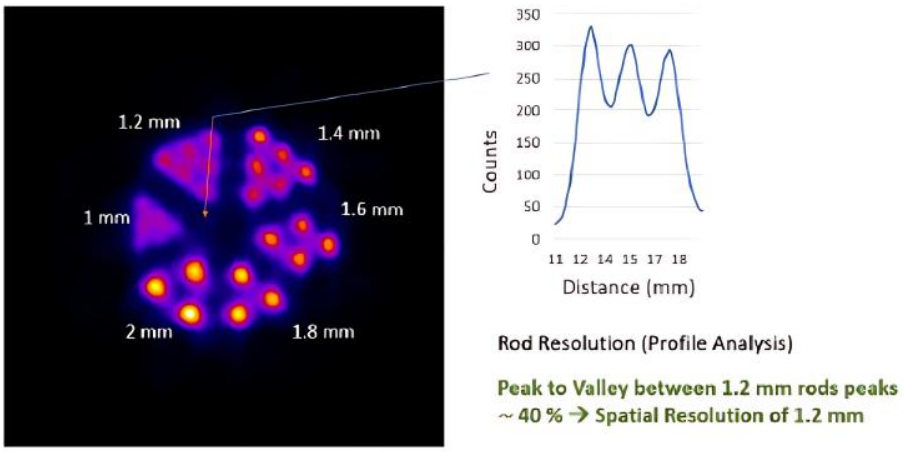
B. Performance

β-eye™ infers unique technical characteristics that enable efficient and high-resolution, whole-body, mouse imaging. With a sensitivity that reaches 2.9 %, spatial resolution near 1.2 mm and TOF capabilities, β-eye™ offers high precision real-time imaging without the cost of time-consuming post-processing routines.

Time frames	Down to 10 sec
Sensitivity	2.9 % @ CFOV
Spatial resolution	<1.2 mm @ CFOV
Energy resolution	~12.4% @ 511 keV
Time resolution	400 ps FWHM | TOF
Dynamic range	0.01 up to 20 MBq

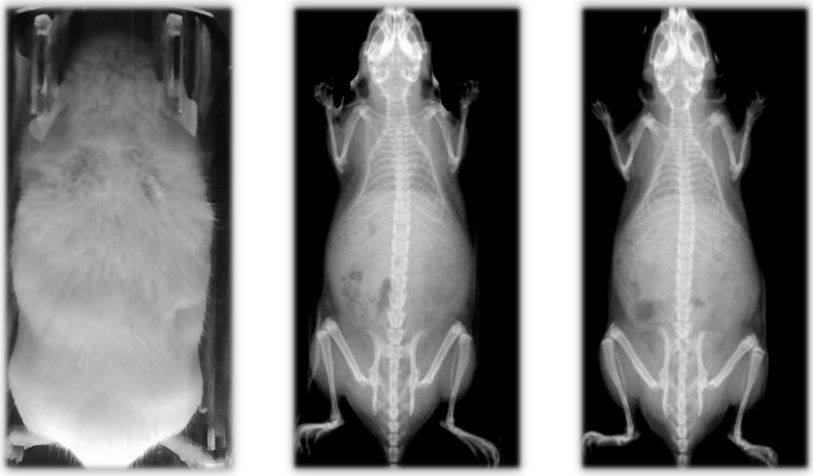
C. Integrated Tomography Mode

Although the β-eye™ was primarily optimized for fast planar imaging, a dedicated 3D tomographic mode is also available, expanding its capabilities beyond traditional screening. This mode enables the volumetric reconstruction of tracer distribution throughout the entire mouse body, providing enhanced quantitative accuracy and spatial resolution. Researchers can perform full-body tomography using PET isotopes, benefiting from both the speed of planar acquisition and the analytical depth of 3D imaging — all within the same compact benchtop system.



D. Artificial X-ray mouse images

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

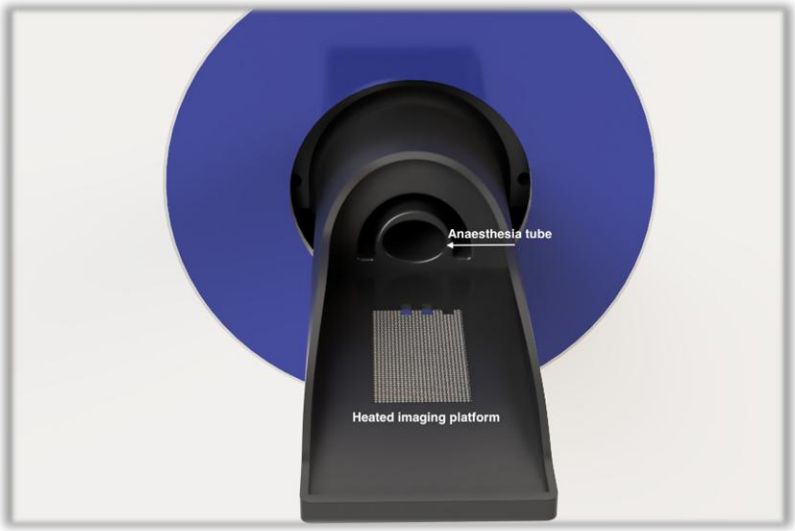


Optical Photo Real X-ray Artificial X-ray

E. Animal handling

To preserve animal's welfare and health, β-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, vital signs of the animal can be monitored including heart and respiratory rate, body temperature and oxygen saturation.

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



F. Footprint and connectivity

β-eye™'s footprint and standard digital interface connectivity can turn any space into an imaging lab. In addition, β-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.

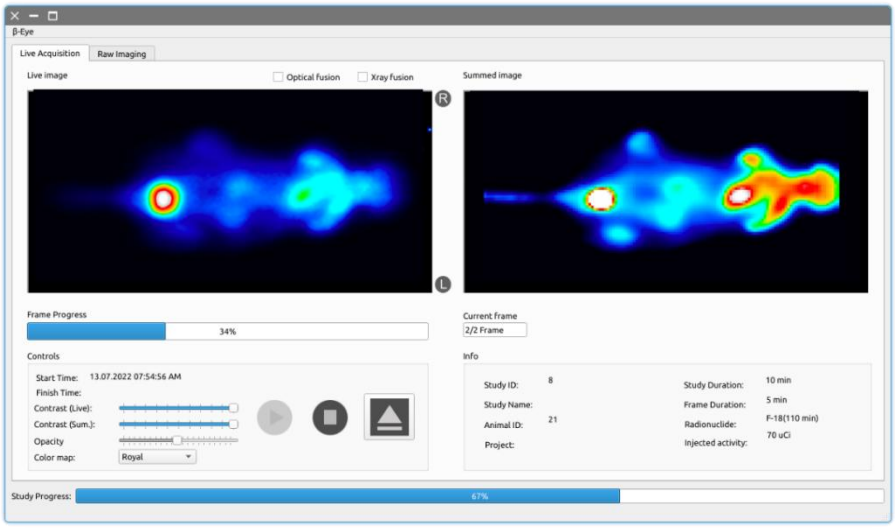
Outer dimensions	44 cm (L) × 46 cm (W) × 40 cm (H)
Weight	40 kg
AC input range	100-240 VAC
PC Connectivity	USB 2.0 Type A and Gb Ethernet
Outer shielding	Sheet metal

G. Visual | eyes Software

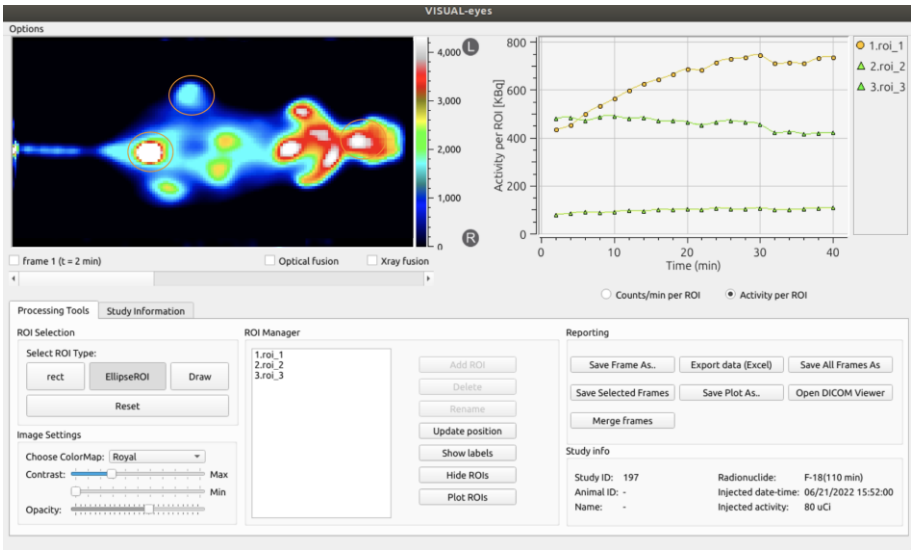
Visual | eyes is a complete software suite that serves for imaging, system control and analytical post-processing routines. Among other possibilities, users through Visual | eyes software, can generate imaging studies using custom and/or pre-defined protocols, obtain quantitative information in user's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

Fast acquisition	Simplified procedure in a robust environment-
	Real time image visualization during 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

- **Tumour Perfusion**

Live frames of 30sec for the first 50 minutes post administration

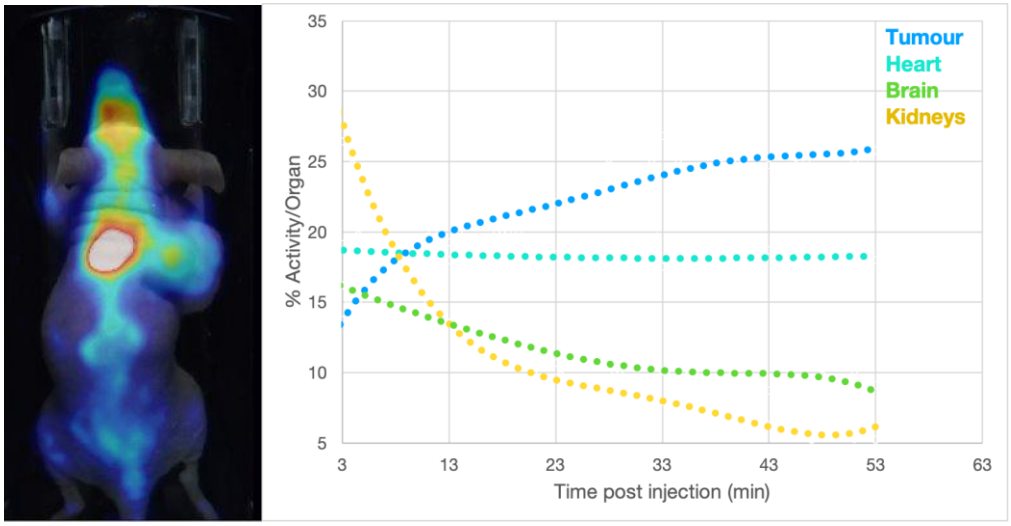


Figure 1. Live frames of 30sec for the first 50 minutes post administration

- **Lung Fibrosis Imaging**

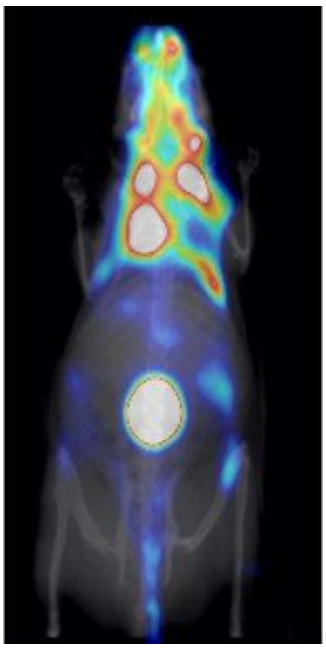


Figure 2. Lung fibrosis model imaged with FDG-F18 with a 6-minute acquisition time. Total injected dose 70 uCi.

- **Tumour Imaging**

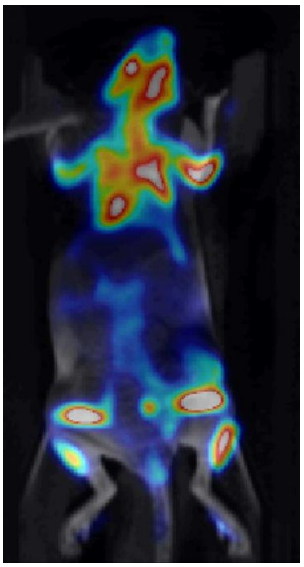


Figure 3. Tumor model imaged with FDG-F18 & 6 min acquisition time. Total injected dose 90 uCi.

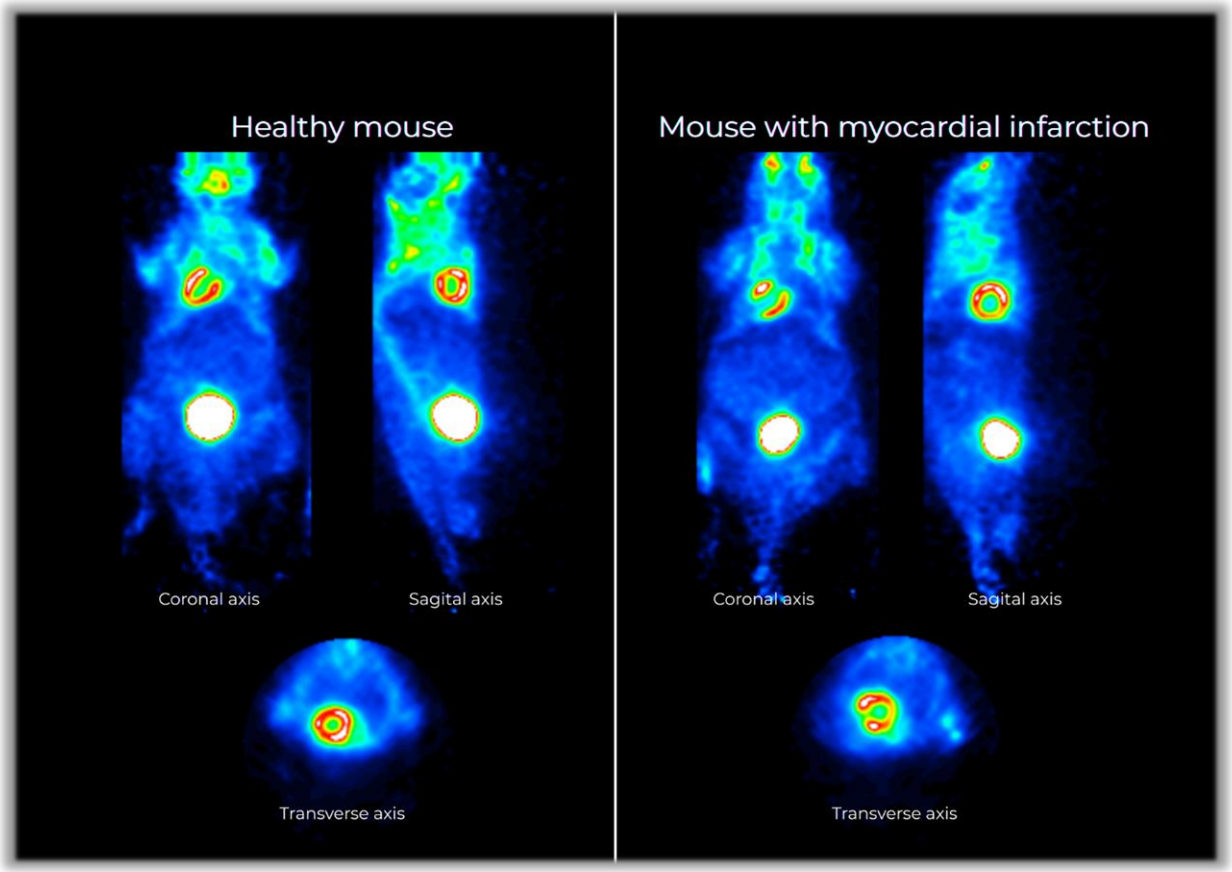


Figure 4. Cardiac PET imaging using 18F-FDG, in a mouse model of myocardial infarction. Image info: 80 min post injection – 20 min scan – total injected activity 6 MBq

BIOEMTECH

Kleisthenous 271, Gerakas, Athens
info@bioemtech.com • **www.bioemtech.com**