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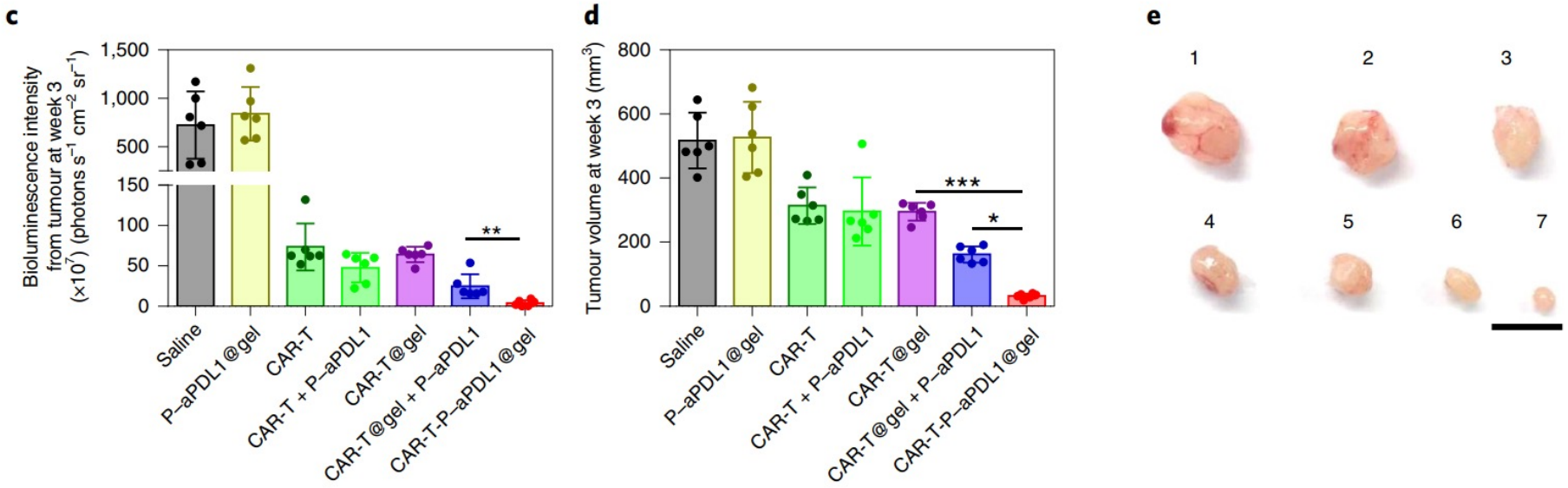
Inhibition of post-surgery tumour recurrence via a hydrogel releasing CAR-T cells and anti-PDL1-conjugated platelets



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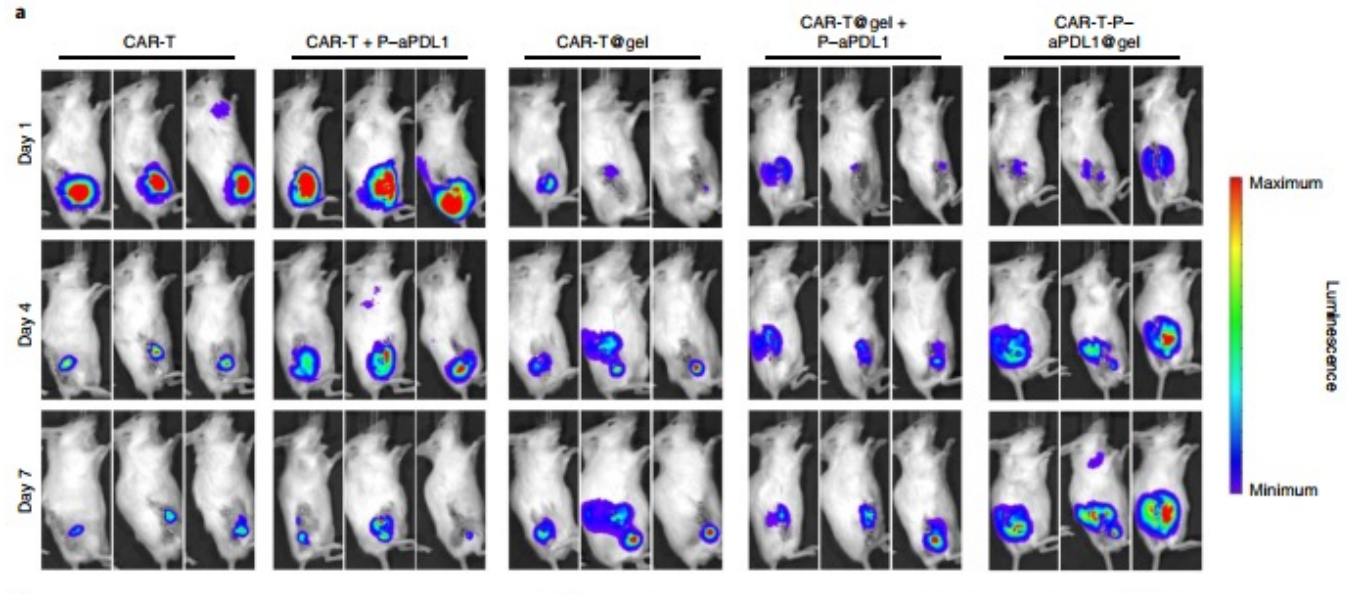

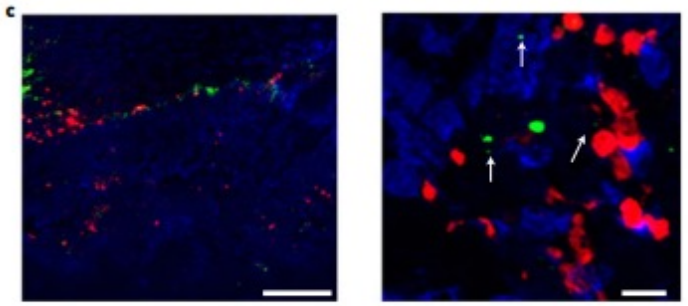

CAR-T-P–aPDL1@gel 72 h after treatment.
CAR-T cells platelets

CAR-T cells encapsulated in the hydrogel persist and expand in vivo.

nature biomedical engineering
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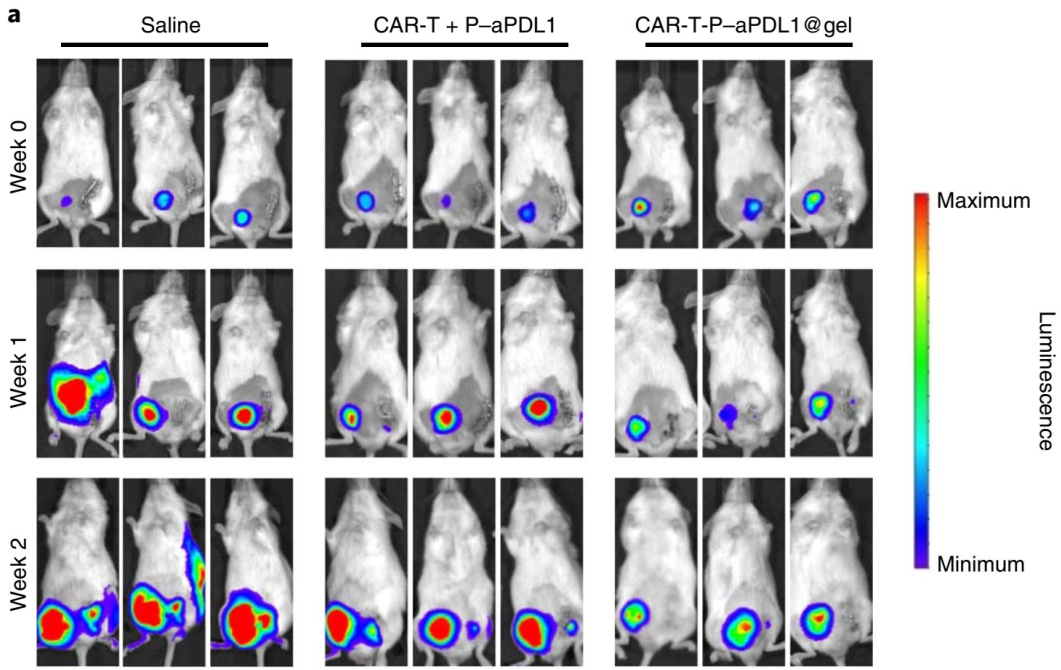
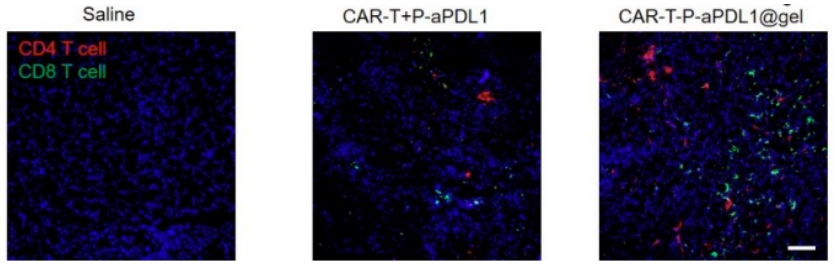




Representative confocal images of CD4 and CD8 T cells detected in the distant tumor.

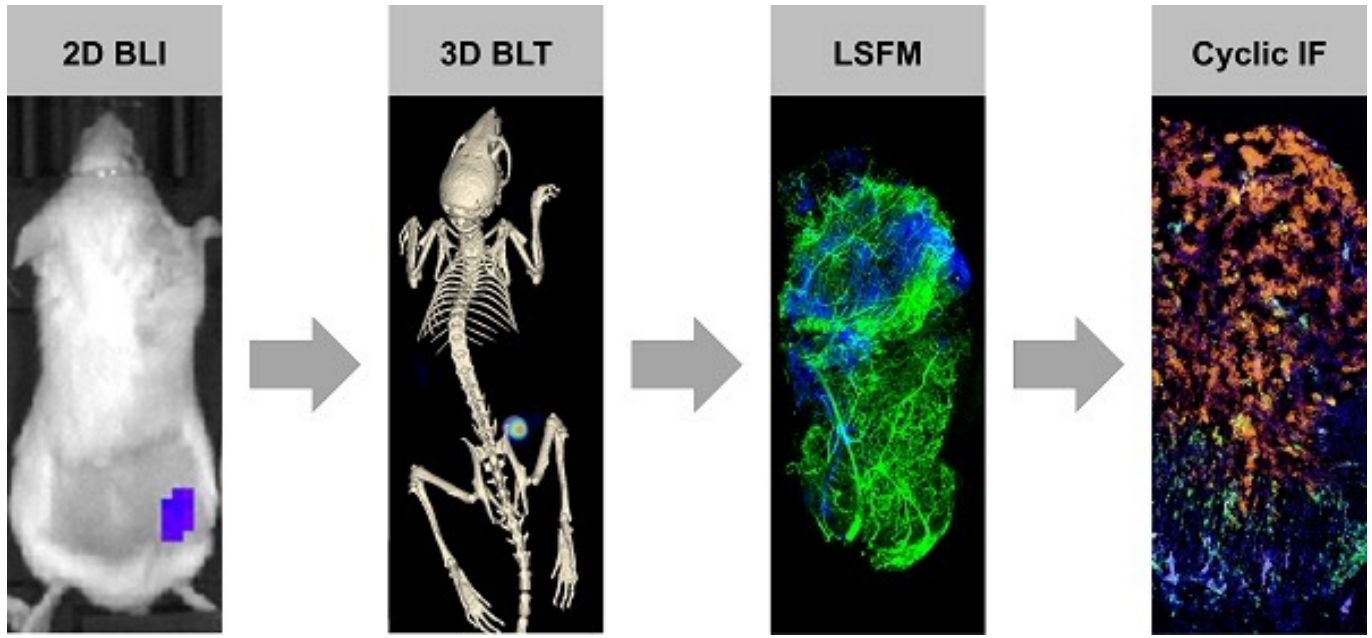
Engineered hydrogel cell delivery promotes abscopal antitumor effects

Multi-modal animal model

Research Paper

A multimodal imaging workflow for monitoring CAR T cell therapy against solid tumor from whole-body to single-cell level

Rita Pfeifer[1*], Janina Henze[1,2*], Katharina Wittich[1], Andre Gosselink[1,3], Ali Kinkhabwala[1], Felix Gremse[4], Cathrin Bleilevens[1], Kevin Bigott[1], Melanie Jungblut[1], Olaf Hardt[1], Frauke Alves[2,5], Wa'el Al Rawashdeh[1,6]✉



Theranostics
2022; 12(11): 4834-4850. doi: 10.7150/thno.68966

Research Paper

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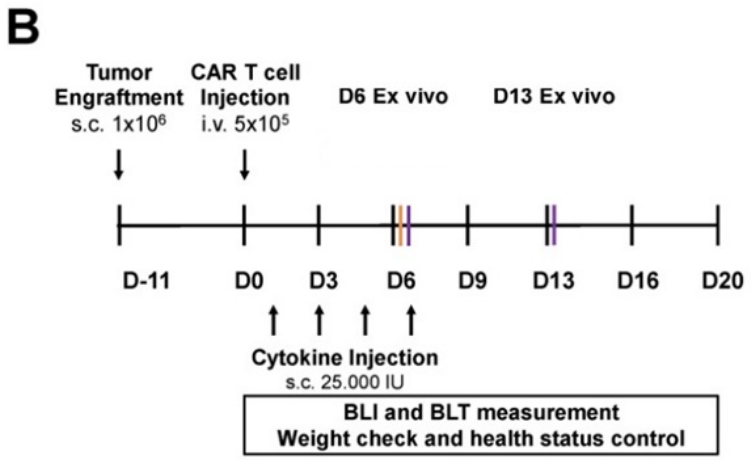

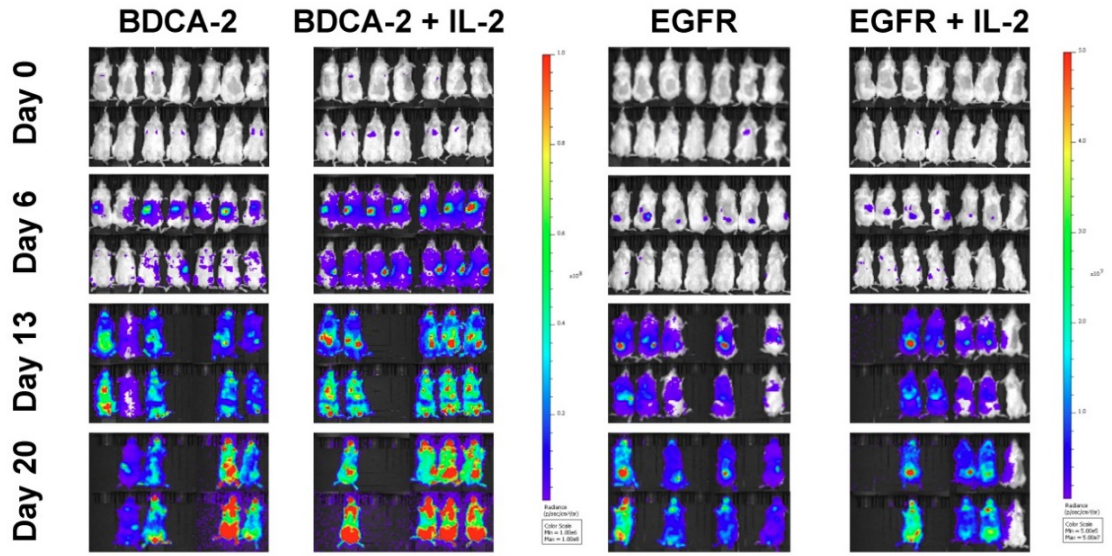

Therapeutic EGFR CAR T cells in comparison to control BDCA-2 CAR T cells in a subcutaneous pancreatic cancer xenograft mouse model

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Research Paper

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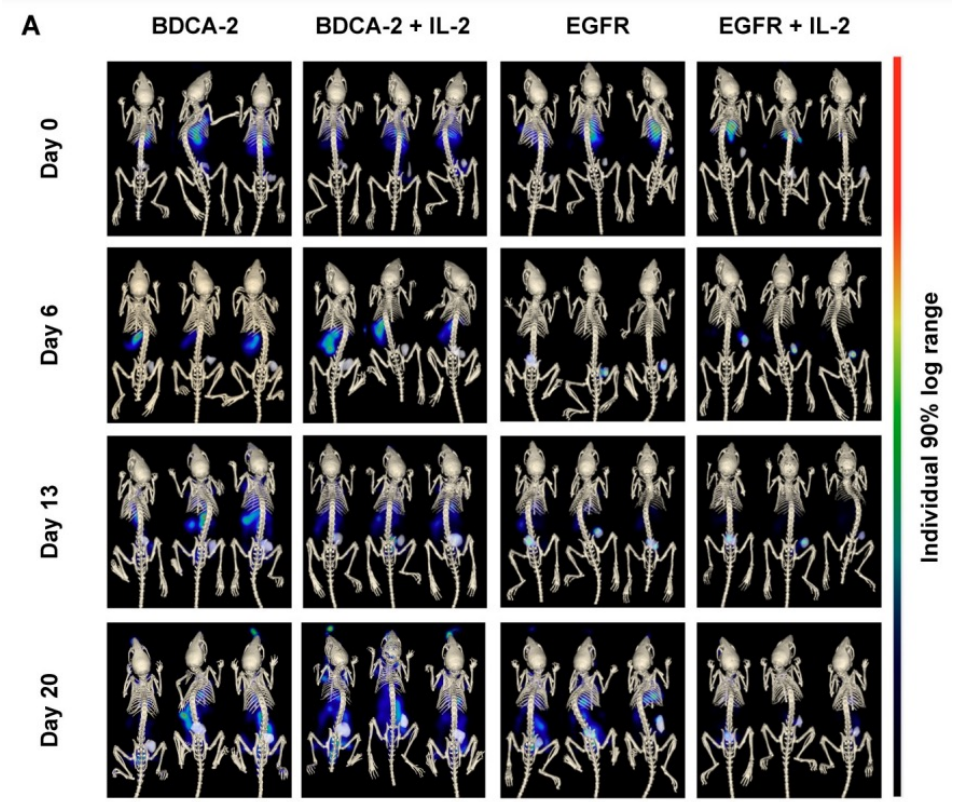
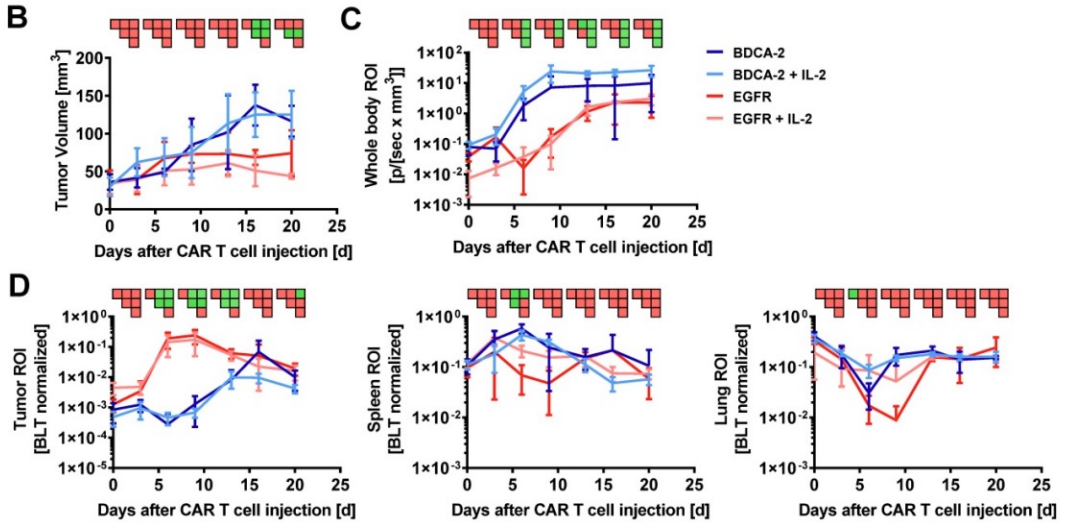


3D hybrid μCT/BLT precisely detects antigen recognition-dependent intratumoral CAR T cell trafficking and expansion



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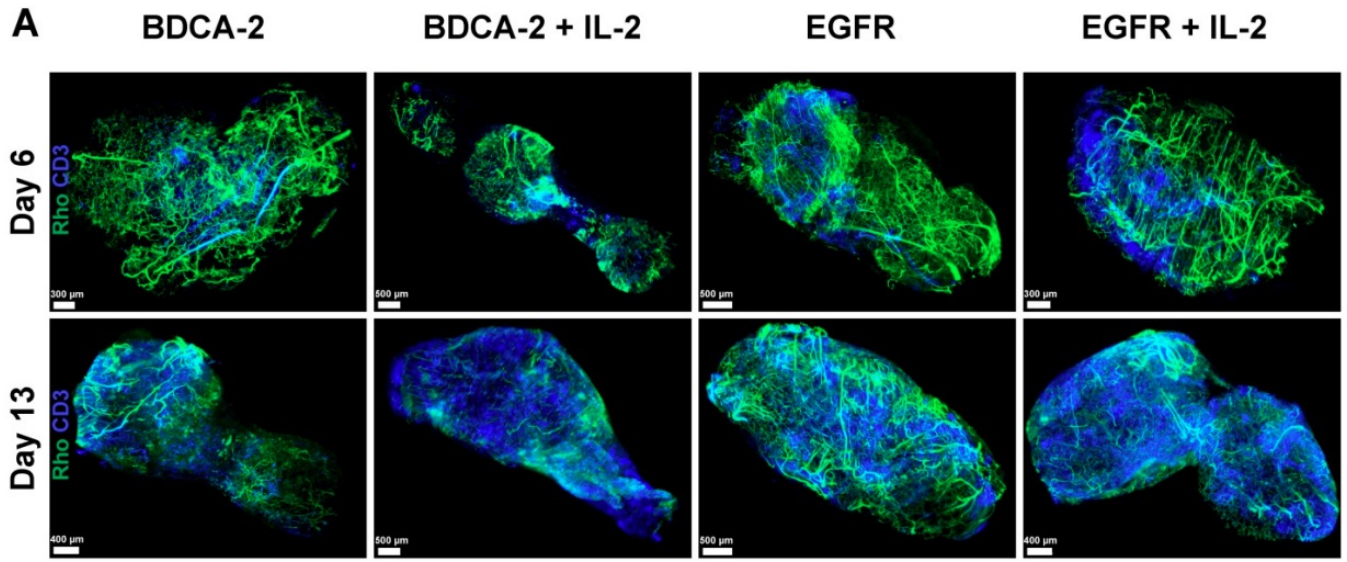
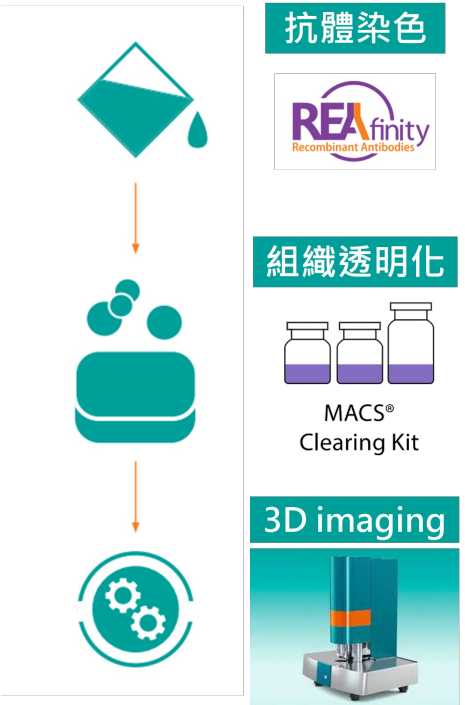


LSFM
Light sheet microscope



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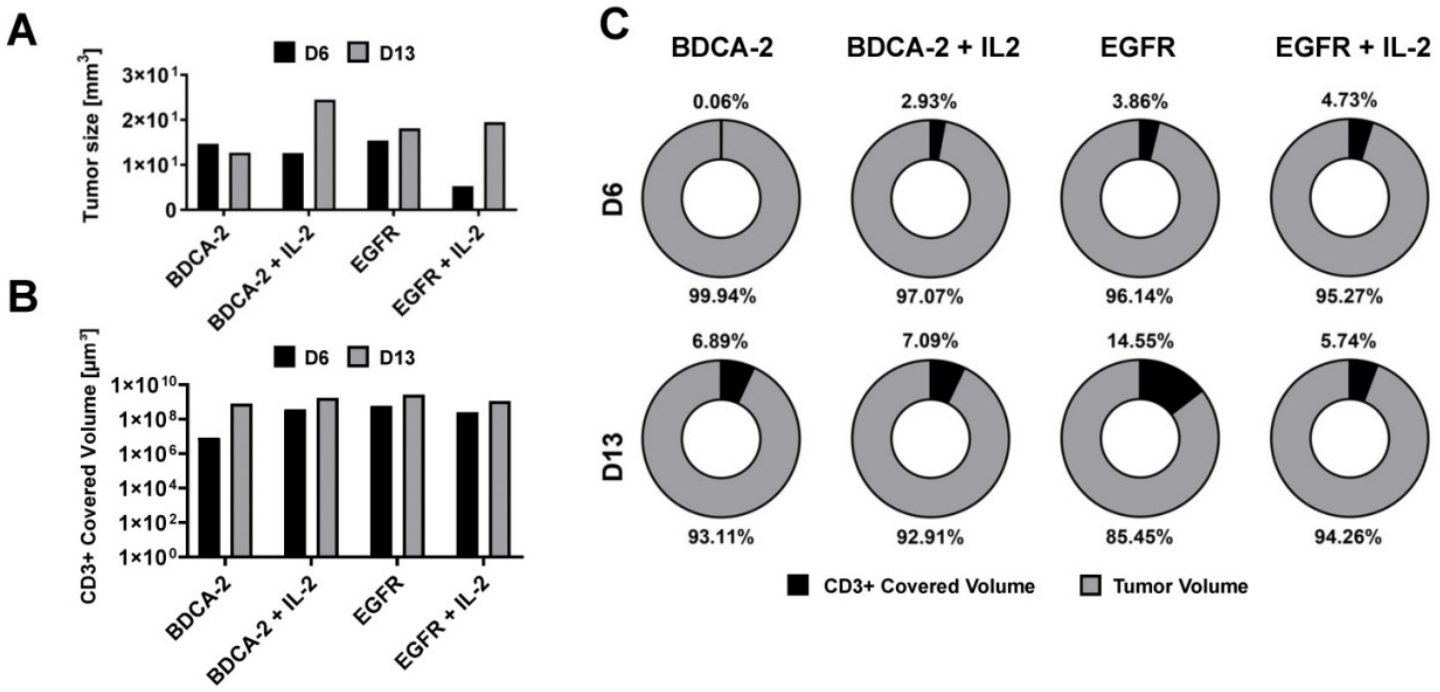

Spot-reconstruction analysis in LSFM reveals effects of IL-2 on CAR T cells intratumoral distribution

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2022; 12(11): 4834-4850. doi: 10.7150/thno.68966

Research Paper

A multimodal imaging workflow for monitoring CAR T cell therapy against solid tumor from whole-body to single-cell level

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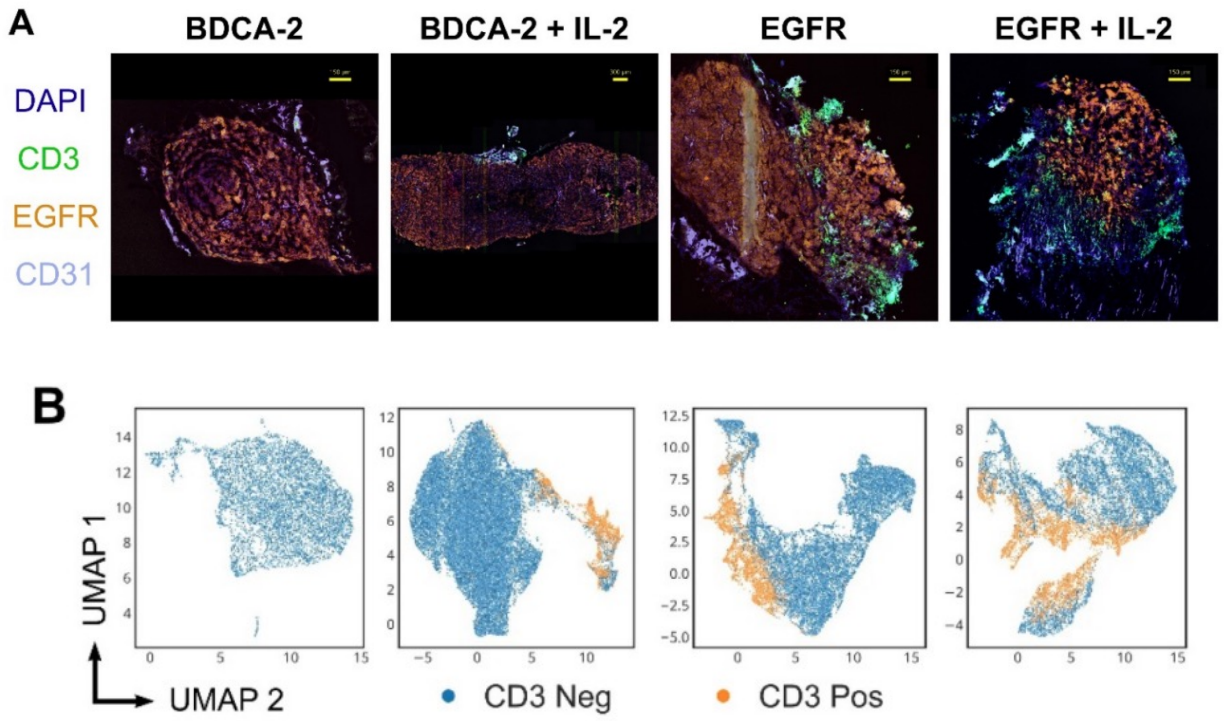

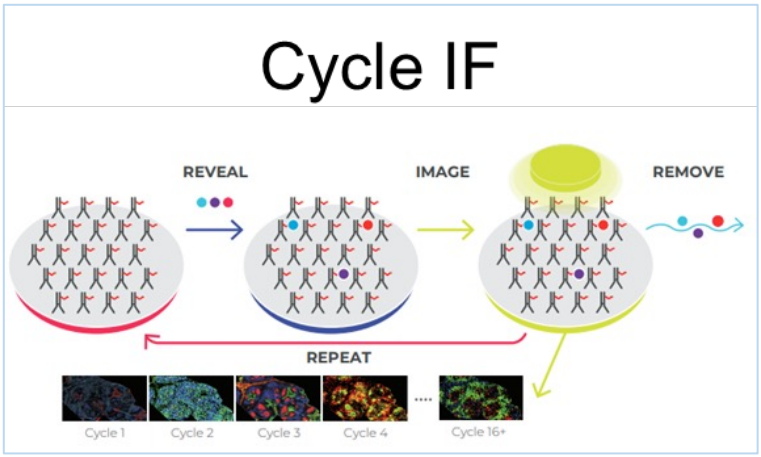

High-content cyclic IF imaging reveals phenotypic changes in tumor and T cells following CAR T cell treatment

Theranostics
2022; 12(11): 4834-4850. doi: 10.7150/thno.68966

JnH total solution for Animal model

Theranostics 2022, Vol. 12, Issue 11 4834

IVYSPRING INTERNATIONAL PUBLISHER

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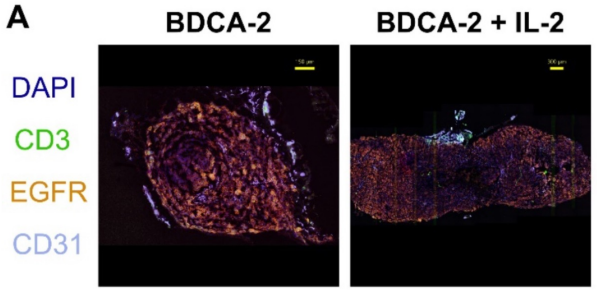
CODEX
Ultra high content



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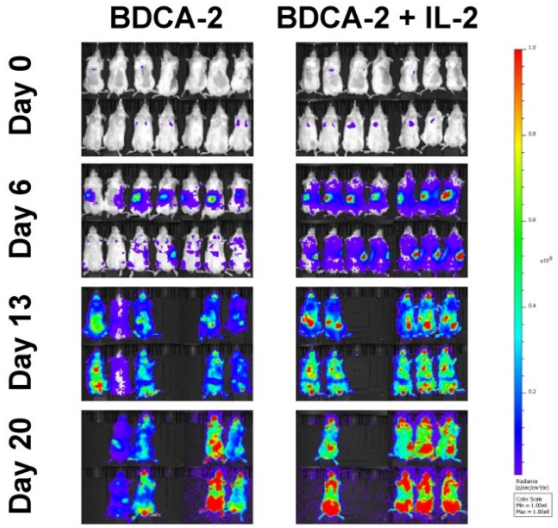
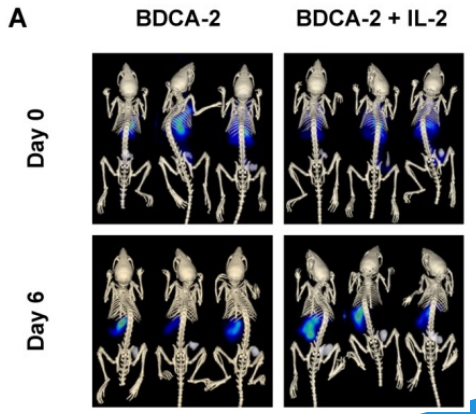
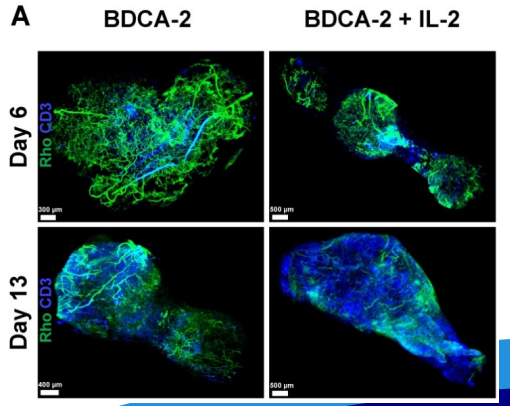


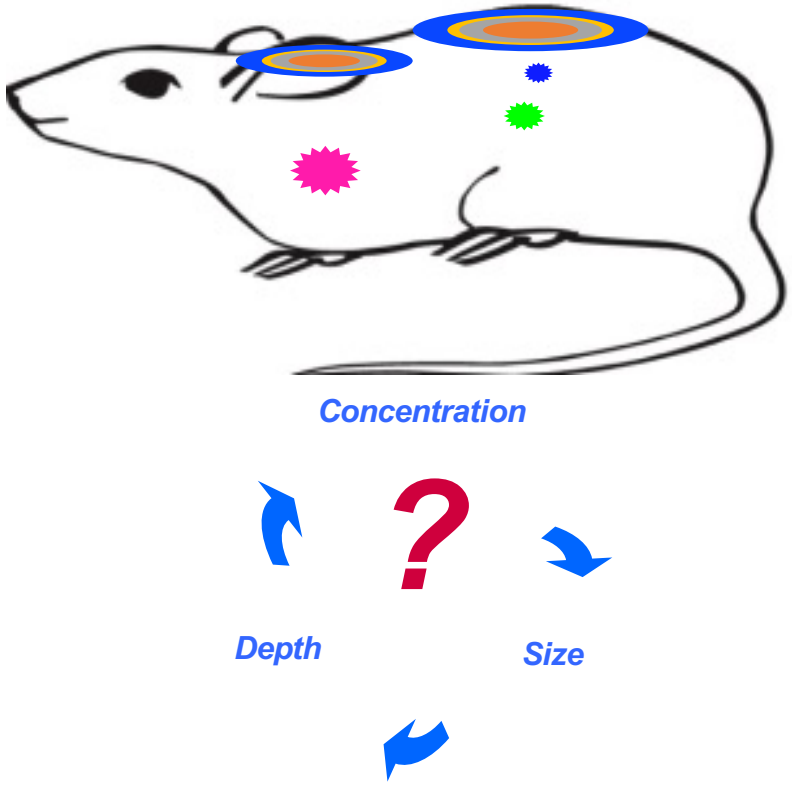
IVIS+uCT



MACS Light sheet



Why 3D Optical Tomography?
2D VS 3D imaging

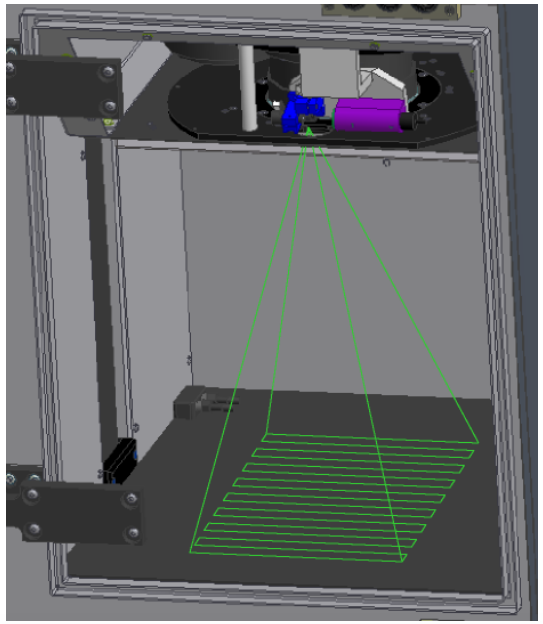


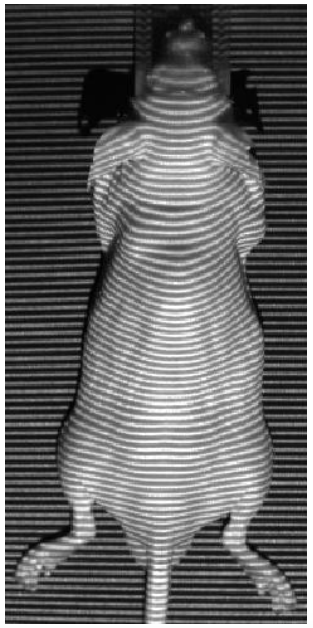
- 2D成像獲得信號到達體表的相對强度
- 是否需要比較不同深度信號的强度？
  3D成像能比較不同深度的信號强弱
- 是否要對信號進行定位和絶對定量？
  3D成像能夠定位，還原信號的體積訊息，並且絕對定量

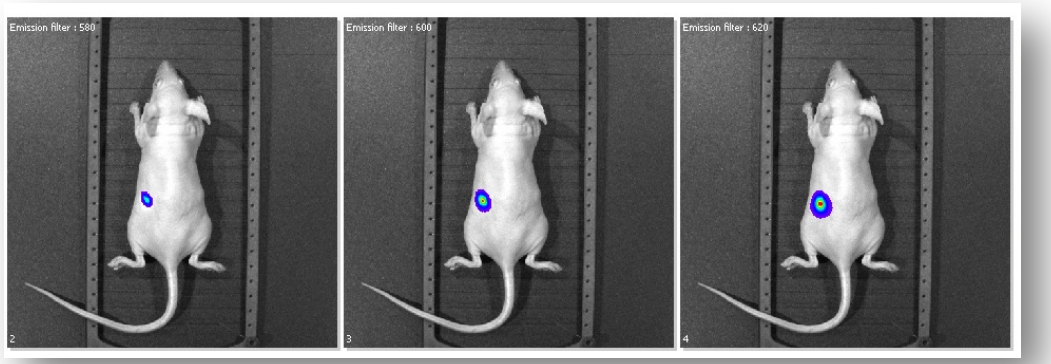
3D Imaging from a Single View is a Two-Step Process

•Bioluminescence (Diffuse Light Imaging Tomograpy ™):

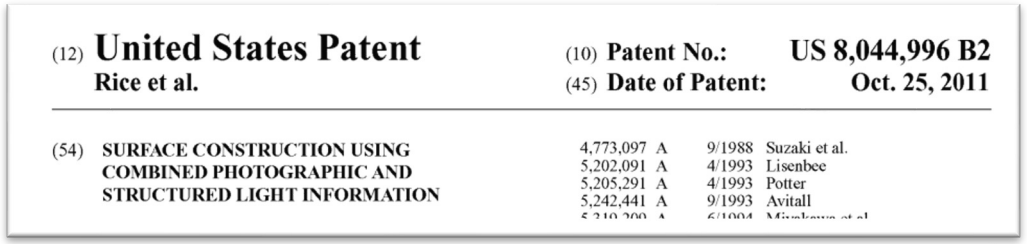
- Step 1: **Surface Topography**
- Step 2: Obtain images using **multiple emission filters** for **Tomographic** mapping of source location







3D Imaging from a Single View is a Two-Step Process

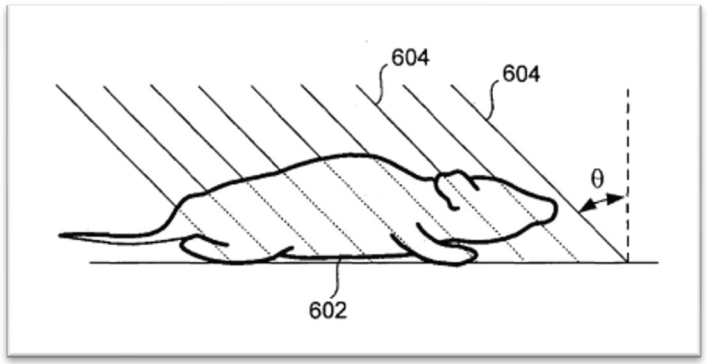


(12) **United States Patent**
Rice et al.

(10) **Patent No.: US 8,044,996 B2**
(45) **Date of Patent: Oct. 25, 2011**

(54) **SURFACE CONSTRUCTION USING COMBINED PHOTOGRAPHIC AND STRUCTURED LIGHT INFORMATION**

4,773,097	A	9/1988	Suzaki et al.
5,202,091	A	4/1993	Lisenbee
5,205,291	A	4/1993	Potter
5,242,441	A	9/1993	Avitall



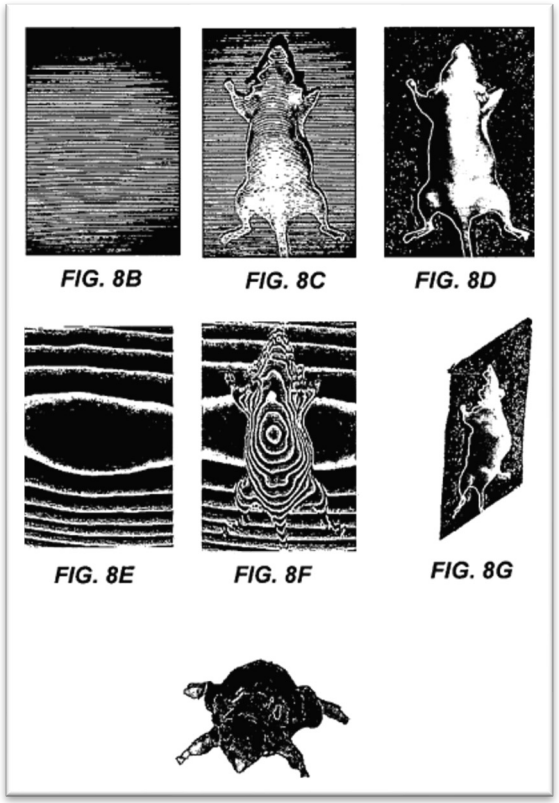


FIG. 8B FIG. 8C FIG. 8D

FIG. 8E FIG. 8F FIG. 8G

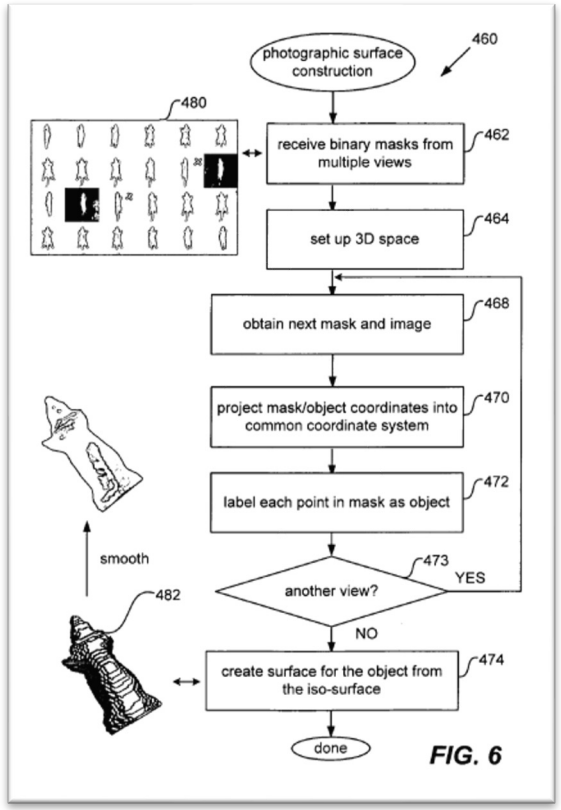
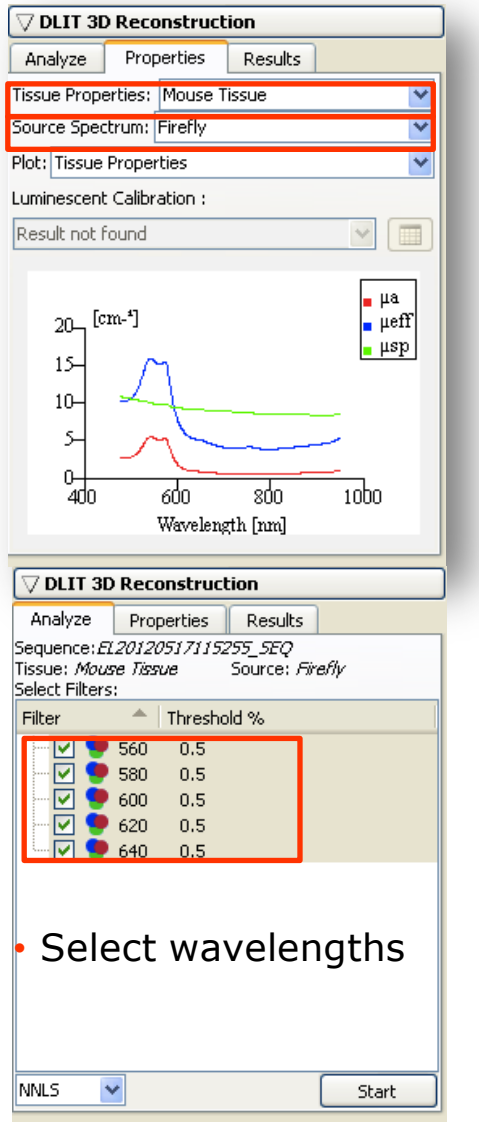
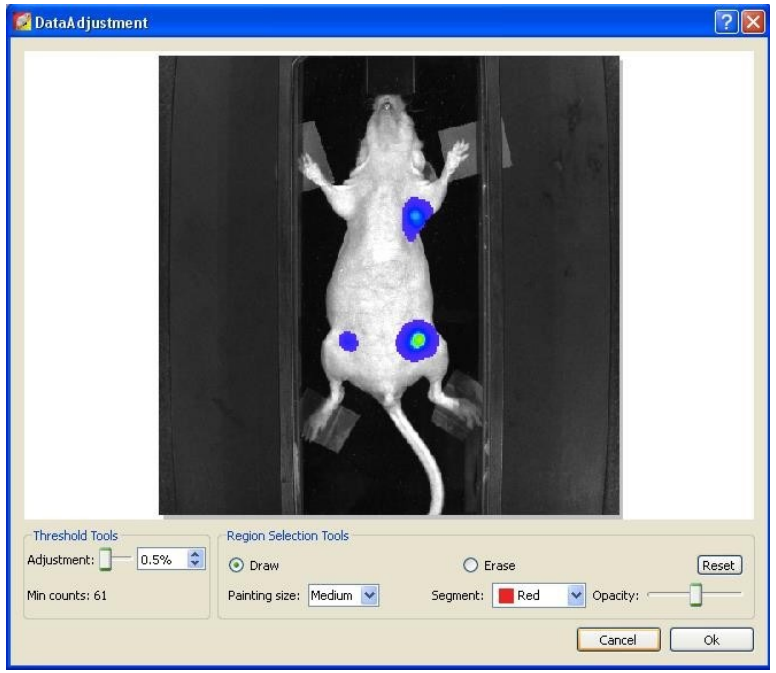


FIG. 6



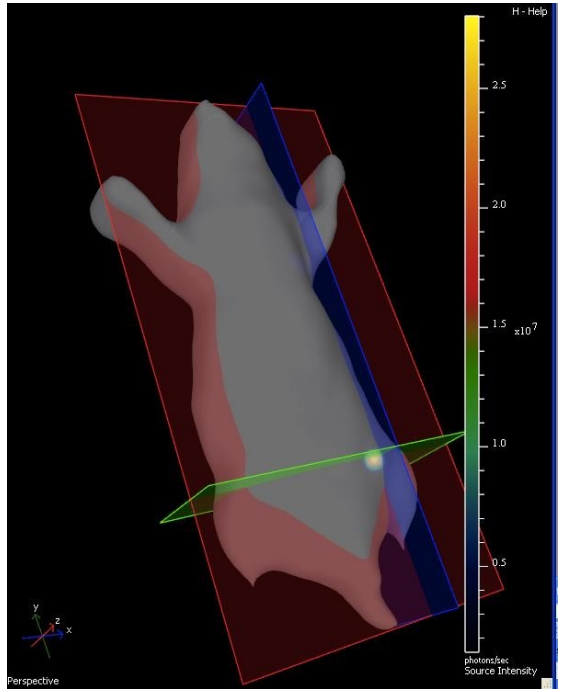
- Select wavelengths

- Select tissue properties
- Select source spectrum



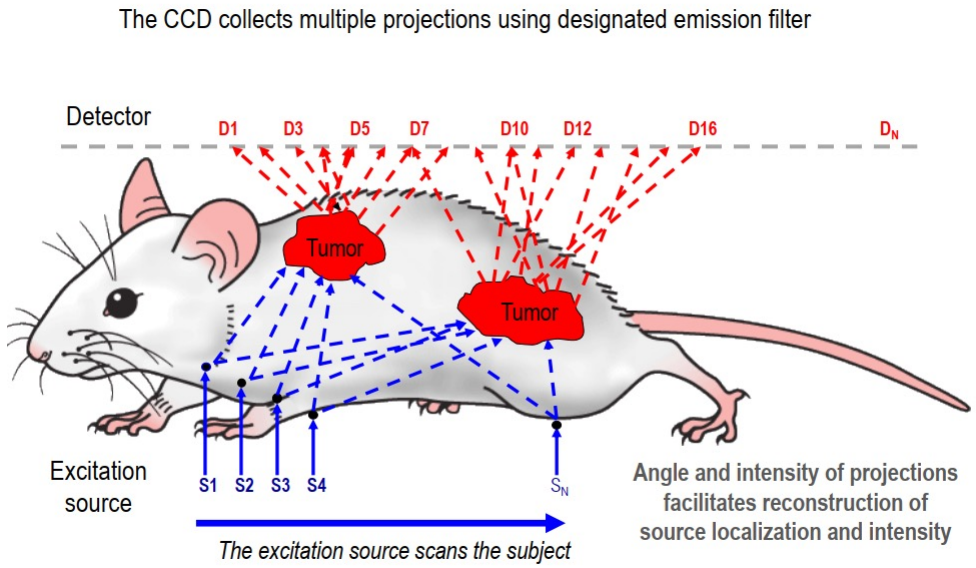
- Threshold your data

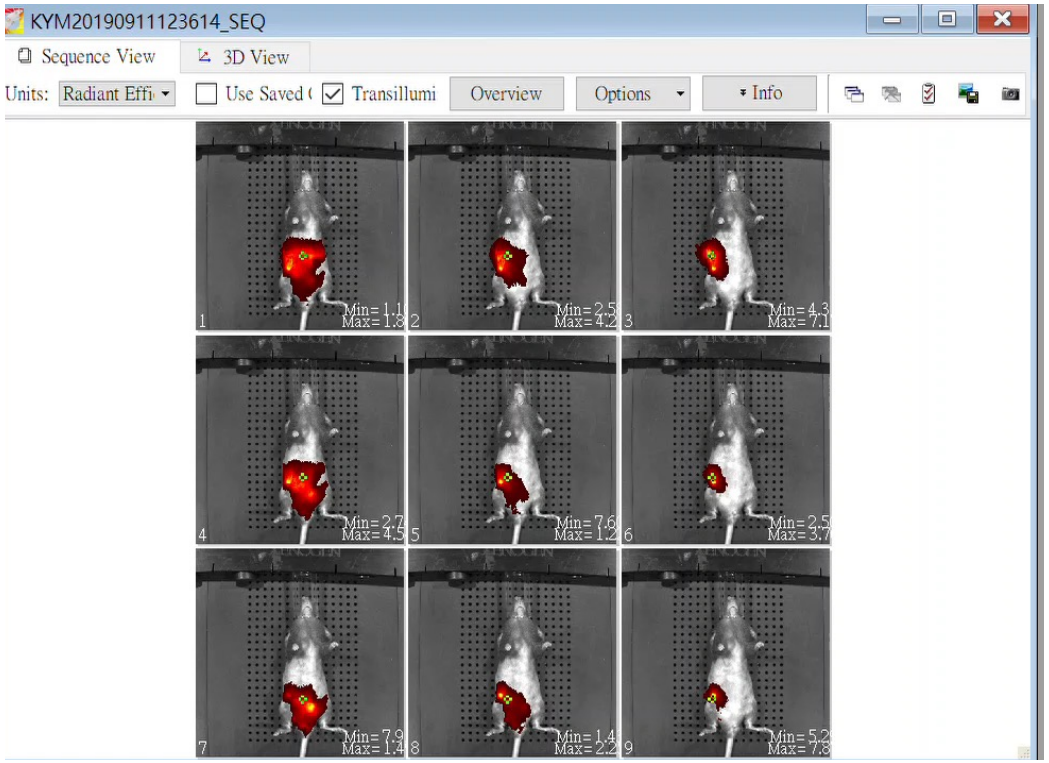
3D reconstruction



3D Imaging from a Single View is a Two-Step Process

- **Fluorescence (FLuorescence Imaging Tomography):**
  - Step 1: **Surface Topography**
  - Step 2: Obtain images using **multiple transillumination points**





(12) **United States Patent**
Rice et al.

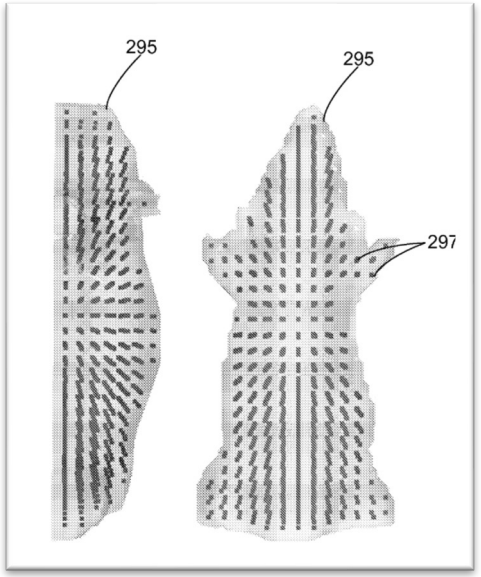
(10) **Patent No.: US 7,599,731 B2**
(45) **Date of Patent: Oct. 6, 2009**

(54) **FLUORESCENT LIGHT TOMOGRAPHY**

(75) Inventors: **Bradley W. Rice**, Danville, CA (US); **Chaincy Kuo**, Oakland, CA (US); **Daniel G. Stearns**, Mountain View, CA (US); **Heng Xu**, Alameda, CA (US)

(73) Assignee: **Xenogen Corporation**, Alameda, CA (US)

4,773,097	A	9/1988	Suzaki et al.	
5,202,091	A	4/1993	Lisenbee	
5,205,291	A *	4/1993	Potter	600/431
5,242,441	A	9/1993	Avitall	
5,319,209	A	6/1994	Miyakawa et al.	
5,334,193	A	8/1994	Nardella	



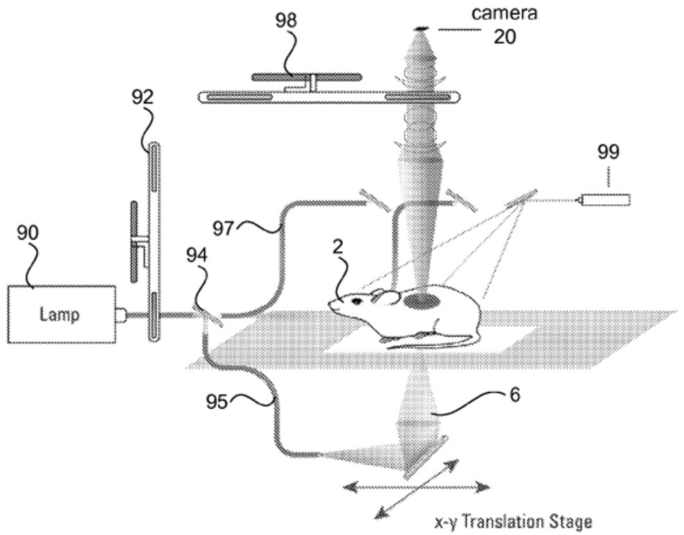


Figure 6A

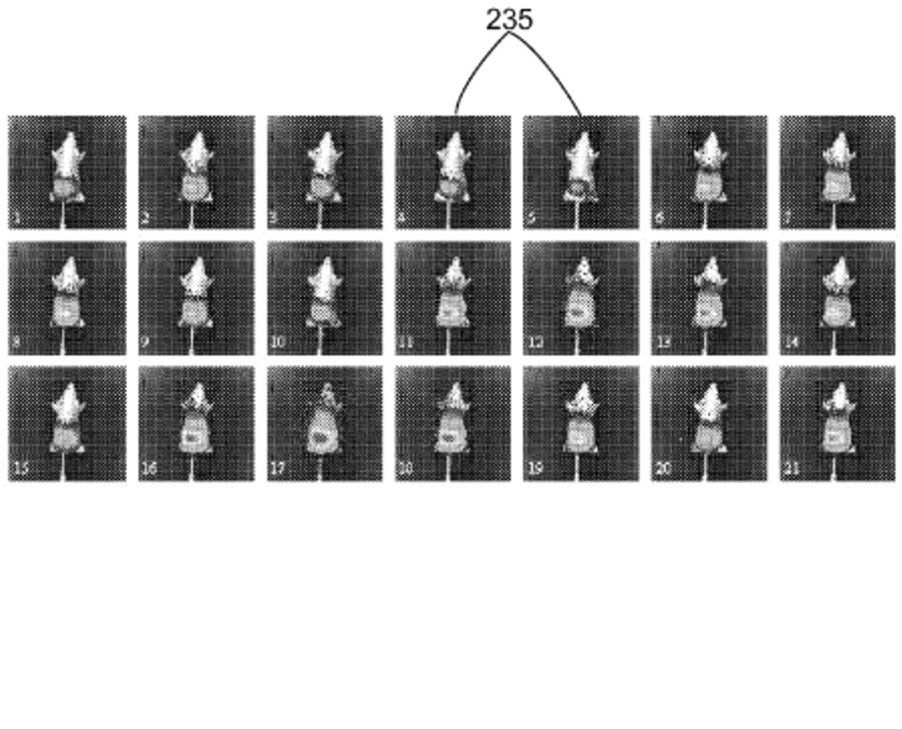
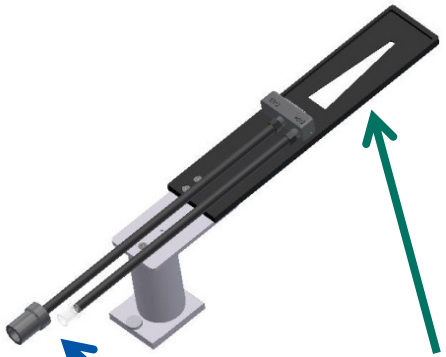


Figure 7

Mouse Imaging Shuttle for Co-Registration

Shuttle Heights:
10, 12, 14 & 25 mm

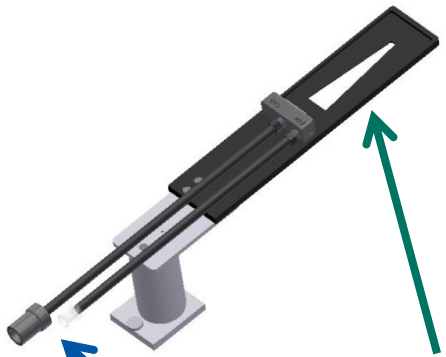
GX2



Fiducial Pattern

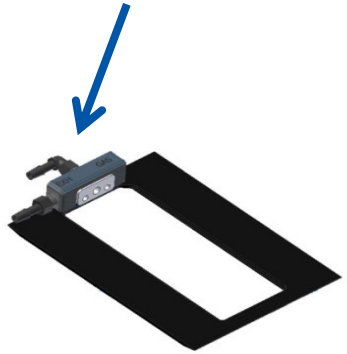
Gas Anesthesia

IVIS



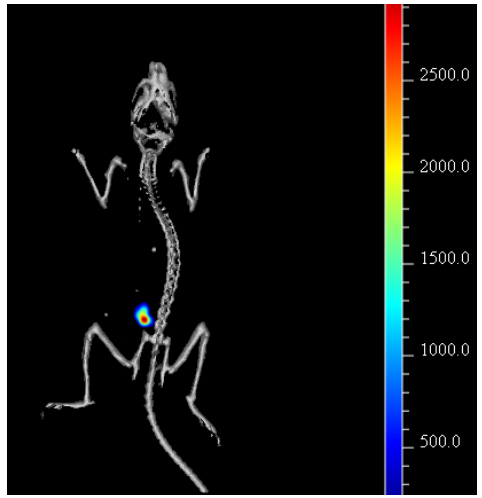
Fiducial Pattern

Gas Anesthesia



GX2

IVIS

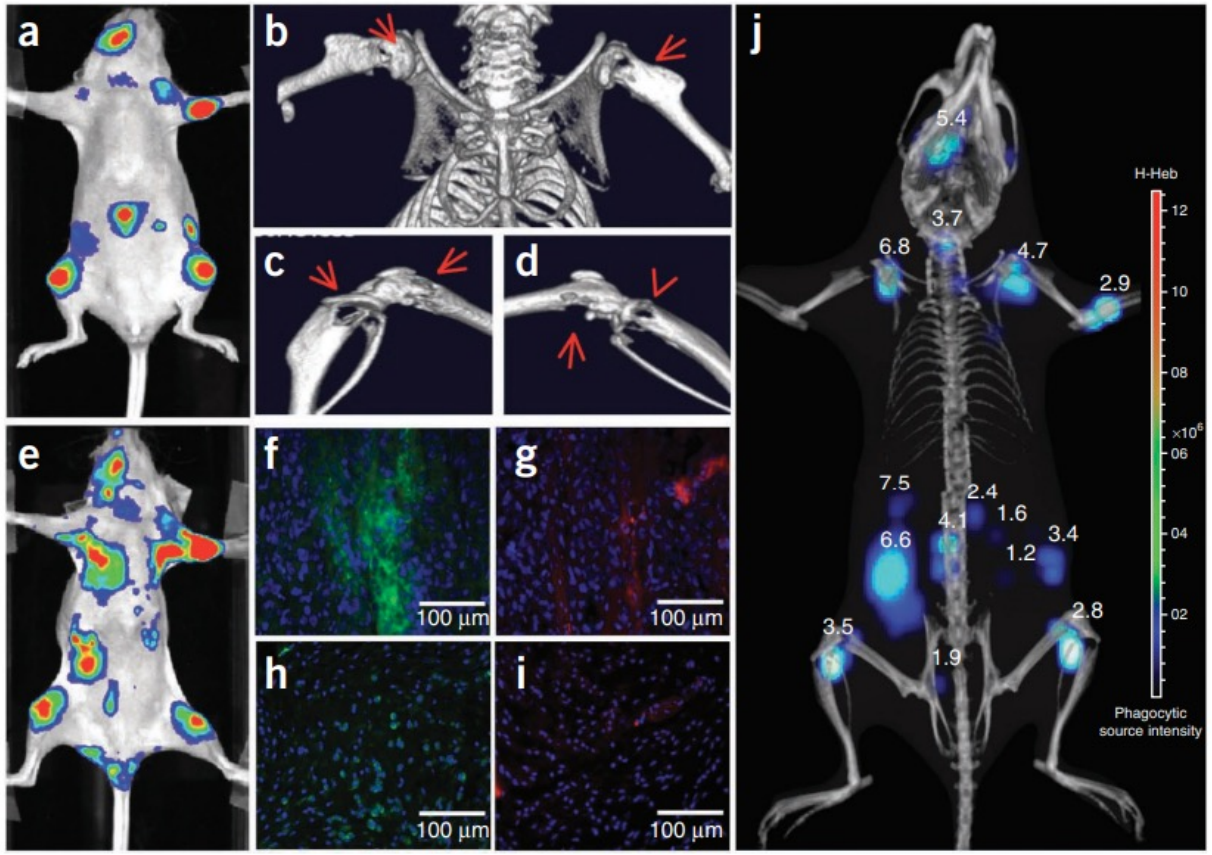


nature medicine

Enhanced detection of myeloperoxidase activity in deep tissues through luminescent excitation of near-infrared nanoparticles

Ning Zhang[1,3], Kevin P Francis[1], Arun Prakash[2] & Daniel Ansaldi[1]

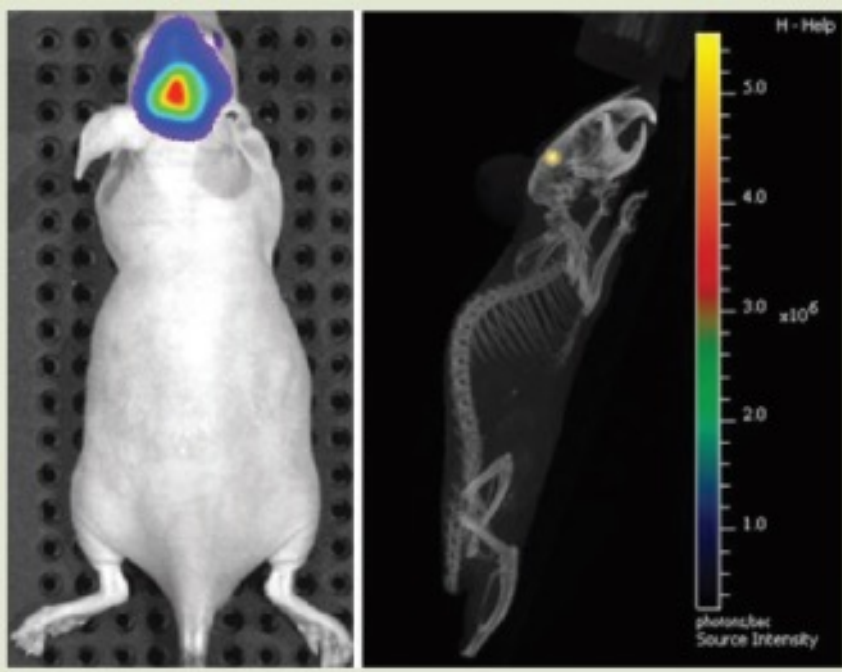
Figure 5 Imaging MPO activity in MDA-MB-231-luc2 tumor metastases. (**a**) Bioluminescent imaging visualizing tumor metastases at 3 weeks in NU/NU mice intracardially injected with MDA-MB-321-luc2 tumor cells. (**b**–**d**) High-magnification microCT images obtained using a Quantum FX µCT system of the shoulders and knee joints showing osteolytic lesions caused by tumor metastases. Arrows indicate regions of osteolytic lesions. (**e**) MPO activity in these lesions analyzed with Luminol-R. (**f**–**i**) Immunohistological analysis of the tumor metastases (**f**,**g**) or healthy tissues from a similar area in a control mouse (**h**,**i**) analyzed for neutrophils (green; **f**,**h**) and MPO (red; **g**,**i**) with a Nuance multispectral CCD camera. Nuclei are shown in blue. Original magnification, ×40. (**j**) Co-registration of multimodality three-dimensional bioluminescent and microCT images obtained using an IVIS Spectrum instrument and a Quantum FX µCT system, respectively. The DLIT-measured depth (mm) of the tumor metastases is shown above each of the metastatic nodules.



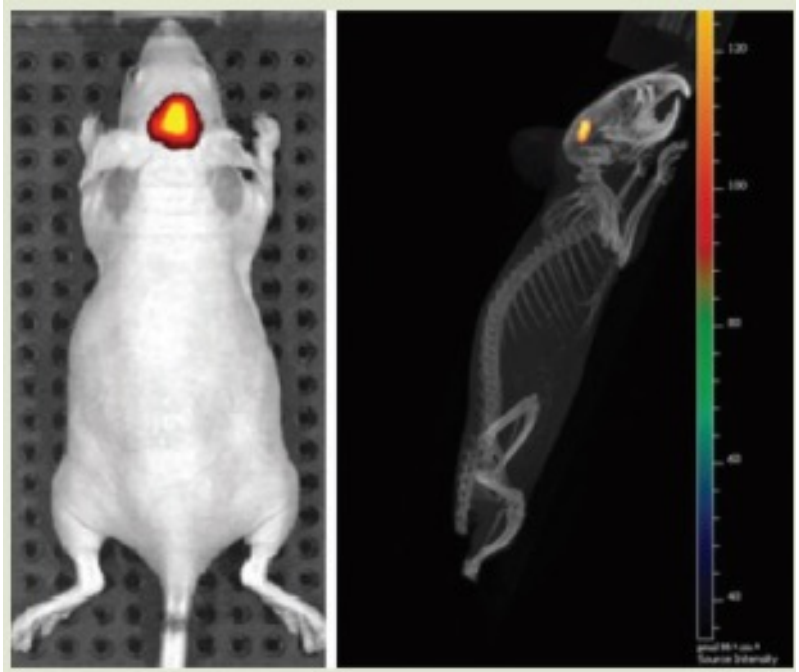
Multimodal Detection with Bioluminescent and Fluorescent Imaging Agents

博克科技股份有限公司
J&H TECHNOLOGY CO., LTD.

- Bioware Brite U-87 MG-Red-Fluc orthotopic tumor cell (3x10^6) were implanted directly.
- DLIT and microCT were used in this study

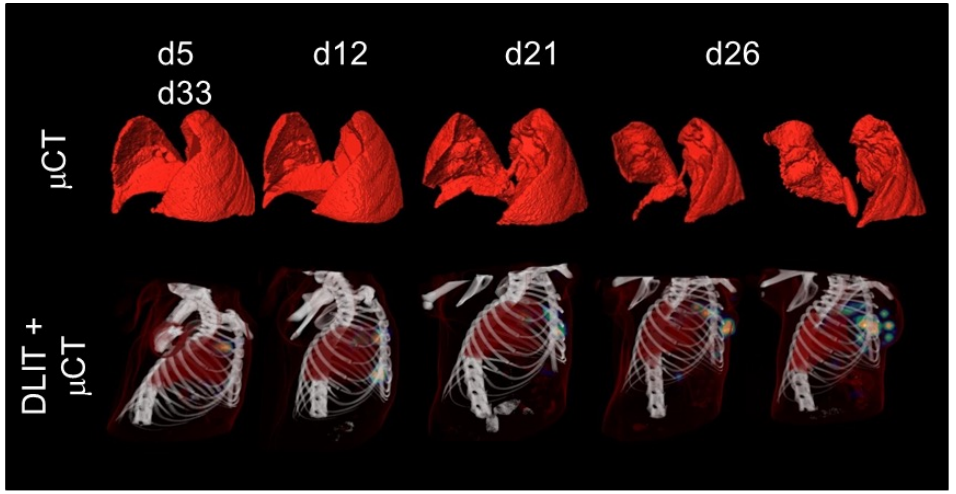


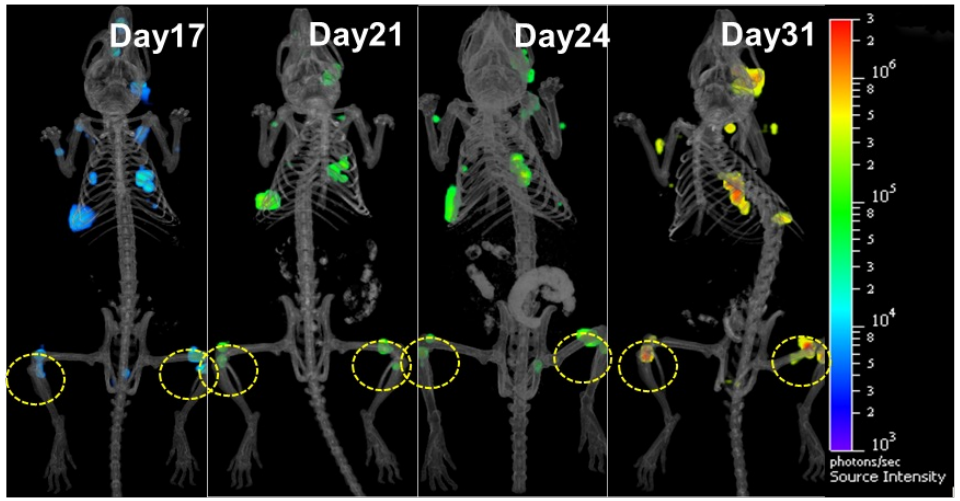
- Mouse was injected with a single dose of IntegriSense750 imaging agent to detect expression of integrin avb3.
- FLIT and microCT were used in this study

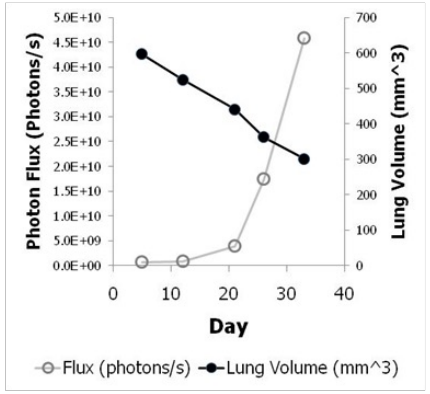


Composite functional and anatomical imaging obtained by using fluorescent and bioluminescent agents together gives a clearer context and understanding of the mechanisms of disease

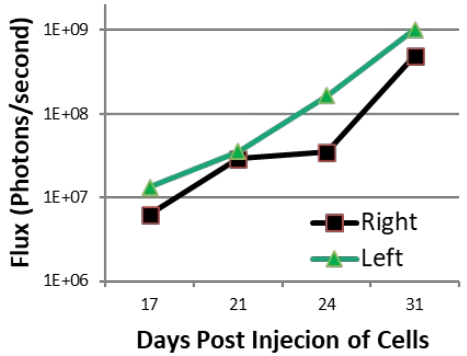
Co-Registration Oncology Apps







3D BLI Quantification of Metastases



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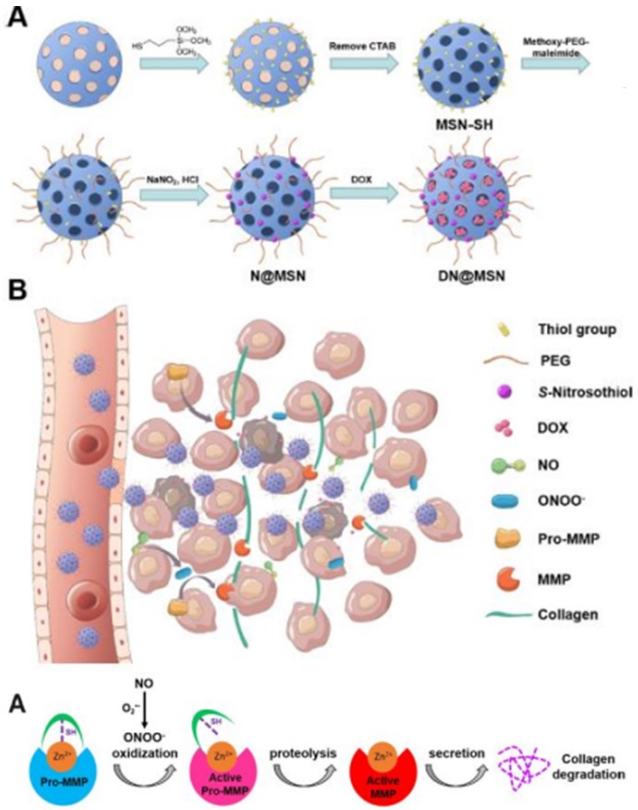
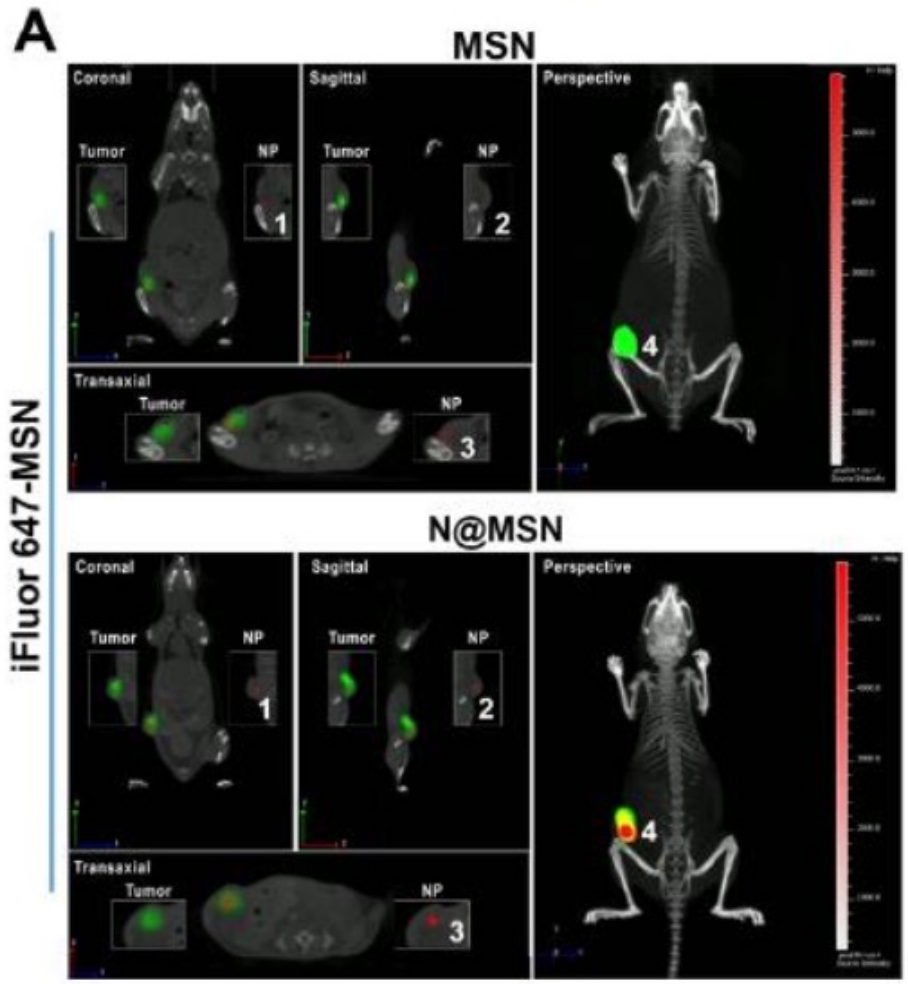
Near-infrared light-triggered nano-prodrug for cancer gas therapy





Top Ten Tips for Optical Imaging

1. Choose reporters that maximize signal-to-noise (S:N) ratio
2. Consider the appropriate control groups and imaging time points necessary
3. Use hairless mice or white-furred animals and depilate or shave
4. Switch to autofluorescence-free mouse diet
5. Closely map the kinetics of your biological bioluminescent model
6. Animal handling can significantly affect kinetics
7. Image in the animal orientation that yields the highest signal intensity
8. Cover intense signal to allow dimmer signals to dictate auto-exposure
9. Utilize guards to prevent reflection off neighboring animals
10. Use black well plates when doing in vitro experimentation

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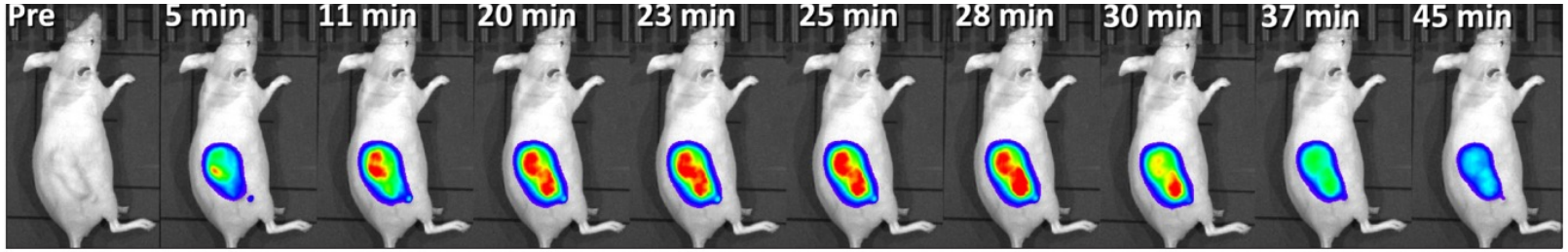
- Lyophilized D-Luciferin – offers the same sensitivity and high performance as the RediJect formulation.



慶祝 IVIS spectrum 2 裝機
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Thank you

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