

TECHNOLOGY OFFERS

Optical Tomographic (OT) Device for Combination with PET in Preclinical Imaging (P-655)

An optical imaging detector for fluorescence and bioluminescence in small animal imaging that is compatible with PET.

EXECUTIVE SUMMARY

DKFZ has developed an optical imaging detector for fluorescence and bioluminescence in small animal imaging that is compatible with positron electron tomography (PET).

The instrument has been evaluated regarding its optical performance, including radiation durability, using various phantoms and measurement setups, and was successfully used in a number of preclinical studies such as simultaneous positron (^{18}F FDG, ^{68}Ga -RGD) - bioluminescence (PC-3- hVEGF-Luc) imaging of reporter gene expression and receptor targeting in mice or simultaneous imaging of fluorescent XenoLight-RediJect-2-DG750 and radio-labeled FDG probes.



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Category

Devices

Indication

Development stage

Prototype

Seeking

Licensing, Development partner

BENEFITS

- Micro-lens array with a plurality of micro-lenses
- Detector: CMOS sensor with high sensitivity
- Combination PET-OT
- Multimodal imaging generating images simultaneously in DICOM standard
- No necessity for contact between detector and object
- Thin CMOS detector (option for small device)

TECHNOLOGY BACKGROUND

Optical techniques, such as bioluminescence and fluorescence, are emerging as powerful new modalities for molecular imaging in disease and therapy. Combining innovative molecular biology and chemistry, researchers have developed optical methods for imaging a variety of cellular and molecular processes in vivo, including protein interactions, protein degradation, and protease activity.

DEVELOPMENT STAGE

A prototype for Optical Tomography (OT) has been developed, established and tested successfully in animal studies in combination with a PET system.

APPLICATIONS

The system of an optical imaging detector for fluorescence can be distributed for the combined use with established PET-devices to academic institutions, but also biotech, pharma and CRO companies for preclinical development.

INTELLECTUAL PROPERTY

The patent family "Dual-Modality Imaging" with the international PCT application (WO2006111485A2) has been validated in US7786443B2, JP5319276B2, EP1715361B1, CA2665980C – all granted

PUBLICATIONS & REFERENCES

- "Iterative reconstruction of projection images from a microlens-based optical detector." By Cao L, Peter J. published in Opt Express. 2011 Jun 20;19(13):11932-43. doi: 10.1364/OE.19.011932. PMID: 21716427
- "Geometrical co-calibration of a tomographic optical system with CT for intrinsically co-registered imaging." By Cao L, Breithaupt M, Peter J. published in Phys Med Biol. 2010 Mar 21;55(6):1591-606. Epub 2010 Feb 17. PMID: 20164534
- "Image formation with a microlens-based optical detector: a three-dimensional mapping approach." By Unholtz D, Semmler W, Dössel O, Peter J. published in Appl Opt. 2009 Apr 1;48(10):D273-9. PMID: 19340119
- "A novel optical tomographic instrument for multimodal imaging application in mice" in J. Nucl. Med. 2011; 52 (Supplement 1):1958; by Joerg Peter and Liji Cao; Medical Physics in Radiology, German Cancer Research Center, Heidelberg, Germany; Abstract No. 1958

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ABOUT THE DKFZ Innovation Management

Working at the interface of research and industry, the Innovation Management of the German Cancer Research Center (DKFZ) helps to get new cancer drug candidates, diagnostic tests, and research instruments onto the market as quickly as possible.

The DKFZ with its more than 3,000 employees is the largest biomedical research institution in Germany. At the Center more than 1,300 scientists investigate how cancer develops, identify cancer risk factors and endeavor to find new strategies to prevent people from getting cancer. They develop novel approaches to make tumor diagnosis more precise and treatment of cancer patients more successful. DKFZ is a member of the Helmholtz Association of National Research Centers, with ninety percent of its funding coming from the German Federal Ministry of Education and Research and the remaining ten percent from the State of Baden-Württemberg.