PhotoSound®

Life Science Imaging in High Definition

Cancer Detection and Monitoring with the TriTom™

Photoacoustic imaging has become a popular tool in preclinical cancer research as a noninvasive technique for monitoring tumor growth and therapeutic response. Specifically, photoacoustic imaging can provide high-sensitivity images of both superficial and deep vasculature and quantitative assessment of blood oxygen saturation without exogenous contrast. The TriTom small animal imaging platform provides high-resolution photoacoustic tomography (PAT) images, enabling whole-body *in vivo* anatomical, functional, and molecular analysis for longitudinal cancer studies.

SYSTEM SPECIFICATIONS

Imaging System	TriTom™
Excitation Wavelengths	460 - 1300nm
Spatial Resolution	Up to 160 µm (PA) Up to 70 µm (FL)
Acquisition Time	36 s per scan

Monitoring Microvascular Development

The microvascular network of a tumor not only regulates the supply of nutrients that contribute to growth and metastasis but influences the response to anticancer therapies. Preclinical studies of tumor growth and neovasculature development are, therefore, critical to fundamental cancer research and therapeutic development. The TriTom is a 3D imaging platform that can resolve the complex and size-varying blood vessels supplying the tumor and quantify the local density of microvessels. Further, the TriTom's superior spatial resolution in all three anatomical planes allows for visualization and monitoring of the microvascular network from any angle. This unique advantage enables longitudinal monitoring of tumor vasculature development and evaluation of therapies targeting cancer blood supply.

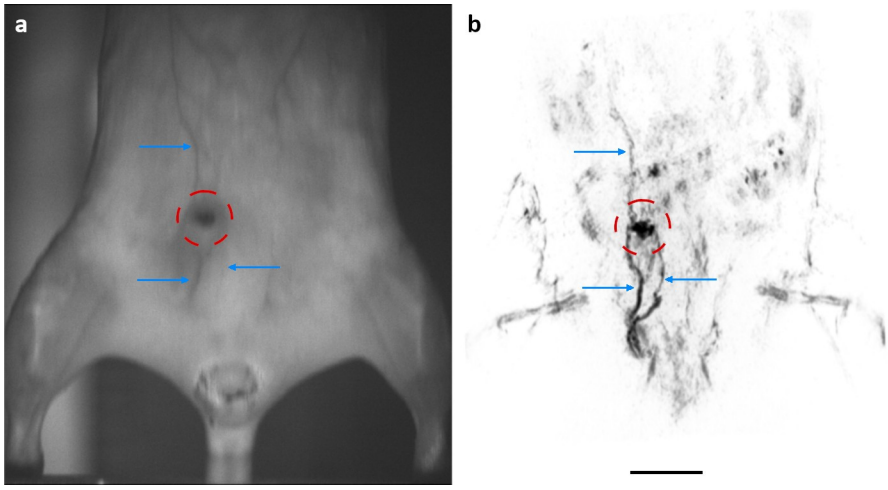

Figure 1: (a) TriTom observation of a tumor-bearing hairless mouse model and (b) corresponding MIP coronal slab constructed from TriTom data acquired with 700 and 1064 nm laser excitation. The high-resolution image shows the local tumor environment (red ROI) and supplying vascular structures (blue arrows). Scale bar = 5 mm.

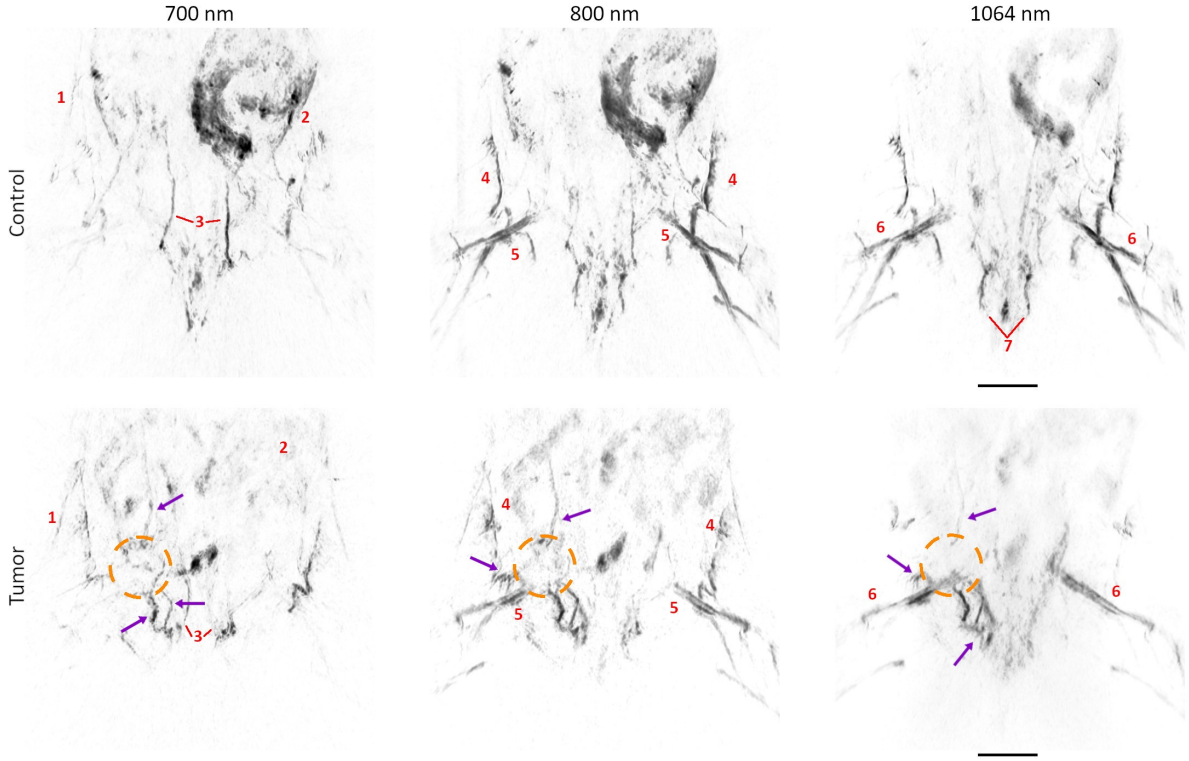

Figure 2: MIP coronal slabs encompassing anterior structures up to 10 mm deep in healthy (top) and tumor-bearing (bottom) mice. The reconstructed TriTom volumes show the high-resolution vascular anatomy maps produced by the TriTom without exogenous contrast agents. Additionally, the superior resolution in all three anatomical planes enables *in vivo* monitoring of tumor (orange ROI) growth and microvascular development (purple arrows). 1. Superficial lateral vein, 2. Intestines, 3. Superficial abdominal arteries, 4. Deep circumflex iliac artery, 5. Common iliac artery, 6. External iliac artery, 7. Lateral caudal vein. Scale bar = 5mm.

Tumor Growth Monitoring

Accurate noninvasive measurements of tumor size and morphology are crucial to evaluating the effects of novel therapies. However, current modalities provide an incomplete picture of the tumor environment due to poor spatial resolution and limited imaging depth. The TriTom is a high-resolution 3D imaging technology with superior molecular sensitivity in deep tissue. As a result, the TriTom images provide a detailed view of the tumor morphology and enable accurate longitudinal assessment of tumor growth. These key features make the TriTom a powerful tool for monitoring tumor growth, metastasis, and therapeutic response in preclinical cancer research.

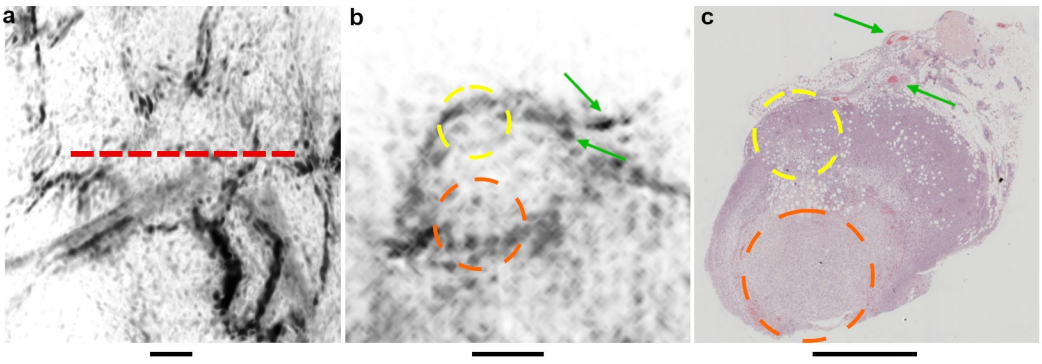

Figure 3: *in vivo* evaluation of tumor growth. (a) High-resolution MIP of the 700 nm and 1064 nm TriTom volumes showing the tumor and its immediate environment. (b) Axial cross-section of the tumor noted by the dashed line in (a). This region corresponds to the H&E-stained tumor section (c) with corresponding structures (orange and yellow ROIs) and tumor microvasculature (arrows) identified and readily available for quantitative measurements. Scale bar = 1 mm.

東京インスツルメンツ
TOKYO INSTRUMENTS
グローバルにネットワークを広げ、最先端の科学をお客様に提供

本　社：〒134-0088 東京都江戸川区西葛西6-18-14 T.I.ビル　Tel. 03-3686-4711
営業所：〒532-0003 大阪府大阪市淀川区宮原4-1-46 新大阪北ビル　Tel. 06-6393-7411
URL：https://www.tokyoinst.co.jp　Mail：sales@tokyoinst.co.jp