Peira

Scientific Instruments

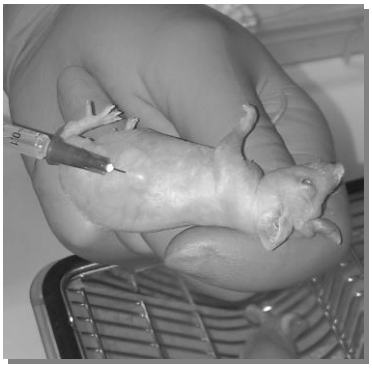
Peira TM900: A novel device for 3D measurements of xenografts in mice

RATIONALE

Measurement of tumor size is important in preclinical animal studies, when assessing responses to cancer treatment. Sequential measurements of tumor volume with a non-invasive method are essential. The current standard technique for volume determination of subcutaneously xenografted tumors is measuring the length and width of the tumor with a caliper. However, caliper measurements are prone to error due to e.g. variability in tumor shape, skin thickness, observer subjectivity and compressibility of the tumor. An alternative for caliper measurements is Peira's TM 900

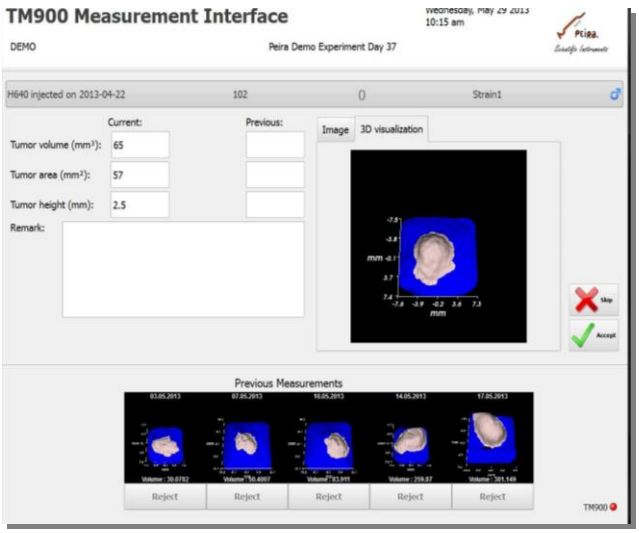
Peira's TM900 is an innovative, non-invasive, accurate and easy to use handheld device for measuring tumor volume in subcutaneous mouse xenografts in vivo

PRINCIPLE



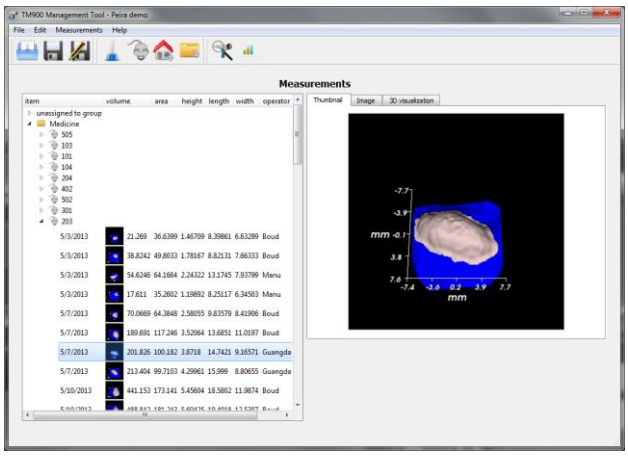
Mice are injected in the flank(s) with tumor cells. The tumor volume is measured over time by positioning the nozzle of the device over the tumor area and pressing a button. The TM900 acquires 3D images of the topography of the tumor based on *stereo vision*; a structured light pattern is projected on the surface. The deformation of the pattern is used to calculate the topography and subsequently, the volume of the tumor. Differently sized nozzles are foreseen to allow measurements of a wide range of tumors.

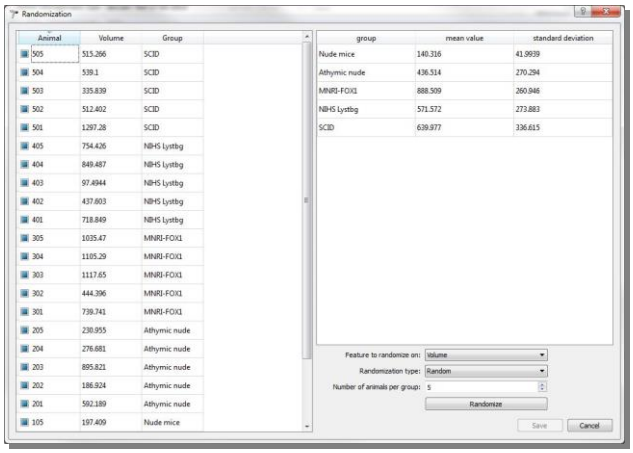
TM900: A COMPLETE PLATFORM

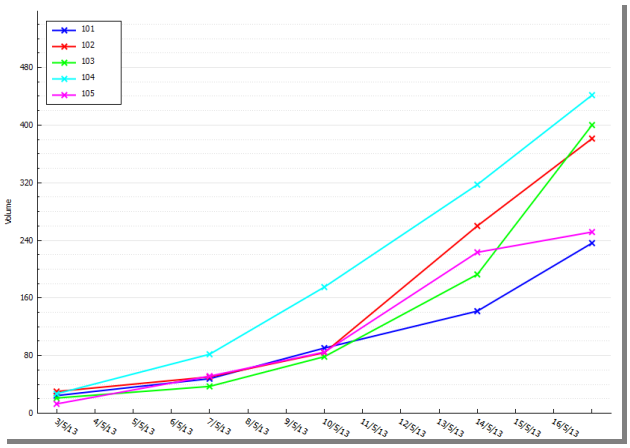


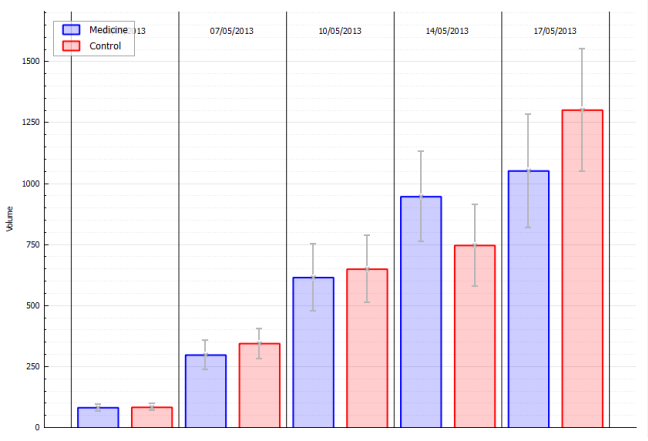
TM900 is a complete platform; besides the handheld device, the TM900 comes with a touch screen laptop PC with the measurement software. The *measurement software* allows visualizing the tumor topography and the analyzed surface. Important tumor features such as height, width, depth and volume are automatically calculated. Previous measurements of the animals are shown on the screen to allow instantaneous follow-up of the tumor volume over time. The software interface also allows coupling with other hardware such as balances, RFID scanners, ... to allow for complementary measurements. An export function is foreseen to export the data to the management software for further analysis.

The *management software* allows for a complete data management of your data; you can define experiments, assign animals to groups (randomization), visualize and reanalyze the tumors and make plots of the data. Export to e.g. excel is foreseen.









WHY THE TM900?

- *Visualization in 3D* of the tumor topography. This allows for visual inspection of the tumor shape and morphology over time and flagging of the necrotic or inflamed tumors
- *Data integrity and traceability.* The software allows for storage, analysis, visualization and management of the data, which is essential for robust data follow-up and QA-requirements
- *Validation.* High resolution 3D images are acquired, allowing precise volume estimations and validation of the measured surface. Especially oddly shaped or thin tumors benefit from TM900 volume estimations.

SPECIFICATIONS

- Measurement range (X – Y): 25mm – 25mm (optional 30mm – 30mm)
- Maximum tumor size (L x W x H): 20mm x 20mm x 20mm (optional 25x25x20)
- Accuracy per measured 3D point: < 0.3 mm
- Stereo capture time: ~0.1 s
- Device <-> touchscreen laptop PC interface: USB 3.0
- Camera: 1600 x 1200 pixels (2 MP)
- Projector: 300 x 300 pixels, 532 nm (green for optimal contrast)
- Camera/projector working distance: 50 mm
- 3D algorithm calculation: < 2sec (depending on processor used)

SYSTEM REQUIREMENTS

TouchScreen laptop PC

- Intel® Core™ i7 or better processor, min. speed 2.6Ghz
- 8GB of RAM and 256MB of available disk space for program installation
- Minimum monitor resolution of 2560x1440, 1920x1080 or 1280x1024
- Min. 2 USB ports available for the TM900 and USB flash drive, optionally extra ports for balance, RFID reader,...
- Operating system Windows 10 pro 64-bit

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