Xstrahl

SARRP Research Platform

Specialist solutions for preclinical and radiation biology researchers

Xstrahl has applied its extensive medical X-ray knowledge in collaboration with internationally renowned researchers to develop the SARRP research platform.

Enables Image Guided Micro-Irradiation (IGMI™) techniques

Commercially available, the SARRP platform enables state-of-the-art Image Guided Micro-Irradiation (IGMI) techniques to be performed on *in vivo* models. This allows researchers to replicate the radiotherapy process of imaging, target localization and treatment delivery. This portable and customizable platform incorporates high resolution CT imaging with precise radiation delivery to enable researchers to pinpoint and confidently deliver 0.5mm beams to an exact anatomical target. SARRP enables non coplanar radiation exposures to be delivered, eliminating the need to reposition the *in vivo* model between each exposure. The SARRP planning module facilitates the design of high-precision irradiation experiments. Advanced preclinical as well as basic and translational radiation biology research is being facilitated by the SARRP platform.

Image Guided Micro-Irradiation

The SARRP platform typically enables imaging, target identification and radiation exposure to be defined and delivered within twenty minutes for a single isocenter.

Specimen set-up and QA

The specimen immobilisation devices are CT and MRI compatible and can be used for both imaging and irradiation purposes. The laser system enables visual confirmation of the initial position whilst the CCD camera system enables the specimen to be monitored during image acquisition and irradiation exposures. The platform's open structure allows the specimen and ancillary equipment to be easily positioned without compromising the radiation field set-up.

Image acquisition and reconstruction

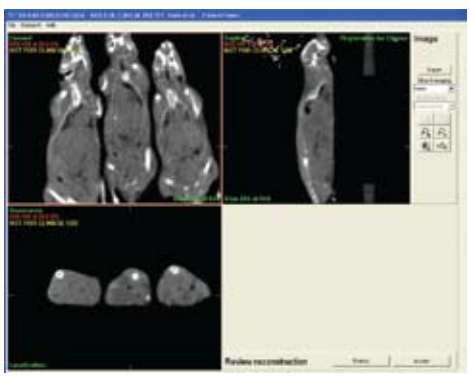
The CT image is acquired by rotating the specimen on the robotic stage. The cone beam CT resolution is 0.25 – 0.5mm voxels, with a 10 x 10cm field of view at the geometrical isocenter. The CT data can be viewed and manipulated in three planes, sagittal, coronal and transverse, allowing easy and accurate target identification.

While MRI compatible immobilisation devices allow straightforward import of image data sets for image fusion within SARRP.

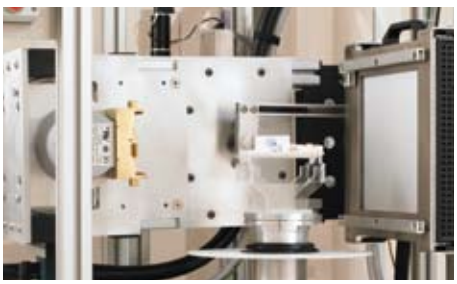
For image reconstruction the target position from the CT data set is automatically translated into X,Y,Z coordinates for the robotic stage and at the touch of a button the target and isocenter alignment is achieved.

SARRP system features:

- Isocenter accuracy to 0.25mm
- On board cone beam CT and image reconstruction
- Minimum field size of 0.5mm diameter
- Gantry and robotic specimen stage enable non-coplanar field arrangements



SARRP Research Platform

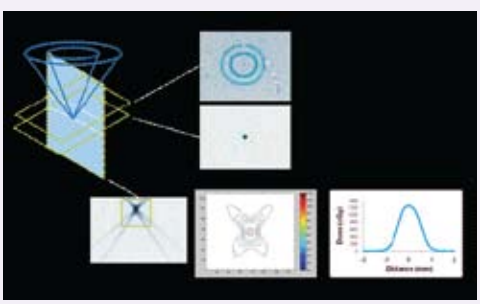


Conformal radiation delivery

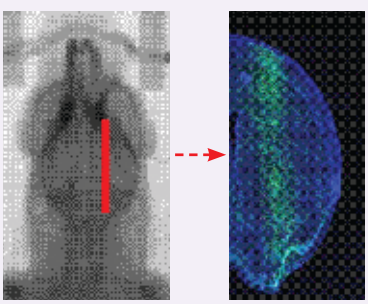
The SARRP platform has the highest degree of geometric accuracy, 0.25mmabout the isocenter, which is unrivalled inthe research setting. The beam collimators range in field size from 0.5mm diameter up to 6cm square, with dose rates of up to 350cGy/min at 35cm FSD. Single 0.5mm beams or multiple beams can be delivered, while robotic calibration procedures verify the isocentric accuracy.

Applications:

- Radiobiology effectiveness
- Preclinical studies
- Bystander effects
- Radiosensitizers
- Oncology research:
  - Preclinical validation of radiotherapy – assessing the risks of radiation exposure are balanced against the efficacy of the treatment in controlling and eliminating tumors
  - Characterize tumors that may not respond to ionizing radiation
  - DNA damage response
  - Spatially targeted radiotherapy can be performed in parallel with molecularly targeted therapies to optimize treatments for solid tumors
  - Tumor biology and the micro-environment
  - Mechanism of tumor control
- Normal tissue complication probability



SARRP enables conformal radiation techniques and dose distributions to be reproduced in the research laboratory. The SARRP platform's specification and manufacturing process is completely applications focused as Xstrahl understands its customers' research and works with them to adapt the platform technology to support their objectives and deliver results. Furthermore the platform can readily adapt and develop to meet the researchers' next stage of scientific advancement.



γ-H2AX DNA damage

SARRP Research Platform Advantages:

- Provides state-of-the-art 3-D volumetric image guidance for localization and targeting
- Conformal dose minimizes exposure to non-targeted tissues and organs
- Easy to use, reliable, and reproducible
- Customizable to meet new and innovative applications
- High resolution, low imaging dose, on board CT imaging and 3D reconstruction
- Image fusion options for easy target localization and conformal avoidance of organs at risk
- High precision beam geometry to achieve conformal dose distributions
- Open platform to enable the addition of other imaging modalities for future research

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