

Australian MRI-Linac

A unique integration of radiotherapy with realtime MRI-based image guidance that allows cancer and normal tissues to be seen directly during radiotherapy for the first time. Approximately 50% of cancer patients will benefit from such a system that will improve survival, prevent recurrence or relieve the symptoms of their cancer.

Competitive advantage

- One of only four engineering approaches in the world to this problem
- The Australian MRI-Linac is a unique 'in-line' system with the magnetic field parallel to the radiation beam. This results in different radiation dosimetry properties to perpendicular systems

Impact

- Early international studies suggest the real-time combination of image guidance and radiotherapy results in better survival for poor-outcome cancers
- The physiologic imaging capabilities of the MRI enable a virtual whole-tumour biopsy prior to and during each treatment, enabling real-time adaptive physiological targeting as a unique way to treat cancer

Successful outcomes

- First human images were obtained in March 2017
- First live MRI-Linac treatment in the southern hemisphere was performed using a rat brain tumour model In January 2019
- Planning for human studies underway

Capabilities and facilities

- The prototype magnet is a 1 Tesla split system designed to let the high energy X-ray beam travel through an open bore parallel to the magnetic field
- The research program is embedded into Liverpool Hospital and involves collaboration between numerous universities and scientific organisations
- Team history of scientific and technological advances in MRI and radiotherapy physics and engineering, as well as the clinical practice of MRI-Linac cancer radiotherapy
- Team record of research translation resulting in improvements in hardware, workflow, patient outcomes and policy

Our partners

• The research program is embedded into the Ingham Institute working with Liverpool Hospital and involves collaboration between numerous universities and scientific organisations.

More Information

Associate Professor Gary Liney

Faculty of Medicine

T: +61 2 8738 9221 E: gary.liney@health.nsw.gov.au

UNSW Knowledge Exchange knowledge.exchange@unsw.edu.au www.capabilities.unsw.edu.au +61(2) 9385 5008