



## MEDIA RELEASE

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### New medical imaging promises improved epilepsy care

For three per cent of Australians with epilepsy, early results in a clinical research study of a new nuclear medicine imaging agent,  $^{18}\text{F}$  labelled Flumazenil ( $^{18}\text{FMZ}$ ) for Positron Emission Tomography (PET) imaging, promises better treatment by more accurately pinpointing the area of seizure in the brain. This was discussed today (10am) at the ANZ Nuclear Medicine conference in Sydney, Australia.

The study is being conducted by the University of Melbourne/Royal Melbourne Hospital with contributions from the CRC for Biomedical Imaging Development Ltd (CRCBID)\* which includes the Australian Nuclear Science and Technology Organisation (ANSTO) and Peter MacCallum Cancer Centre, which worked together to prepare  $^{18}\text{FMZ}$ ; and commercial radiopharmaceutical supplier Cyclotek, which could eventually market and supply the product.

Dr Rob Ware, CRCBID's Clinical Director, said using  $^{18}\text{FMZ}$  in PET imaging appears to provide additional information to current methods such as Magnetic Resonance Imaging (MRI), by accurately identifying the seizure focus in a significant number of patients.

"By being able to exactly see where the seizure point is, doctors can more accurately prescribe and monitor treatment or recommend surgery, ultimately improving the lives of patients, who often have significant medical psychological and economic difficulties as a result of their disorder," he said.

"Currently one third of epilepsy patients cannot be adequately controlled with medications, or the drugs lead to unacceptable side effects," explained Dr Ware. "In addition, although neurological surgery can be a very effective treatment for these medication-resistant patients, surgery can only be applied in a small proportion because of problems localising the source of the seizure. The radiopharmaceutical  $^{18}\text{FMZ}$  may help to solve this issue.

"The current situation is that MRI cannot identify the seizure focus in a significant number of patients.  $^{18}\text{FDG}$  PET is helpful in many of these MRI negative patients but it often shows a relatively wide area of abnormality. This area does not need to be totally surgically removed for effective seizure control and FDG PET scan abnormalities can be very subtle, complicating image analysis," said Dr Ware.

ANSTO Radiopharmaceutical Research Institute's Head and conference presenter, Dr Ron Weiner, explained that for many years strong evidence has shown that seizure foci can be accurately localised by PET scans using FMZ, even when these patients had inconclusive MRI and  $^{18}\text{FDG}$  PET findings.

"To date however, FMZ PET studies have used the radioactive tracer  $^{11}\text{C}$ -FMZ but radioactive carbon ( $^{11}\text{C}$ ), used to synthesize this PET radiotracer has only a 20 minute half life. Therefore, it is radioactive for a very short period time and can not be transported," he said. "This practical limitation confined  $^{11}\text{C}$ -FMZ PET scanning for epilepsy patients to the few research centres that have sophisticated radiotracer synthetic capabilities plus an onsite cyclotron for supply of  $^{11}\text{C}$ .

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“The challenge for ANSTO and our other CRC colleagues at Peter MacCallum Cancer Centre was to replace the fluorine atom in this molecule with an atom of radioactive <sup>18</sup>Fluorine. Once achieved it could then be optimized and the synthesis of <sup>18</sup>FMZ can be automated,” Dr Weiner said.

Members of the CRCBID team recently published PET imaging study demonstrated that <sup>18</sup>FMZ has high level of receptor specific uptake in a rodent epilepsy model. This work was vital to establish that <sup>18</sup>FMZ is highly effective at targeting the brain receptor of clinical interest, as previous human trials have demonstrated the effectiveness of <sup>11</sup>C-FMZ at localizing seizure foci. As <sup>11</sup>C-FMZ loses half its radioactivity every 20 minutes, this form of FMZ is only suitable for investigating epilepsy patients in a very small number of research centres.

As <sup>18</sup>FMZ has a radioactive half life of 109 minutes widespread clinical application of this agent in the care of epilepsy patients is feasible, if as expected, the previous benefits of PET scanning using <sup>11</sup>C-FMZ are replicated using <sup>18</sup>FMZ.

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**For media inquiries and to arrange interviews please contact Sharon Kelly on 0400 394 085 or (02) 9717 9575 or CRCBID Clinical Director Dr Rob Ware on (03) 9467 6277 or 0409 228 012**

\* CRC BID aims to develop and commercialise new radiotracers for clinical use to pinpoint disease to ultimately improve treatment and patient care. The CRC is founded on a collaborative arrangement between research and industry participants, established and supported under the Australian Government's Cooperative Research Centres Programme. The participants include the Australian Nuclear Science and Technology Organisation (ANSTO), The Peter MacCallum Cancer Centre, The Garvan Institute of Medical Research, Monash University, Cyclotek, GE Healthcare and Berthold.