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Australian Nuclear Science and Technology Organisation

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ANSTO to develop window into Alzheimer's and Parkinson's with the support of Bayer Schering Pharma AG

A medical breakthrough by researchers from the Australian Nuclear Science and Technology Organisation (ANSTO) is backed in a bid to commercialise a way to image and manage patients with Alzheimer's and Parkinson's disease by the pharmaceutical company Bayer Schering Pharma.

Human trials are set to begin in the United States on the new imaging technique involving the development of F-18 (Positron Emission Tomography [PET] isotope) PBR ligands for clinical applications.

The agreement with Bayer Schering Pharma stems from research performed by ANSTO scientists, Dr Andrew Katsifis and Ms Filomena Mattner who have generated a selective and specific Single Photon Emission Computed Tomography [SPECT] radioligand for the Peripheral Benzodiazepine Receptor (PBR); ¹²³I-CLINDE.

Collaborative research programs with the French Atomic Energy Commission – (Commissariat à l'énergie atomique) and the University of Tours, demonstrated the effectiveness of ANSTO's PBR compounds in animal models of neurological diseases. At the same time, compounds incorporating an F-18 atom that can be used as PET imaging agents were prepared and intellectual property on these PET imaging agents was filed.

ANSTO's Dr Ron Weiner says this Australian-grown research could prove to be a major step towards improving the diagnostic capabilities for a range of important conditions that are understood to be related to neuroinflammation.

"The diagnosis of neuroinflammation is believed to have the potential to monitor disease activity but we also believe it may be a crucial tool for researchers seeking to find treatments and cures. This technique would allow simple monitoring of therapeutic response," Dr Weiner said. There are currently more than 70,000 Australians and one million people in the United States suffering from Parkinson's disease, while 245,000 Australians and 5.3 million Americans are estimated to suffer from dementia.

ANSTO CEO, Dr Adi Paterson said it is understood to be rare for agreements like this to be made between government research organisations and pharmaceutical companies.

"It demonstrates that ANSTO research programs are at the forefront of innovative medical research initiatives with the potential to deliver real benefits to millions of people. This agreement is a credit to the researchers as well as those who have fostered the links that have led to this arrangement with Bayer," Dr Paterson said.

Notes for editors follows.

For media information please call ANSTO Communications Manager, Nadia Levin (02) 9717 9208 or 0457 505 438.

Notes for editors – the research that led to the ANSTO/Bayer Schering Pharma AG agreement

In the mid 1990s, scientists from ANSTO, Dr Andrew Katsifis and Ms Filomena Mattner worked on a project aimed to design and synthesise novel radiotracers for imaging the Peripheral Benzodiazepine Receptor (PBR).

Radiotracers are radioactive substances that allow easier detection and measurement of activities in the body.

The rationale of the ANSTO researchers was that tracers which can image these receptors might be more effective in delineating disease origins and establishing relationships between changes in receptor density and the origin of disease.

Data from the literature suggested that the PBR, was increasingly relevant in a number of diseases involving neuro-degeneration. Their hypothesis was that radiopharmaceuticals and drugs based on ligands (molecules that bind to this receptor) may have value in imaging a variety of diseases and disorders as well as in their potential treatment.

The unique advantage of the PBR was that it was present at a low level in a normal brain but the receptor density was substantially increased in neuroinflammation, a hallmark of many neurodegenerative diseases.

The investigators quickly realised the potential of developing Iodine-123 (Single Photon Emission Computed Tomography [SPECT] isotope) and F-18 (Positron Emission Tomography [PET] isotope) PBR ligands for clinical applications. SPECT and PET are sophisticated imaging techniques used in nuclear medicine that use gamma rays in different ways to produce 3D images.

In 1998, Dr Katsifis and Dr Mattner demonstrated the first selective and specific SPECT radioligand for the PBR; ¹²³I-CLINDE and a patent was filed.

By this stage they and others began to confirm that the PBR played a critical role in a wide range of diseases.

Studies suggested changes in PBR signal in multiple sclerosis, stroke, dementias, and gliomas (a form of tumour that starts in the brain or spine, respectively). At a conference in 2005, a collaboration was established between investigators from Yale University (they subsequently formed a small company) to undertake primate and clinical studies with ¹²³I-CLINDE. The most recent result suggests that ¹²³I-CLINDE has the potential to image Parkinson's disease patients but the ligand needs modifications to improve its metabolic stability and reduce brain background noise.

Interest and demand for ANSTO's PBR tracers triggered collaborative research programs developed with a government research organisation in France – the CEA - and the University of Tours. This collaboration demonstrated the effectiveness of ANSTO's PBR compounds in animal models of neurological diseases.

At the same time, compounds were prepared incorporating an F-18 atom. This atom allows PET imaging, a newer technology with higher resolution than SPECT. Then intellectual property on these PET imaging agents was filed.

The promising results generated at ANSTO stimulated interest in their PBR PET imaging agents from both academic and industrial groups, culminating in the current agreement with Bayer Schering Pharma AG. A pilot study in the US with ANSTO's PET ligand in Alzheimer's patients is intended to commence in 2010.

Both Bayer Schering Pharma and other companies are using PET compounds in advanced clinical trials, which target another hallmark of Alzheimer's disease, β -amyloid brain deposits. Targeting the PBR is a different approach. Because the PBR is increased in neuroinflammation which is associated with diseases like Alzheimer and Parkinson, PET Imaging of the PBR might provide valuable insights on the inflammatory component of these diseases. This can help for the diagnosis and for the development of new therapeutic approaches.

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