

## **PRESS RELEASE**

### **Six million Alzheimer patients in Europe: Nuclear medicine enables early diagnosis**

#### **EANM: Molecular imaging of the brain is continuously gaining importance**

(Vienna, 14 December 2010) Cross sectional imaging techniques in nuclear medicine like PET (positron emission tomography) and SPECT (single photon emission computed tomography) enable brain diseases such as Alzheimer's and Parkinson's disease to be diagnosed at an early stage. "In patients whose hereditary factors for example put them at a high risk of developing these diseases, first signs may be detected with nuclear medicine techniques even before clinically relevant symptoms appear," explains Prof. Dr. Klaus Tatsch from the European Association of Nuclear Medicine (EANM). On major advantage of early diagnosis is that new, putative neuroprotective drugs, whose purpose is to delay disease progression, can already be used in the initial disease stages.

It is often not possible to exactly classify diseases of the brain by the use of conventional diagnostic methods. Biopsies may be risky and CT and MRI are mainly focused to show changes in structures. "Nuclear medicine techniques are of particular value because they allow to depict metabolic changes or specific alterations of various neurotransmitter systems which occur in many diseases of the central nervous system (CNS)," explains EANM expert Prof. Tatsch from Karlsruhe, Germany. According to Tatsch, great strides have been achieved in the technological development of these methods, which now enable analyses to be made at the molecular level. "This type of molecular imaging of the CNS using nuclear medicine techniques is continuously gaining importance in clinical practice and offers enormous possibilities for future applications."

#### **Dementia: similarity of symptoms makes the differential diagnosis difficult**

The new methods are especially important in dementias such as Alzheimer's disease. About six million people throughout Europe suffer from it, a figure which is continuously increasing. However, a certain distinction between the various neurodegenerative and other types of dementia can only be made after the patient's death by analyses of the brain tissue. During lifetime, information obtained from the patients and their relatives is equally important in establishing the diagnosis as the evaluation of clinical symptoms by experienced doctors. "Differential diagnosis, however, may be extremely difficult due to the overlap of many clinical symptoms. Often it is not possible to clearly distinguish between different diseases such as frontotemporal dementias and Alzheimer's dementia, especially in the early stages," says Prof. Tatsch. It is equally difficult to predict whether mild cognitive impairment will subsequently proceed to a manifest neurodegenerative dementia. However, this is of major importance for drug therapy, which might have the greatest prospects of success in the early stages.

Nuclear medicine examinations with PET or SPECT add important information in the process of establishing a correct diagnosis. These special imaging techniques visualise metabolic processes in the brain in a unique way and can therefore determine at an early stage whether, for example, a pathological accumulation of amyloid plaques – the main cause of Alzheimer’s disease – has occurred. Imaging is based on the use of radioactive molecular markers which are injected into the patient prior to the examination. Thus, PET and SPECT images deliver patterns which are considered typical of the respective diseases, and show, for example, in which regions of the brain glucose metabolism is impaired or amyloid plaques have accumulated.

### **Parkinson’s disease: nuclear medicine may establish whether drug therapy is working**

“Patients with movement disorders such as Parkinson’s disease increasingly benefit from the possibilities of CNS imaging,” explains the EANM expert. PET and SPECT easily allow to assess whether the dopaminergic system is involved in a movement disorder or not. Dopamine is a neurotransmitter which plays an important role in the central control of movements. A shortage of dopamine is indicative for an entity of diseases characterized by a progressive death of dopamine producing cells. The most important representative of these so-called neurodegenerative Parkinsonian syndromes is Parkinson’s disease. Nuclear medicine techniques can reliably image the loss of dopamine producing cells, allow to differentiate between the different types of neurodegenerative Parkinsonian syndromes and distinguish these entities from others mimicking Parkinsonism. This knowledge is important because the respective diseases have to be treated in different ways and often have a completely different prognosis. Prof. Tatsch: “Nowadays, the impact of nuclear medicine techniques clearly extends beyond merely making a diagnosis. Today it is not only possible to decide in general whether drug therapy in Parkinsonian patients will be helpful for alleviating their symptoms, but also whether these drugs may delay the progression of the nerve cell loss.”

### **Tracking molecular signal pathways with PET examinations**

The number of different molecular signal pathways that can be tracked with PET examinations and the information they provide about the type and progression of CNS diseases is growing constantly. EANM expert Prof. Tatsch: “Nuclear medicine techniques play already a vital role in characterizing metabolic diseases of the brain and the CNS. In addition, many new approaches currently evaluated in clinical trials give rise to great hopes.”

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