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Karl Herholz, J Nucl Med Radiat Ther 2016, 7:4(Suppl)
http://dx.doi.org/10.4172/2155-9619.C1.005

International Conference on

Nuclear Medicine & Radiation Therapy

July 14-15, 2016 Cologne, Germany

Planning and monitoring brain tumor therapy by positron emission tomography (PET)

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Modern brain tumor imaging mainly relies on MR, while PET can provide additional information for grading, therapy planning and assessment of response to therapy. PET is most informative when used jointly with MR by image registration and fusion display. 18F-FDG does not provide good contrast from normal brain, but can predict prognosis and differentiate cerebral lymphoma from non-malignant lesions. Amino acid tracers including 11C-methionine, 18F-fluoroethyltyrosine (FET) and 18F-fluoroDOPA provide high sensitivity, which is most useful for detecting recurrent or residual gliomas, including most low-grade gliomas. 18F-fluorothymidine (FLT) is a proliferation marker with potential for tumor grading and monitoring of therapy, but it can only be used in tumors with absent or broken blood–brain barrier. Ligands for somatostatin receptors are of particular interest in pituitary adenomas and meningiomas. Tracers to image expression of specific cellular markers, neo-vascularization; hypoxia and phospholipid synthesis are under investigation for potential clinical use.

Biography

Karl Herholz is Professor in Clinical Neuroscience at the University of Manchester. He leads neuroscience research at the Wolfson Molecular Imaging Centre with particular research interest in positron emission tomography (PET). He is also Honorary Consultant at Salford Royal Hospital and the Nuclear Medicine Department, Central Manchester Foundation Trust. Before joining Manchester University he worked as a clinical neurologist and professor of neurology at University Hospital and the Max-Planck Institute for Neurological Research in Cologne, Germany. He has leading roles in several international multicentre PET studies. His research has been published in more than 400 research papers (ISI H-index 67) and several books.

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