Novel Positron Emission Tomography Probe

PCA: Nanomaterials

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[18F]FAC (1-(2'-deoxy-2'-[18F] fluoroarabinofuranosyl) cytosine) is a new Positron Emission Tomography (PET) probe that allows for visualization of thymus and spleen in mice and is sensitive to alterations in lymphoid mass and immune status. Studies in mice have shown that PET is useful to visualize immune responses and antitumor T cell responses. Other studies conducted in mice showed that [18F]FAC could be used to image murine models of leukemia, melanoma and glioma. [18F]FAC microPET also detected early changes in lymphoid mass in systemic autoimmunity and allowed evaluation of immunosuppressive therapy. These data support the use of [18F]FAC PET for immune monitoring and suggest a wide range of clinical applications in immune disorders and in certain types of cancer (*Radu et al., Nat. Med. 2008 Jul;14(7):783-8.*). The biodistribution of D-FAC and L-FAC have been determined in eight healthy volunteers. Recruitment of patients with autoimmune disorders as well as patients with lymphomas, pancreatic and ovarian cancers is underway.

[18F]D-FAC, [18F]L-FAC and [18F]L-FMAC are produced using a microfluidic platform developed by Caltech and UCLA investigators (*Lee et al, Science 2005 Dec; 310(5575):1793-6*). Several generations of microfluidic chemical reaction circuits (CRCs) have been developed and a prototype has been licensed to Siemens.
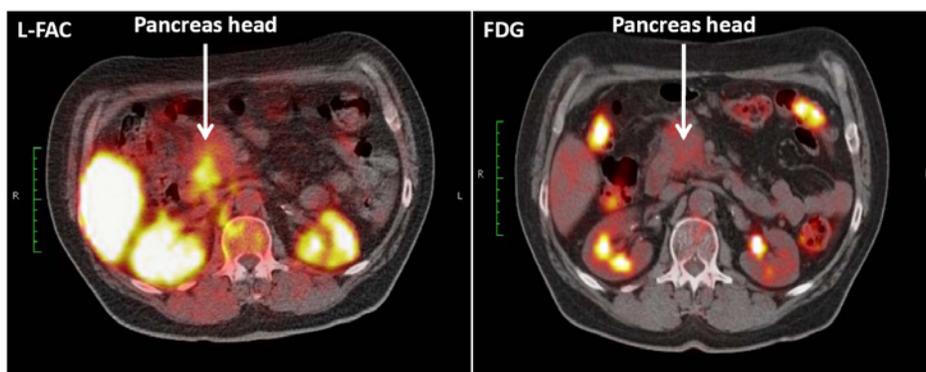
L-FAC and FDG PET/CT scan of 56 y.o. male with chronic pancreatitis confirmed by biopsy. Microscopic examination shows predominantly lymphocytic inflammatory infiltrates with associated degenerative small ducts.