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A YAP-CAMERA FOR MONITORING THE BIODISTRIBUTION OF RADIOTRACERS CONJUGATED WITH HYALURONIC ACID IN “IN VIVO “SYSTEMS

Thursday, 11 May 2006 14:00 (20 minutes)

The aim of the SCINTIRAD experiment is to determine the radio-response to ^{188}Re in various cells in vitro, the biodistribution of the radiopharmaceutical in different organs of mice in vivo, and subsequently the therapeutic effect on liver tumours induced in mice inoculated with M5076 murine fibrosarcoma cells. Both the gamma and beta emissions of ^{188}Re have been used in the experiment. The in-vivo biodistribution in mice is studied with a gamma camera using different parallel hole collimators. In the ^{188}Re spectrum, while the 155 keV gamma peak is useful for imaging, less intense photon lines emitted at larger energies (given their much larger penetration) and the beta particles emitted in the decay (given the secondary interactions they can generate everywhere in the FOV) act as noise from the point of view of the image reconstruction. Gamma cameras previously used to image biodistributions obtained with ^{99}Tc are therefore not optimized for use with ^{188}Re . A new setup of the gamma camera has been studied for ^{188}Re : 66x66 YAP:Ce crystals (0.6x0.6 mm², 5µm optical insulation between crystals, thickness 10 mm) guarantee a FOV of 40x40 mm²; a Hamamatsu R2486 PSPMT, 3 inch diameter, converts their light output into an electrical signal and allows reconstructing the spatial coordinates of the light spot; the direction of the incoming photon is selected by a Lead collimator with 1.5 mm diameter parallel hexagonal holes, 0.18 mm septa, and 40 mm thickness. Using the new setup, preliminary results have been obtained both with ^{99}Tc filled capillaries and ^{188}Re filled capillaries and small phantoms. The energy spectrum of the collected photons and some preliminary measurement of the spatial resolutions achievable with the two sources will be presented. In addition the first experiment of imaging with a mouse in vivo is planned well ahead the beginning of the conference and will be reported.

The preliminary results obtained so far suggest that radiopharmaceuticals containing ^{188}Re and HA may represent useful tools for the treatment and imaging of liver tumours.

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