FWHM with analog CF discrimination) is obtained with BGO-APD detectors. With LSO-like scintillators, <2 ns FWHM is easily achieved. Phoswich crystal identification is where advanced digital processing proves to be the most beneficial by fully exploiting all the features of crystal scintillation responses and outperforming analog methods with error rates < 0.5% with most crystal combinations. In conclusion, the overall performance of APD-based detectors can be significantly enhanced by digital signal processing methods.

No. 273

VALIDATION OF ULTRASONOGRAPHY TO EVALUATE MURINE ORTHOTOPIC ORAL CAVITY TUMORS

J. Pezold, E. L. Rosenthal, K. Zinn
University of Alabama at Birmingham, Birmingham, AL.

Background: The murine orthotopic oral cavity tumor model allows evaluation of tumor growth and invasion. Currently, serial measurements of tissue growth are difficult to obtain since invasive procedures or animal sacrifice is necessary to evaluate tumor size. High resolution ultrasound was evaluated as a non-invasive method to monitor tumor size *in vivo*.
Methods: Sixteen immunodeficient mice, age nine weeks, were injected transcervically with human squamous cell carcinoma cell line into the tongue, and tumor volume was assessed by high frequency ultrasound at 11 days. The animals were subsequently sacrificed and the tumors processed for histology. Tumor size was then calculated by caliper measurement in two dimensions.
Results: Tumor dimensions obtained using ultrasound were found to significantly correlate with histologic measurements (Spearmann coefficient 0.90, $p<0.0001$). Tumor dimensions on average were larger using ultrasound versus histologic measurements although this was not significantly different than zero (95% confidence interval -13.96 to 62.37 mm2).
Conclusions: High resolution ultrasound accurately measures tumor volume in the murine orthotopic oral cavity tumor model without sacrifice.

No. 274

FAST USER GUIDED SEGMENTATION AND QUANTIFICATION OF VOLUMES IN 3-D DATASETS

C. Pötzsch1, F. Hofheinz2, J. van den Hoff1
1Forschungszentrum Rossendorf, Dresden, GERMANY, 2ABX GmbH Radeberg, Radeberg, GERMANY.

Positron emission tomography (PET) studies typically contain several hundred tomographic images, which have to be analyzed to derive informations such as the volume of target structures (e.g. tumors). Available programs do not offer the necessary functionality because evaluation is limited to processing of individual tomographic images.
We present a newly developed tool for easy and fast evaluation of regions of interest in a volume orientated way. Examples of typical applications to microPET studies are presented.
To achieve that aim the following key functionality was defined and implemented:
For acceptance the tool should offer an easy and fast way of navigation through the 3-D volumes. For that purpose three views are available, an orthogonal view, a multiple plane view and a maximum intensity projection view.
Interesting regions are enclosed by user defined masks to exclude regions of high activity background.
A threshold guided automatic delineation of interesting structures as well as an automatic segmentation of the thresholded data is used to find the target structures. These detected volumes of interest are delineated in realtime in all available views (including, especially, the maximum projection view) with a separate colormap for visual control through the operator. For each detected region the volume and parameters characterizing the tracer accumulation (maximum, minimum, mean, standard deviation, etc.) are provided. For post processing and archiving an export (XML and ASCII) as well as printing of these statistical values is possible.

No. 275

RODENT PREPARATION, ANESTHESIA, AND VENTILATION DURING RESPIRATORY-GATED IMAGING AND IMAGING PROCEDURES REQUIRING BREATH HOLDS

R. E. Price
UT MD Anderson Cancer Center, Houston, TX.

Safe, reliable immobilization and support of rodents during imaging procedures is crucial in obtaining high quality anatomic and functional images in a timely manner. Little information is currently published regarding methods of providing animal support during imaging procedures. Each research group is typically required to develop their own methods. Here we describe procedures and equipment we have developed to support imaging procedures that require intubation of animals for respiratory-gated imaging or for breath holds during imaging procedures. We describe a quick, easy, reliable method for intubating rodents along with custom designed software and equipment for controlling the breathing cycle during respiratory gated imaging or providing consistent breath holds during imaging procedures.

No. 276

EFFECT OF INTRACELLULAR SPIO ON T2 SIGNAL INTENSITY AND T2 MAP: COMPARISON WITH FREE SPIO

A. M. Rad, A. S. Arbab, J. Quan, H. Soltanian-Zadeh
Henry Ford Health System, Detroit, MI.

This purposes of this study were to compare the effects of intracellular ferumoxides (FE) to that of free FE on T2-weighted and T2*-weighted magnetic resonance imaging (MRI) and to make a phantom to quantify the number of cells per voxel. Glioma cells were labeled with FE-protamine sulfate complexes using 100µg/ml of FE and 5µg/ml of protamine sulfate. On average 5.8pg iron per cell was achieved. Labeled cells (from 3.75x103 to $2x10^6$) were put into tubes containing 1 ml of 4% gelatin, mixed thoroughly and quickly solidified. The amount of intracellular iron in tubes was from 4.25pg to 2.26ng/voxel, corresponded to 0.7 to 389 cells/voxel. Free FE ranging from 0 to 50µ were put into similar tubes. The amount of free FE in the tubes was from 0 to 9.73ng/voxel. Both T2 and T2*-weighted MR images were acquired using a 7T MR systems. The imaging parameters were for T2: TR=1000ms, TE=15,30,45,60,75,90,105,120ms, and for T2*: TR=450ms, TE=5,10,15,20,25,30,35,40ms, using matrix 128x128, field-of-view (FOV)= 40mm, voxel=0.1941 mm3. Signal intensities were calculated from both images and T2 map was created for all the tubes containing cells and free FE. When cell concentration reached 97 cells and above (0.5626ng of iron and above)/voxel, signal intensity of intracellular iron on T2-weighted images was lower than that of corresponding free FE. T2 maps of intracellular and free iron were different. These preliminary data would make a way to differentiate free iron from intracellular iron in cellular MRI.

No. 277

CONSTRUCTION AND VALIDATION OF CASPASE SENSOR VECTORS BY REPORTER GENE EXPRESSION

P. Ray, S. S. Gambhir
Molecular Imaging Program in Stanford (MIPS), Department of Radiology and Bio-X Program, Stanford University, Stanford, CA.

Objective: Caspases play central roles to initiate or execute apoptosis during normal development and in pathological conditions. We hereby report the development of caspase sensor vectors to detect caspase activation indirectly through reporter gene expression. These multimodality fusion