IS-26 Functional Mapping of Human Brain During Field Running with ^{18}F-FDG PET

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Our knowledge of the mental aspects during physical exercise has so far been very limited. We investigated effects of the field running on cerebral glucose metabolism using statistical analysis (SPM) of PET data obtained from eight healthy male Japanese volunteers who were requested to run "in the field" before and after injection of FDG, followed by PET examination.

Activated areas were found mainly in the visual cortex and somatosensory association cortex rather than the motor cortex. We conclude that brain consumes more energy in processing of visual inputs and spatial information of the outer world than in motor execution itself during the field running. It is suggested that the association cortices may play more important roles than we have imagined even in simple tasks in our daily life.

IS-27 EFFECT OF LASSEN'S LINEARIZATION WITH ^{99m}Tc-HMPAO AND ^{99m}Tc-ECD BRAIN SPECT.

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In 10 patients (Mean 62yrs), uncorrected and corrected HMPAO and ECD brain SPECT were compared with PET-rCBF using $C^{15}O_2$ with pixel by pixel base using an automatic three-dimensional adjustment with mutual information technique on Unix computer. Correlation coefficient between corrected HMPAO and PET-rCBF and between corrected ECD and PET-rCBF was 0.789±0.047(α=1.4) and 0.767±0.068 (α=2.1), respectively. There was a significant difference between uncorrected and corrected brain SPECT data with HMPAO ($p<0.0001$) and ECD($p<0.0001$)(paired t-test). We can conclude that Lassen's algorithm is useful for linearization with both HMPAO and ECD brain SPECT.

IS-28 Automated Image Registration (AIR) for computation of mean rCBF images of normal subjects.

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We aimed at preparation of mean rCBF image of normal subjects and calculation of relative uptake of Tc-99m HMPAO in various regions of brain after standardization of individual rCBF images with the help of Automated Image Registration (AIR) program.

Tc-99m HMPAO brain SPECT images and X-CT scans of 33 normal subjects (age 52.1±12.9 years) were acquired and normalized to average activity of 100 counts/pixel. Brain images were aligned and registered to standard size and shape with the help of AIR. Realigned brain SPECT images were used to evaluate regional RI uptake, bilateral asymmetry and intrasubject regional variations by ROI method. Mean and sd images were prepared using individual standardized images. This mean image was compared with another mean image prepared by Human Brain Atlas (HBA) standardization technique. Student t test was applied on voxel by voxel basis to generate three dimensional T-map.

There was statistically significant difference between two mean images in deep white matter, pons and occipito temporal regions. This finding may due to difference in samples and in protocol of data handling by AIR and HBA. Brain rCBF images standardized by AIR can be used for any kind of arithmetical analysis.