

Applied Quantum Medical Engineering



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We aim to contribute on future medicine by developing practical and efficient technologies and evaluation methodologies in the field of nuclear medicine (PET and SPECT) and related imaging modalities.



Quantification of physiological functions in human body

Quantification of functional imaging can be degraded by limited spatial resolution, incomplete processing, subject's motions and so on. To improve the quantification, we are developing methodologies for motion correction and image-processing.



Tracking subject's motions

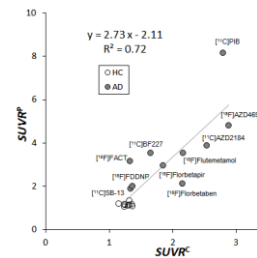
Development of robust algorithm for resolution recovery



Software of SFSRR

Computer-aided virtual clinical trial for efficient development of radioligands

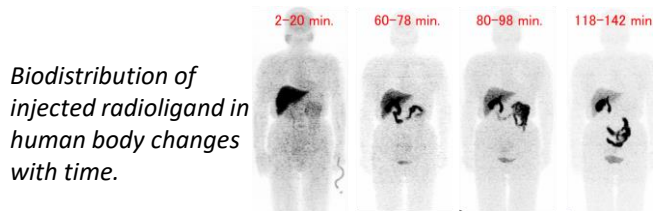
Computer-aided virtual clinical trial is a kind of simulation techniques for human body but its application have great potential as before having clinical trial in many ways. We try to develop the system for efficient development of radioligands.



Development of methodologies to predict outcome measures and its clinical impact of candidate compounds

Radiation dosimetry in both diagnostic and therapeutic purposes

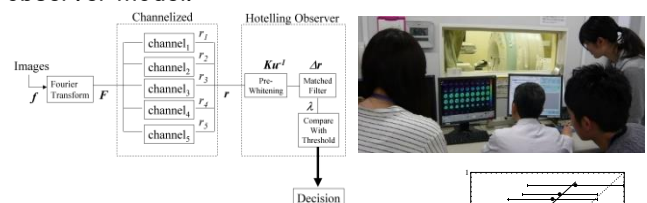
Internal radiation exposure in nuclear medicine is inevitable and have to be estimated for risk-benefit management. Human radiation dose suffered from nuclear medicine can be estimated from time-series measurement of the biodistribution of the injected radioligand. We aim to develop noninvasive methodologies further practical applications.



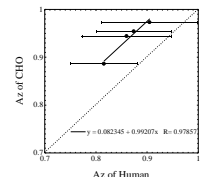
Biodistribution of injected radioligand in human body changes with time.

Numerical observer model for prediction of diagnostic ability in medical imaging

Lesion-detection ability is one of important diagnostic factors for medical imaging. We try to predict the impact of introducing new technologies by numerical observer model.



Prediction of the detection ability by numerical observed model (psychophysical approach based on theory of signal detection)



Research Topics

- Quantification of physiological functions in human body
- Computer-aided virtual clinical trial for efficient development of radioligands
- Numerical observer model for prediction of diagnostic ability in medical imaging
- Radiation dosimetry in both diagnostic and therapeutic purposes

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