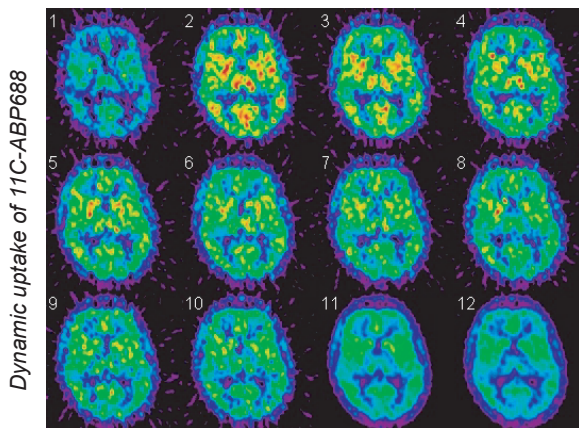


Tool for Pixel-wise Modeling

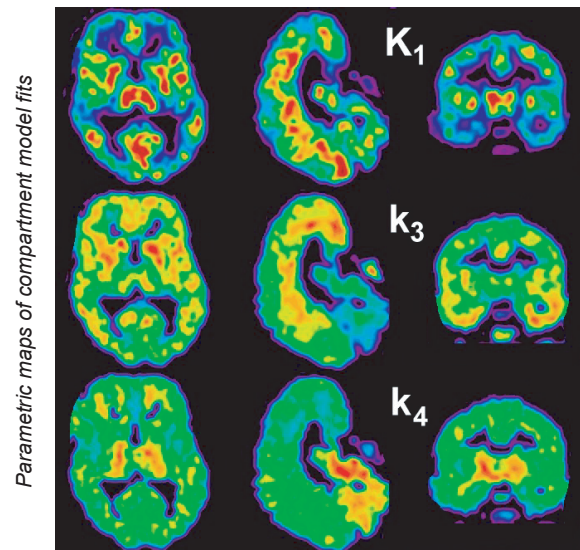
Absolute Function from Nuclear Medicine Data

Although called „functional“ images, reconstructed emission tomography images just represent the average tracer activity during the acquisition. This snapshot depends on several factors such as the injected dose, time after injection, and the tracer uptake parameters. Successful tracers have the property, that one main parameter is emphasized, while the other factors are less relevant for the image. Still, the images are only „functionally weighted“, but not in absolute units such as tissue perfusion in [ml/min/ccm tissue] and can not truly be compared across studies. However, if the tracer uptake is recorded with a suitable acquisition protocol, a model-based analysis can be performed in each image pixel. It results in a functional image showing one isolated tissue parameter. With the present PXMOD tool such functional images can efficiently be calculated with over 20 methodologies.



Supports Comprehensive and Intuitive Pixel-wise Data Analysis

After loading blood and dynamic image data, a pipeline of three processing stages is performed. First, externally sampled blood data undergoes some corrections such that afterwards it represents blood activity at the site of the analysis. Second, a model pre-processing step is performed which calculates quantities relevant for model evaluation in all pixels. Third, the selected model is applied to the time-activity vector in each pixel, and for each result parameter a functional image is formed. The results can be explored with an inspector which shows the time vector in parallel with the result parameters, and be saved in one of the many formats. In order to optimize reproducibility and throughput, standard processing protocols can be defined for certain study types.



Selected Models

- Patlak, Logan plots
- Time-weighted integral method
- Simplified reference model
- Ichise's reference models
- Logan's non-invasive model
- Glucose autoradiography
- Fractal analysis
- 2-Compartment model with K_1/k_2 constraint

Selected Applications

- rCBF from water PET studies
- MrGlu from FDG PET studies
- Binding potential and k_3/k_4 from neuro-receptor studies
- Distribution volume
- Correlation coefficients
- Regression analysis
- 2-Compartment model parameters