

# Trends in mMRI & MR-PET

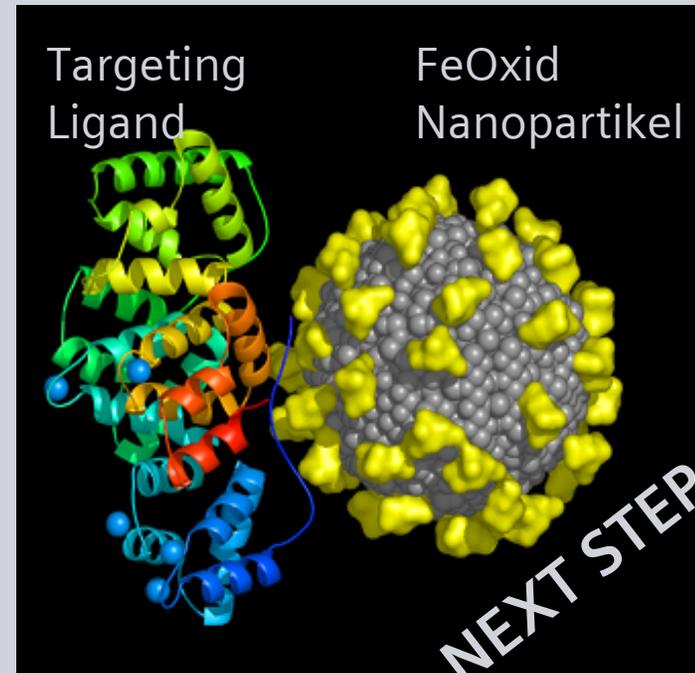
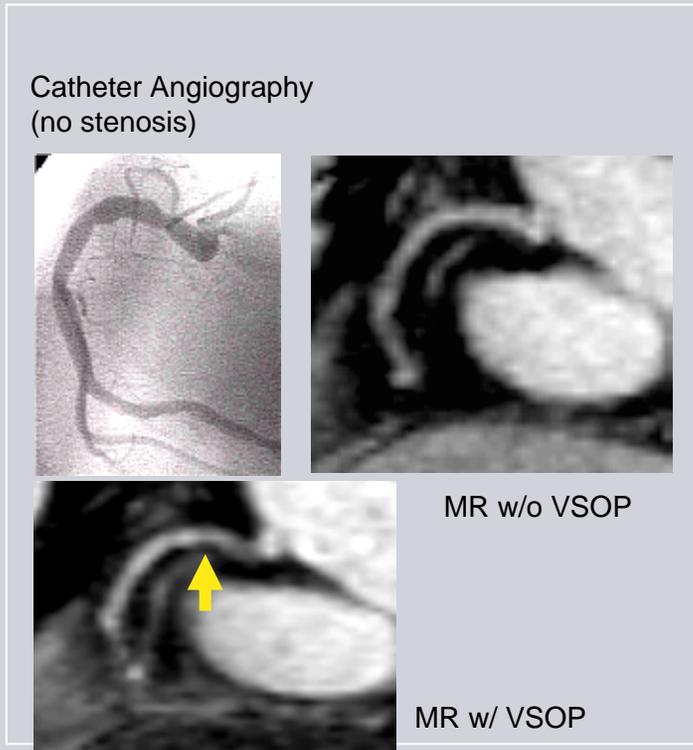
Robert Krieg

Bern, 26. Sept 08

# Trends on contrast agents

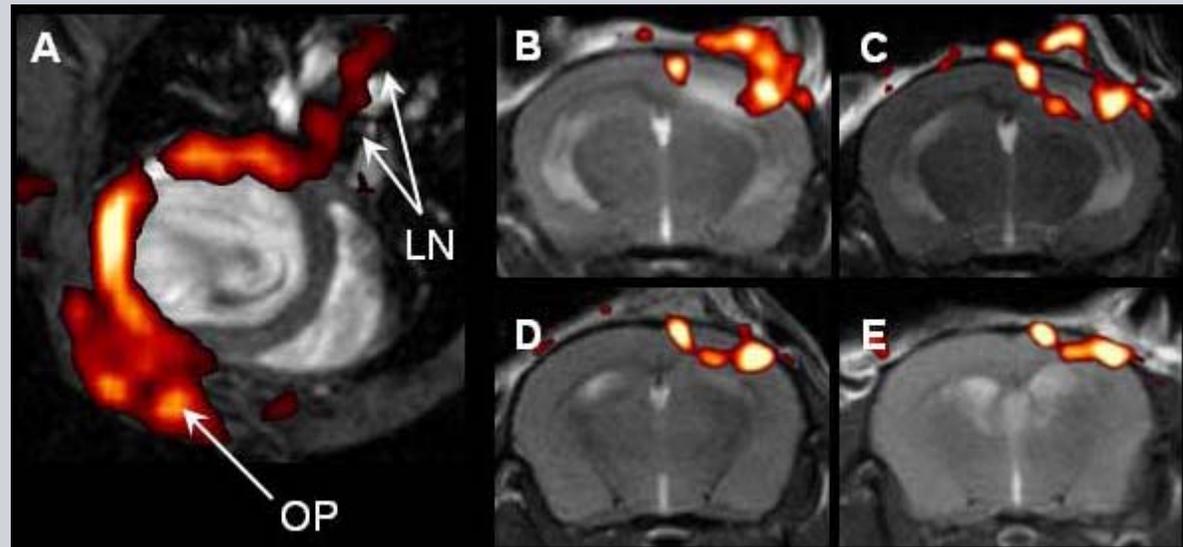
# Early Detection of Vulnerable Plaques With Citrate Coated VSOPs

- Need for new parameters to increase the predictive value of the Framingham score (inflammation in endothelium by MRI)
- In next Step these particles are functionalized



Courtesy of M. Taupitz & E. Schellenberger, Charité, Berlin

## Imaging of Inflammation with Perfluorocarbon



U. Flögel et al., Proc. Intl. Soc. Mag. Reson. Med. 15 (2007)

- After induction of myocardial or cerebral ischemia a transient F19 signal can be detected due increased macrophage activity.
- B) – E) in 7,9,12,19 days after infarction
- Allows false colour contrast overlay

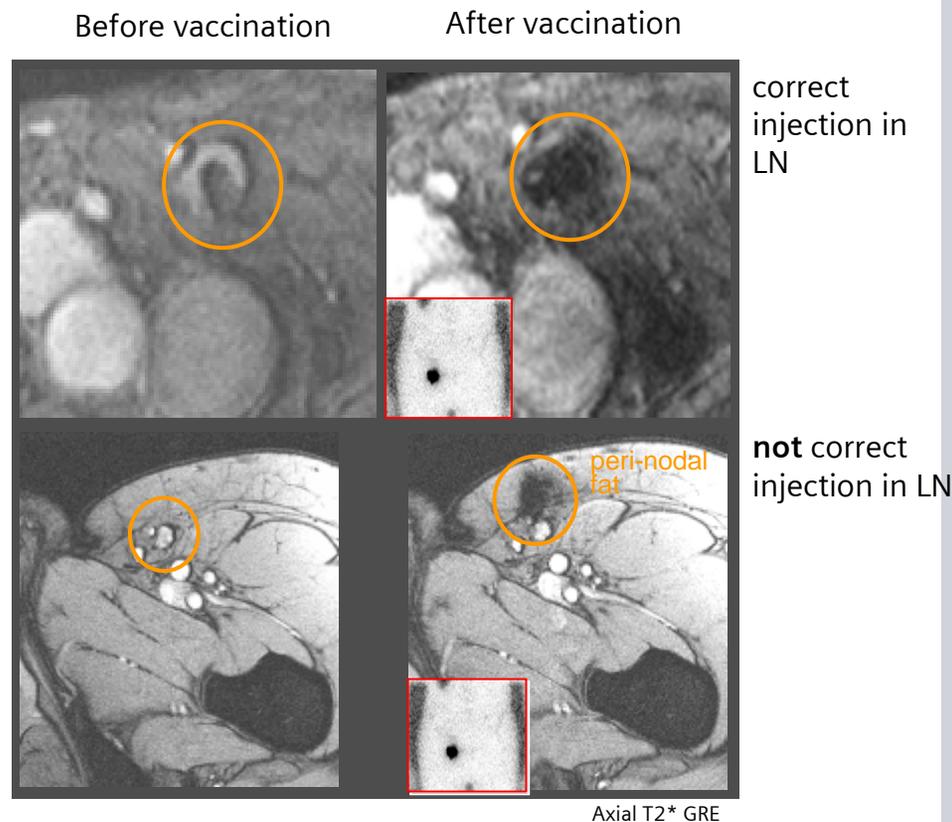
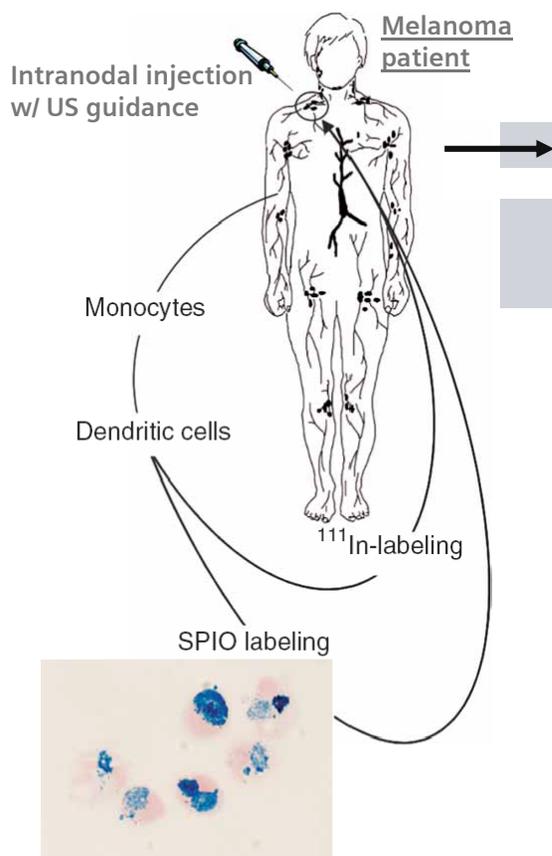
# Theranostics



# Tim TRIO for Monitoring of Cellular Therapy

Courtesy of Jelle Barentsz, Nijmegen

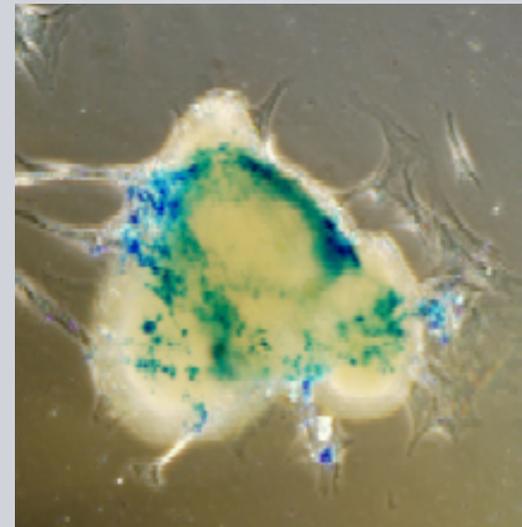
**Dendritic cell therapy:** delivery of cells to regional LN is essential for effective stimulation of the IS



Tim Trio is at least as sensitive as scintigraphy for the detection of DC migration in vivo  
(Scintigraphy:  $7.5 \times 10^6$  cells, 3T:  $10^5$  cells)

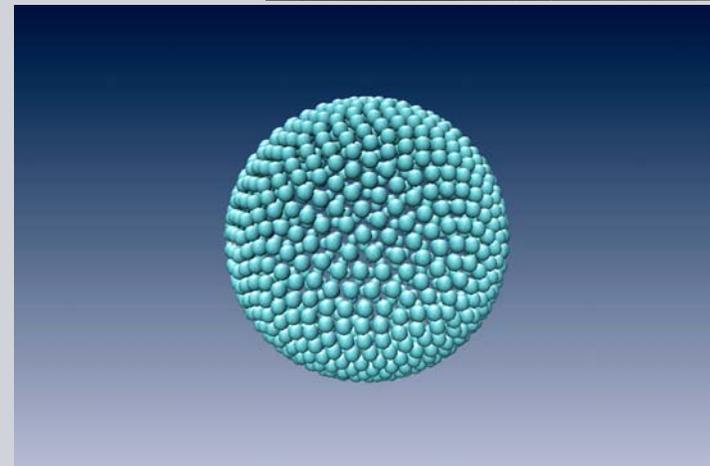
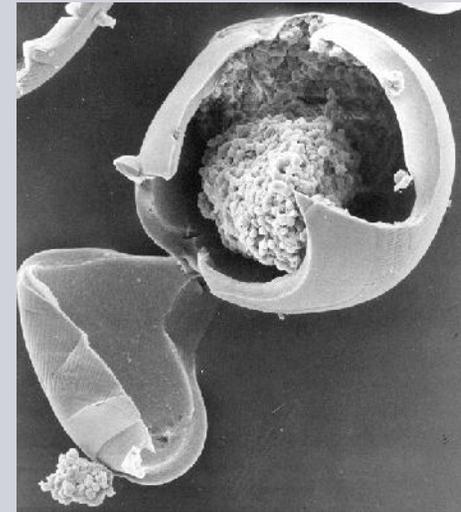
## Downsides of today's labelling techniques

- Non Uniform labeling
- Transient Changes in Gene Expression
- Can Inhibit Cellular Differentiation



## Alternative Approaches

- Provides scaffold of capsule labeling
- Selective Permeability
  - Blocks Antibody
  - Allow Insulin Secretion
  - Could allow gradual drug release

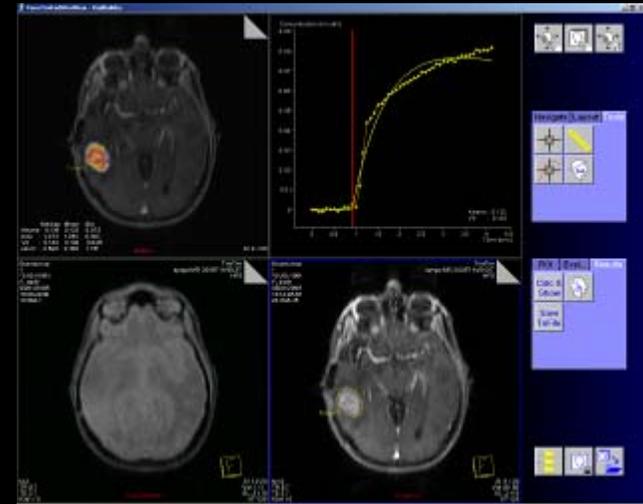
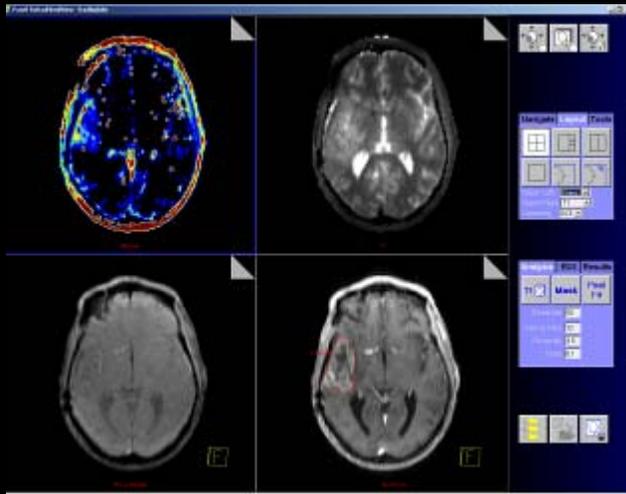


MR is becoming molecular

MR & PET are complementary

# Drug Therapy Monitoring with DCE - MRI

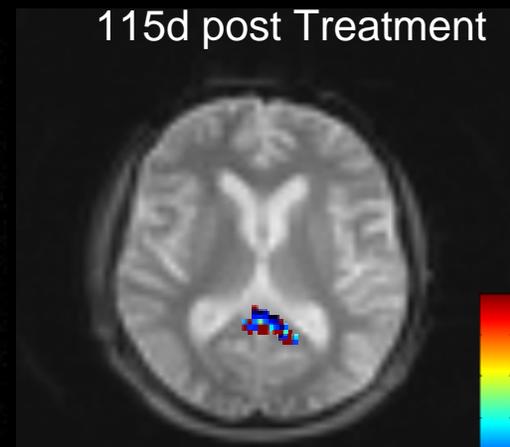
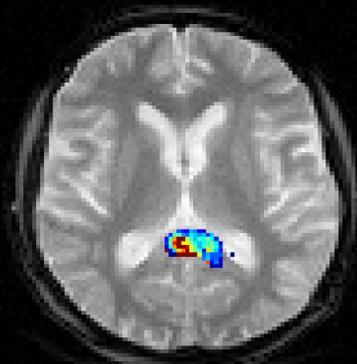
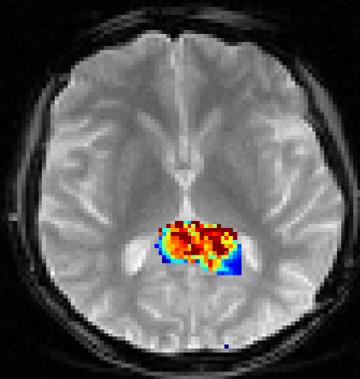
PostProcessing SW Package for k-Trans evaluation



Before Treatment

21d post Treatment

115d post Treatment



Courtesy of Prof. J. Hennig, MRDAC, University Hospital Freiburg

Intutions

# MR-PET: Combining Best of Both World's

**SIEMENS**

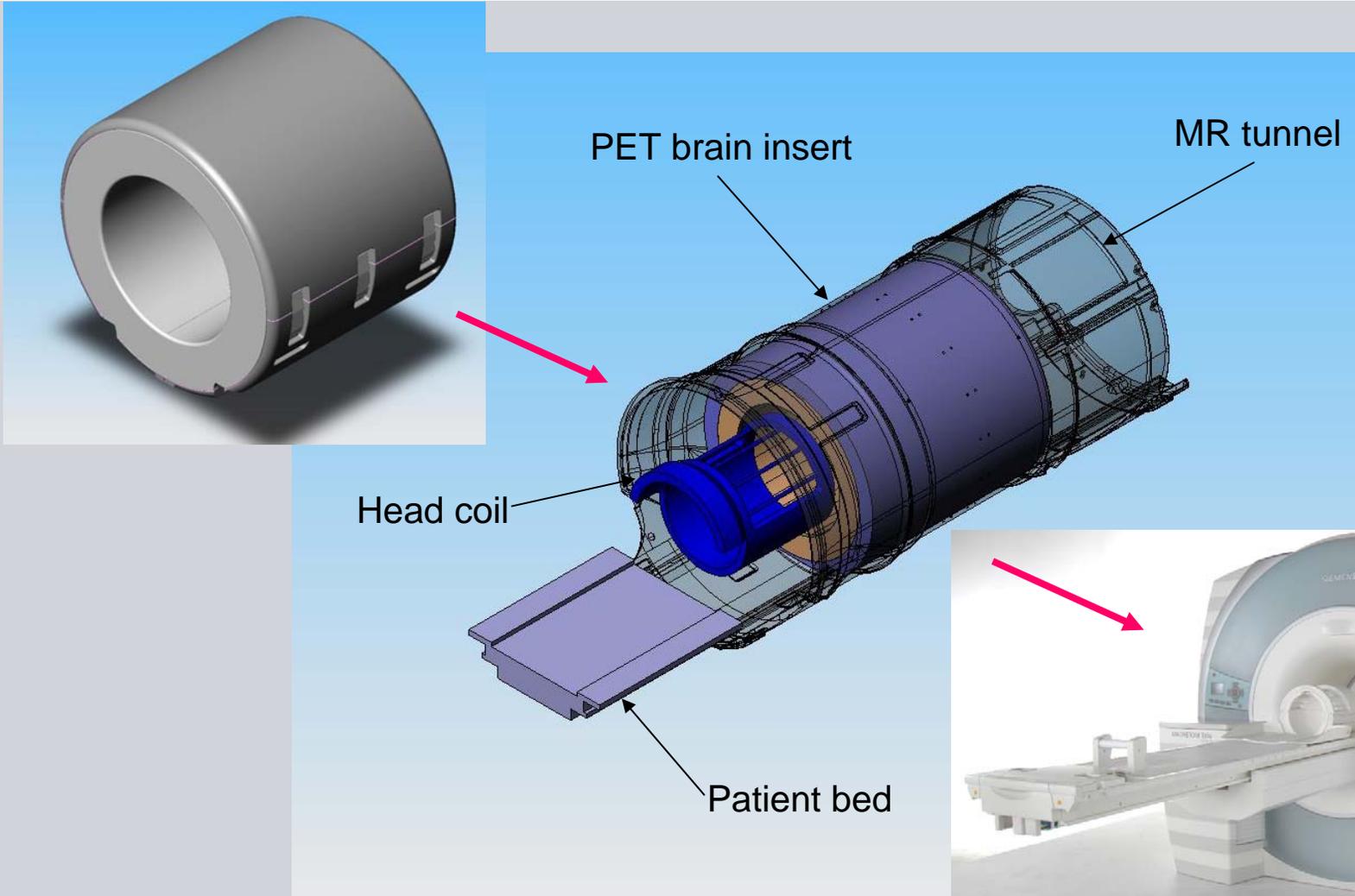
## Benefits

- Simultaneous, Isovolume measurements
- Retrospective Motion Correction for PET by MR Navigator techniques
- Complementary molecular information within single examination
- Analysis of flow dependent kinetics
- Development and evaluation of cell therapy



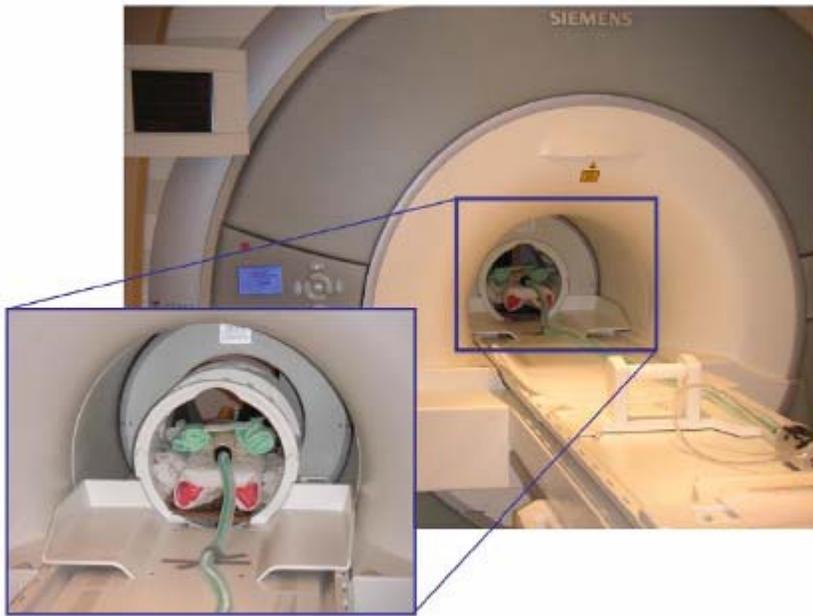
How ?

## Prototype design – MR/PET scanner



## 2 Installations of BrainPET in clinical environment

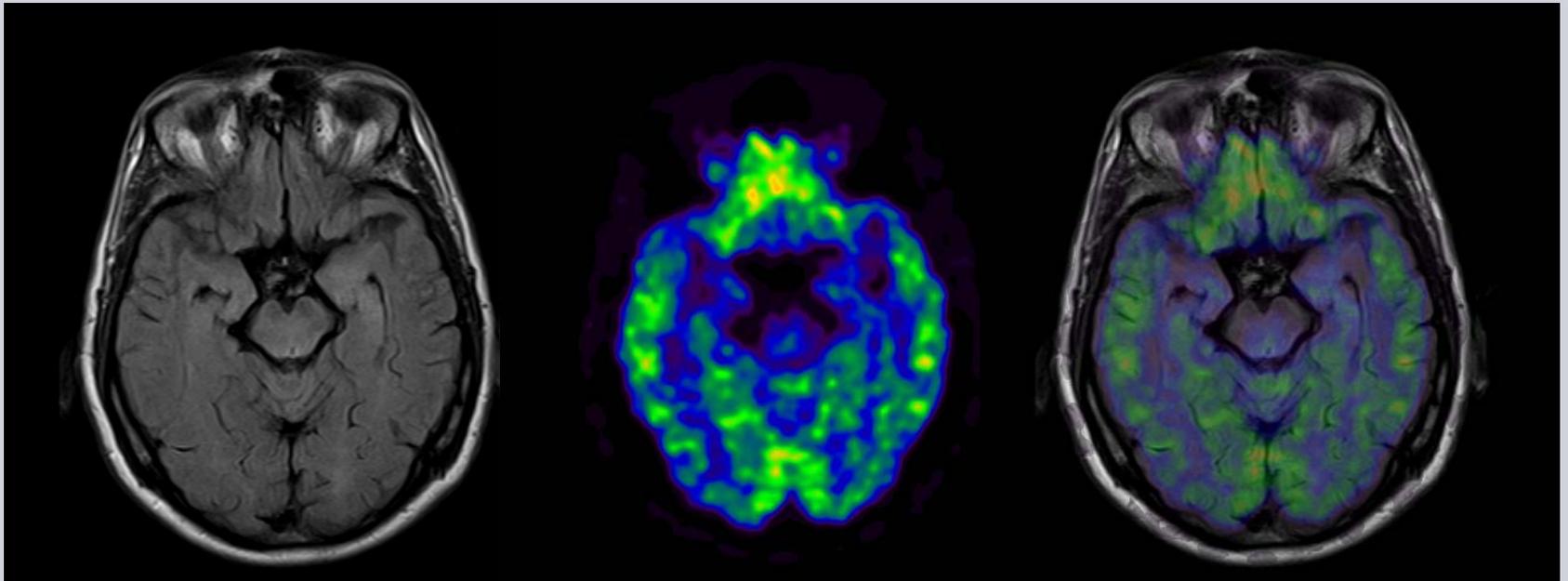
Eberhard Karls Univ. Tübingen



Massachusetts General Hospital



## Recent BrainPET Images



In press: J. Abdominal Imaging

**Perspective applications of a combined MR/PET system**

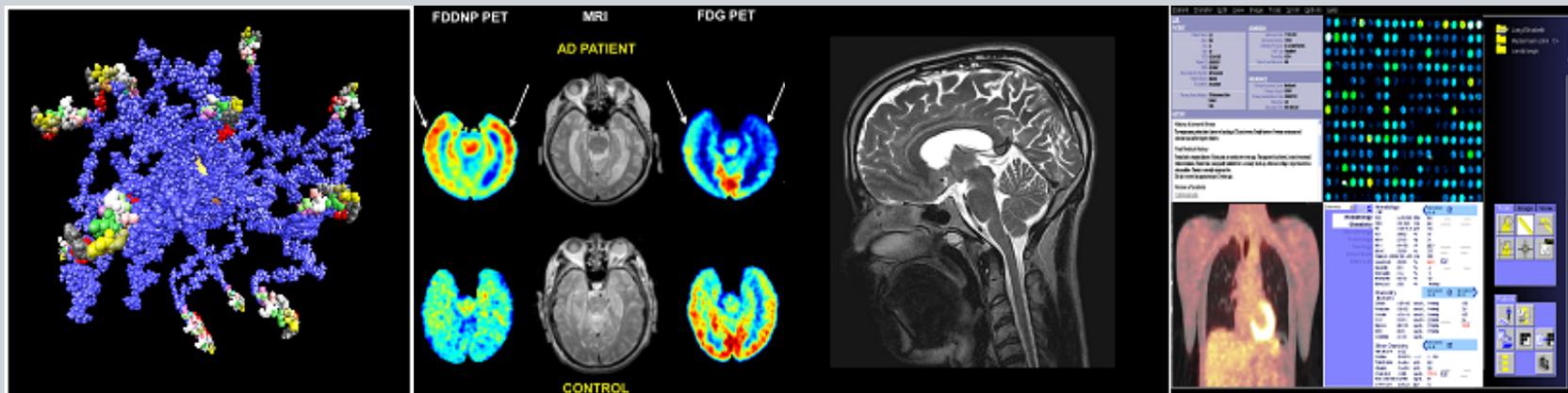
H.P. Schlemmer, B. Pichler, R. Krieg, W.D. Heiss

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Thank You !!